Climate Outlook for 2020

This work is a publication of NOCC, whose production was made possible, thanks to the collaboration of the Regional and Divisional Delegates of the Ministry of the Environment, Nature Protection and Sustainable Development, who have on most occasions promptly furnished us with information, on recorded impacts resulting from climate perturbations throughout the national territory

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PREAMBLE

Since the year 1992 at the Rio de Janeiro Summit, Cameroon has been strongly committed to participate as an international community in addressing the impacts of climate change to ensure sustainable economic and social development for the present generations without compromising that of the future generations.

With this approach and its socio-economic development process, Cameroon is fulfilling its commitments to addressing climate change. This is done through; the publication of its national communications (2004 and 2015); the development of a National Climate Change Adaptation Plan (NCCAP, 2015); the restoration of degraded ecosystems through operation "Green Sahel"; the submission of its National Determined Contribution (NDC-2015) and the ratification of the Paris Agreement on climate change (2016).

Indeed, at the United Nations Rostrum, the President of the Republic mentioned: *"Concerning climate change, Africa, like other continents, is severely experiencing its effects, though its participation in the emission of greenhouse gases remains low. Global warming, which is the most striking fact, has consequences in some socio-economic sectors, notably energy, health, agriculture, livestock, and ecosystems, not to mention rampant desertification"* (H.E. Paul Biya, 2009).

To translate this will into action, the Head of State, His Excellency Paul BIYA, from the United Nations rostrum in 2007, announced the creation of a National Observatory on Climate Change (NOCC). NOCC was effectively created on December 10, 2009, by Decree No. 2009/410 on its creation, organization, and functioning of the National Observatory on Climate Change, then reorganized by Decree No. 2019/026 of January 18, 2019, establishing it as a Directorate General and giving it a scientific and technical status.

The urgency of taking into account the issue of climate change in the socio-economic development process in Cameroon, as highlighted by the Head of State, requires regular and accurate monitoring of the spatial and temporal dynamics (daily, monthly, seasonal and annual) of climatic parameters, to have timely information on the evolution and their influence on socio-economic activities, to contribute to the resilience of the national economy to climate change as intended by the National Development Strategy 2030 (MINEPAT, 2020), a vision to which this document entitled *"Climate Report 2020"* applies.

This document is a tool for scientific and technical reference, that provides comprehensive information on the evolution of climatic parameters throughout the national territory in 2020,

compared to the historical reference period of 1979 to 2019. In addition to the spatial and temporal dynamics of climatic parameters (rainfall and temperature), it highlights the salient climate facts recorded in the various socio-economic development sectors of Cameroon, due to the extreme climatic situations observed during the year 2020.

It is therefore imperative to thank all international institutions working in the field of climate prediction in the world, notably: The International Research Institute for Climate and Society (IRI), the University of Colombia (USA), the National Oceanic and Atmospheric Administration (NOAA) (USA), AccuWeather (American Institution specialized in weather forecasting) (USA), the African Center for Meteorological Applications for Development (ACMAD), as well as the National Meteorological Department (DMN), for their willingness to share data and information, which was indispensable for the elaboration of the 2020 Climate Report of Cameroon.

All other stakeholders who contributed to the realization and completion of this document are duly acknowledged.

The Minister of Environment, Nature Protection and Sustainable Development

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ABSTRACT

Over the previous dekads, experts gathered an increasing amount of evidence that demonstrates the extent of the Earth's climate change and the role human activities play in it. This warning enabled international, regional, and national organizations to establish programs aimed at assessing and managing the effects of climate change. In this context and concerning the missions assigned, NOCC produced the 2020 annual climatic outlook, which aimed at assessing the climatic situation this year, comparing the results with the intra-seasonal forecasts made, and then reiterating the impacts, risks, and threats observed at the national level, and propose appropriate adaptation strategies to decision-makers and public authorities.

The 2020 Climatic Outlook is based on data collected from more than 70 spatial meteorological stations, international meteorological and climatological research centers, notably the National Meteorological Department for Cameroon, AccuWeather, NASA, NOAA, Canadian Space Agency, etc. the temperature and precipitation data results from daily observations of climatic parameters according to their trend and historical values.

The controversy surrounding the issue of climate uncertainty is now a fruitless debate. According to the annual draft report of the World Meteorological Organization (WMO) on the state of the world climate, the ending dekad will be the warmest ever observed, as well as the past six years since 2015. In the same light, the various publications of the major international centers unanimously agreed on the assertion that 2020 will be the second hottest year, after 2016 and before 2019. With a global average temperature between January and October of about 1.2°C higher. The WMO further emphasizes the fact that the global average temperature reached 14.9°C in 2020, which is 1.2°C (± 0.1°C) above its pre-industrial value (period 1850-1900). Thus, it states, *"Recorded warm years have generally coincided with a strong* El Niño *event, as was the case in 2016.* La Niña *tends to cool global temperatures, but the anomaly that appeared this year was not enough to slow the warming."*

The realities experienced over recent years show the effectiveness of climate change in Cameroon through the dynamics and variability of climatic parameters (rainfall and temperature) in 2020 compared to the historical period 1979-2019. The year 2020 is characterized by an early onset of rainfall from the first dekad of January, interspersed with

periods of breaks between 05 and 08 days. The results indicate that the cumulative rainfall in 2020 is very significant compared to the decadal rainfall (2009-2019) with an average volume of 2700.6mm against 1749.1mm on the national scale. With regards to the number of rainy days, the year 2020 sums 236 days of average rainfall, against 229 days for the period 2009-2019.

The analysis of rainfall intensity in 2020 reveals that eleven months out of twelve had a positive trend in terms of rainfall intensity, some of them will double the values of historical intensities. From January to December, except February, we observe 4.1mm/day in January, 0.6mm/day in March, 2.1mm/day in April, 3.4mm/day in May, 6.5mm/day in June, 8.7mm/day in July, 3.5mm/day in August, 10.8mm/day in September, 5.1mm/day in October, 0.5mm/day in November and 3.8mm/day in December. The heterogeneity of the intensity observed from one month to another is simply expressed by the difference in rainfall amounts recorded around these different months. The difference recorded provides information on the average additional or lesser volume observed per month during this year compared to the historical volume.

The interannual classification by order of the wettest months in 2020 compared to the historical period indicates that March, April, and May recorded the most significant rainfall amounts compared to other years of the dekad, and therefore take the first rank with 185.7mm, 221.7mm and 342.3mm of rain respectively. The months of June, July, August, and September 2020 occupy the second rank on the classification scale with 979.9mm, 482.9mm, 282.7mm, and 506.9mm respectively compared to previous years. The months of October, November, and December are ranked third with 315.2mm, 98.9mm, and 18.2mm respectively. Concerning January and February, they come in last i.e, 5th and 9th respectively with 9.2mm for January and 20.4mm for February thus indicating that February is one of the least rainy months in 2020 compared to February of the past ten years.

The consistency of reports from various international climate prediction centers on the temperature situation in 2020 raises awareness of the increase in average temperatures. The temperature data studied at the national level reveals a trend of increasing average temperatures around 1.2°C compared to the historical period 1991-2019, or an inter-annual increase of about 0.9°C. The average annual temperature in 2020 is around 25.7°C. The highest average temperature was recorded in March, being 27.8°C, while the lowest average temperature recorded in July is around 24.1°C. Over the 28 years observed, it was noticed that the deviations from the average temperature in 2020 compared to the period 1991-2020 vary considerably. For we observed an average variation of 0.8°C for the lowest deviations from the average,

especially in December, to 1.7°C for the most significant deviations from the average, especially in March, indicating that March 2020 was the hottest month of the year.

The variation in minimum temperatures between 1991-2020 generally shows a decreasing trend on an annual scale. However, the year 2020, compared to the period 1991-2019, shows a slight trend of increasing minimum temperatures. Significant positive deviations from the mean are observed in March (2.1°C), April (2.7°C) and May (2.5°C) while negative deviations from the mean are observed in November (0.1°C) December (2.3°C) and January (1.5°C). On an annual scale, the average minimum temperature in 2020 is around 20.4°C compared to 19.7°C for the period 1991-2019, thus an average increase of 0.7°C.

The profile of maximum temperatures in 2020 compared to that of historical temperatures reveals an increasing trend in the said temperatures. The significant positive deviations from the average reflect a strong increase in maximum temperatures over the 28 years of observation range between November and May, with very significant peaks in February and March, which indicates 4.2°C for February and 4.5°C for March respectively. Negative deviations from the average are noticeable between July and September, reflecting a slight decrease in maximum temperatures. This inflection varies between -0.7°C and -1.6°C. It should be noted that this decrease is justified by the position of the Intertropical Front which during this period lies over Lake Chad, allowing the monsoon winds to blow over the entire national territory. Moreover, the analysis reveals that the average temperature is around 31.1°C, against 29.3°C, i.e. an increase of about 1.7°C.

The increasing temperatures or any change in climatic parameters would only induce impacts on the environment and socio-economic activities. Nonetheless, "sectors" such as agriculture, forestry, ecosystems, infrastructure, fisheries, water management, tourism, energy production and demand, are more vulnerable to climate change given the frequency of adverse events induced by climate change at the national level. Of note is the fact that in its operational memoranda, NOCC has produced 36 forecast and decadal warning bulletins during this year whose objective was to enhance the accuracy of the 04 seasonal forecast bulletins produced for the same year.

These documents are produced for forecast purposes so as to assess the climatic dynamics at a fine spatiotemporal scale; anticipate the risks and potential impacts that affect the various socio-economic development sectors in Cameroon. Unfortunately, the impacts predicted by the Observatory are often accompanied by significant damages, necessitating considerable deployment of financial resources for the rehabilitation and reconstruction of infrastructures

affected by climate change, or the compensation of people whose property were highly affected. This document is therefore in line with the National Development Strategy 2030, which advocates for the consideration of climate change in planning developmental activities, and the resilience to current and future climate change impacts.

PART: 1

GENERAL ASSESSMENT OF THE CLIMATIC SITUATION FOR THE YEAR 2020

1. GENERAL CLIMATE SITUATION FOR THE YEAR 2020

1.1 GLOBAL CLIMATE CONTEXT FOR THE YEAR

According to the World Meteorological Organization's (WMO) annual draft report on the state of the world's climate, the outgoing dekad will be the warmest ever recorded, as well as the past six years since 2015. According to forecast data, 2020 is the second warmest year after 2016, with the global average temperature of about 1.2°C between January and October. The same institution reports that the global average temperature reached 14.9°C in 2020, which is 1.2°C (± 0.1°C) warmer than its pre-industrial value (period 1850-1900). She adds, *"Years of recorded warmth have usually coincided with a strong El Niño event, as was the case in 2016. La Niña tends to cool global temperatures, but this year's anomaly was not enough to stop the warming"*.

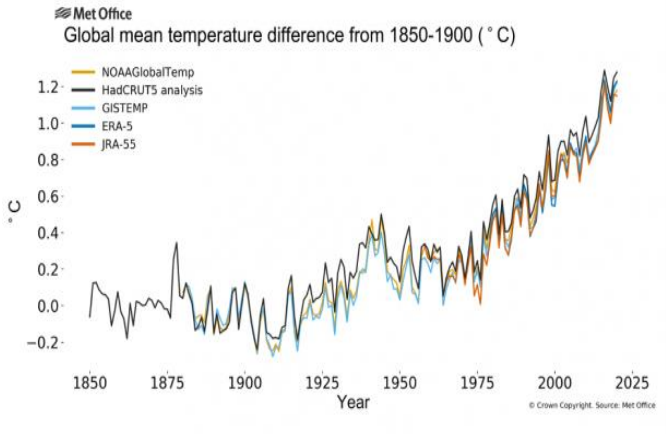


Figure 1: Global average temperature trends from 1850 to 2025. (WMO, 2021)

NASA affirms that climate change is progressing at an alarming rate, destroying livelihoods and lives worldwide. With temperatures reaching a record of 1.2 degrees Celsius in 2020, we are already perceiving unusual extreme weather events in every region and on all continents. We are heading towards a catastrophic preceding increase of 3 to 5 degrees during the XXIst century.

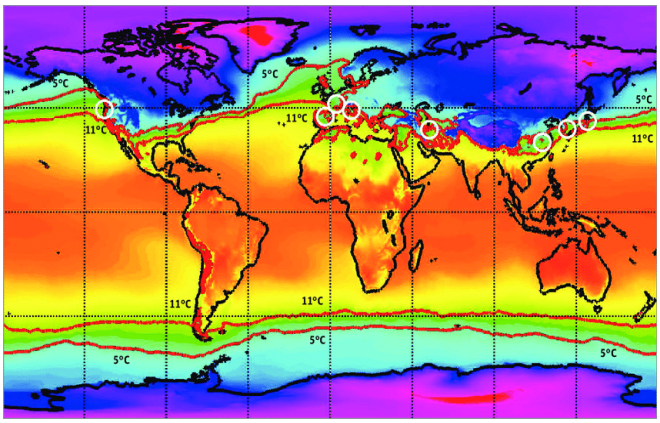


Figure 2: Global average temperature from 1850 to 2020. Source; NASA, 2021

According to the European Union's Copernicus Maritime Monitoring Service, the global average sea level has risen considerably. This rise has been rapid, partially due to the accelerated melting of the Greenland and Antarctic ice sheets. A slight decrease in the global average sea level was recorded during 2020 summer. This is likely to be linked to the onset of La Niña.

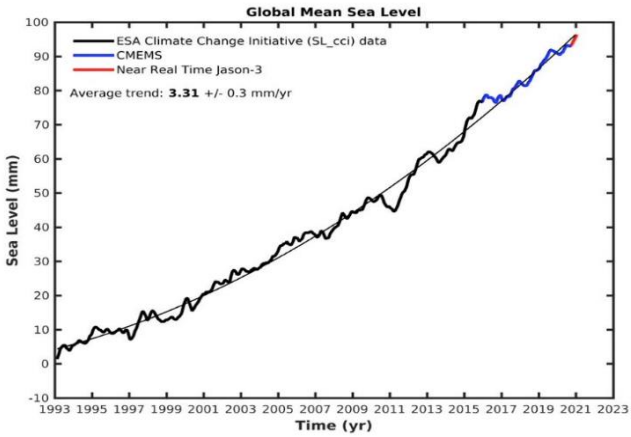


Figure 3: Scenario of average sea level rise from 1993 to 2023. Source; Copernicus, 2021

Long-term climatic trends remain alarming. Marked by extreme events (extreme heat, wildfires, floods, increasing ocean acidity, seasonal Atlantic hurricane, etc.), climate change has continued its inexorable progress this year, with significant human, economic, environmental and health damage on a global scale. Hence, the effects of climate change that are already being felt today from global to local levels represent a potentially catastrophic risk, given the future projections made by the major international climate and disaster risk prediction centres.

1.2 CLIMATIC SITUATION OF CAMEROON FOR THE YEAR 2020

The controversy that once surrounded the issue of climate uncertainty is now a fruitless debate. The realities experienced over the past few years bear witness to the fact that climate change in Cameroon is effective in terms of the dynamics and variability of climatic parameters (rainfall and temperature) in 2020 compared to the historical period 1979-2019.

Characterized by a transitional phase between the waning of the El-Niño episode in March 2017 and the formation of the La Niña episode in the South Pacific in September 2020, the year 2020 rather presents an unusual rainfall situation compared to the previous years.

1.2.1 Evolution of average monthly rainfall and number of rainy days in 2020 compared to the historical period 2009-2019

The year 2020 was characterised by the early onset of precipitation from the first dekad of January, but interspersed with periods of breaks of between 5 and 8 days. Table 1 and figures (4) and (5) below highlight the evolution of rainfall amounts in 2020 compared to the 2009-2019 dekad, as well as the evolution of the number of rainy days during the said period. The figures show that the cumulative rainfall in 2020 was very high compared to the dekadal rainfall, with an average volume of 2,700.66mm compared to 1,749.19mm on the national scale. In terms of the number of rainy days, the year 2020 had an average of 236 rainy days, compared to 229 days for the period 2009-2019.

Table 1: Monthly evolution of the number of rainy days in 2020 compared to the decade 2009-2019

Mois	Avg His Nº of rainy days(2009-2020)	Real Avg Nº of rainy days 2020	Avg Diff of rainy days
January	7	6	1
February	10	3	7
March	17	17	0
April	21	24	3
May	24	27	3
June	24	28	4
July	26	30	4
August	27	27	0
September	26	29	4
October	25	26	2
November	15	13	2
December	7	6	1

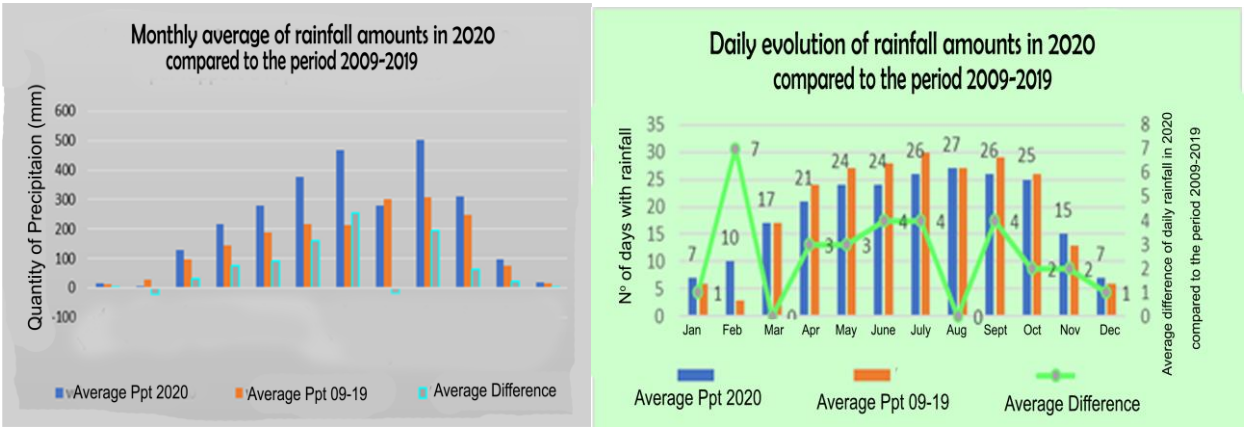


Figure 4: Monthly evolution of rainfall amounts in 2020 compared to the period 2009-2019

1.2.2 Analyses of rainfall intensity in 2020 compared to the period 2009-2019

Considered as the report of rainfall amounts over time, the rainfall intensity in 2020 shows a real fluctuation from one month to another. Thus, table 2 and figure 5 show that during this year, eleven out of twelve months maintained a positive trend in terms of rainfall intensity, some of them doubled the values of historical intensities. From January to December, with the exception of February, we observe 4.06mm/day in January, 0.69mm/day in March, 2.19mm/day in April, 3.47mm/day in May, 6.54mm/day in June, 8.70mm/day in July, 3.50mm/day in August, 10.8mm/day in September, 5.08mm/day in October, 0.51mm/day in November and 3.85mm/day in December respectively. The heterogeneity of intensity observed from one month to another is simply explained by the difference in rainfall amounts recorded around these different months. The difference recorded provides information on the average additional or lesser volume observed per month during this year compared to the historical volume.

Table 2: Rainfall characteristics in 2020 compared to the decade 2009-2019

Month	Avg-vol-pptn 2009-2019	Hist N° of rainy days	Hist Intensity - pptn	Avg-vol-pptn 2020	N°-RD	Intensity-pptn-2020	Avg Diff Nbd
January	13.85	7	2.00	17.01	6	3.00	1
February	27.38	10	3.00	6.3	3	2.00	-1
March	97.57	17	6.00	128.9	17	8.00	2
April	144.27	21	7.00	218.02	24	9.00	2
May	187.31	24	8.00	279.61	27	10.00	2
June	216.92	24	9.00	376.15	28	13.00	4
July	214.21	26	8.00	467.61	30	16.00	8
August	300	27	11.00	280.4	27	10.00	-1
September	307.71	26	12.00	500.9	29	17.00	5
October	248.77	25	10.00	311.3	26	12.00	2
November	74.52	15	5.00	96.21	13	7.00	2
December	16.68	7	2.00	18.25	6	3.00	1

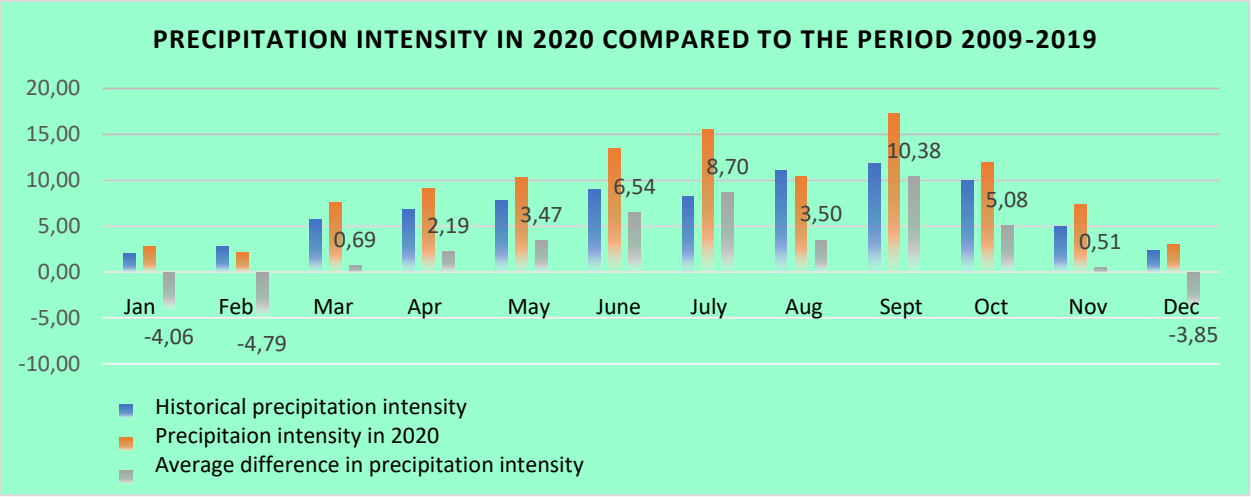


Figure 5: Monthly evolution of rainfall intensity in 2020 compared to the period 2009-2019

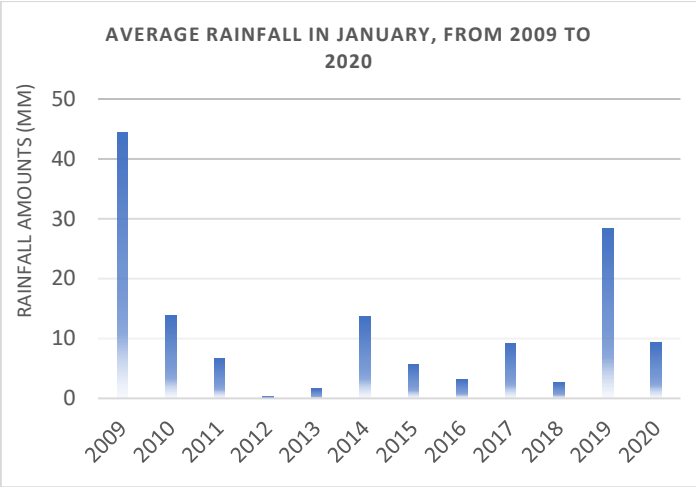
1.2.4 Interannual classification of the wettest months from 2009 to 2020

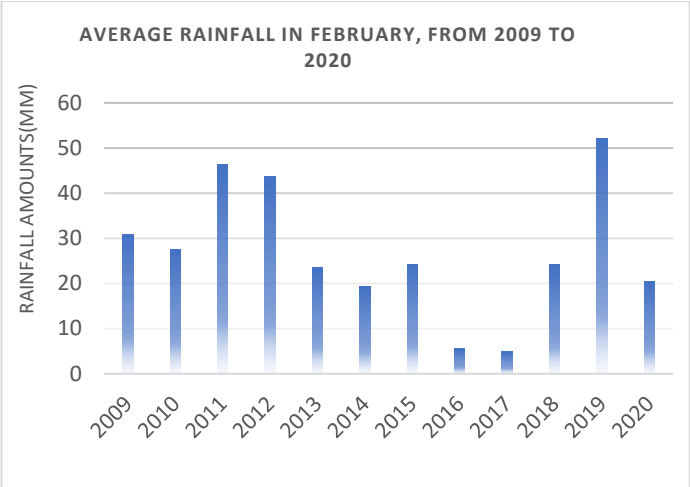
Table 3 highlights four sets of values, each of which expresses the rank of the months of 2020 in relation to their respective rank over the period 2009-2019 as follows:

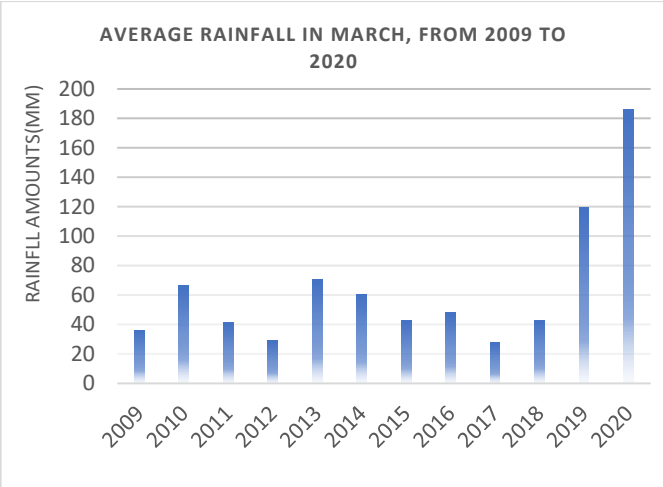
- For January 2009 to 2020: January 2020 ranks 5th with an average rainfall volume of 9.28mm;
- For February 2009 to 2020; February 2020 ranks 9th with an average rainfall of 20.49mm. February was also one of the least rainy months of the decade;
- For March, April, and May 2009 to 2020: these three months ranked 1st in 2020 with an average rainfall of 185.73mm, 221.74mm and 342.31mm respectively;
- For June, July, August and September 2009 to 2020: these four months ranked 2nd in 2020 with an average rainfall of 379.99mm, 482.98mm 282.76mm and 506.97mm respectively;
- For October, November and December 2009 to 2020: these three months ranked 3rd in 2020 with an average rainfall of 315.29mm, 98.96mm and 18.26mm respectively.

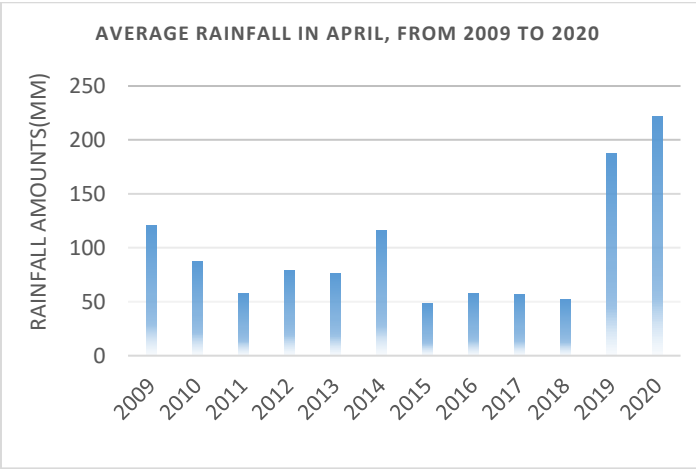
Table 3: Precipitation amounts per month and corresponding rank compared to the decadal values recorded between 2009-2019.

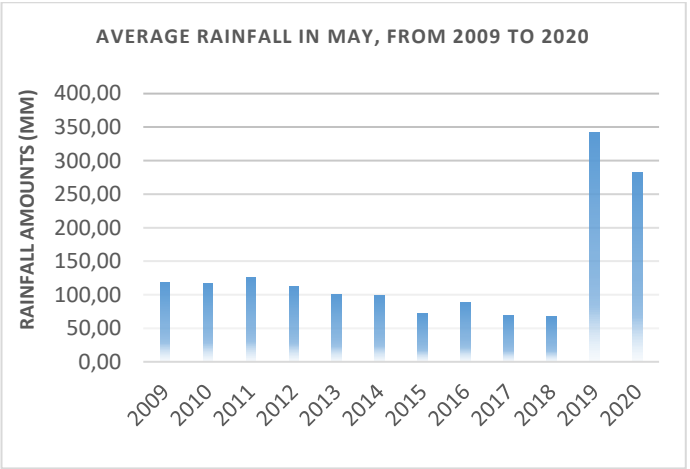
Months from 2009 to 2020	Avg Volume for pptn (mm) in 2020	Classification for the 12 past years
January	9.28	5th
February	20.49	9th
March	185.73	1st
April	221.74	1st
May	342.31	1st
June	379.99	2nd
July	482.98	2nd
August	282.76	2nd
September	506.97	2nd
October	315.29	3rd
November	98.96	3rd
December	18.26	3rd

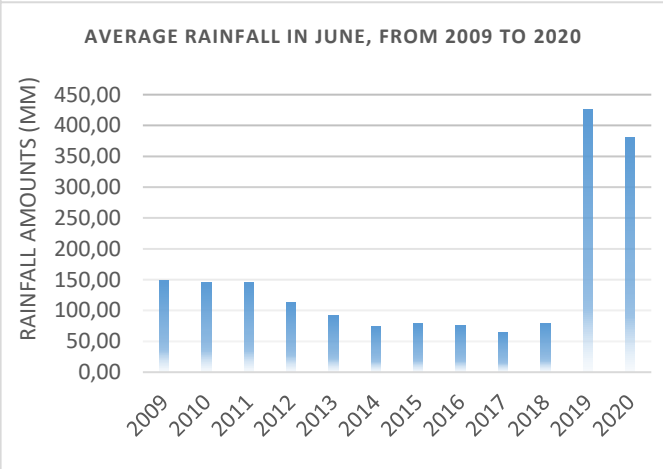

AVERAGE RAINFALL IN JANUARY, FROM 2009 TO 2020
RAINFALL AMOUNTS (MM)
50
40
30
20
10
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


AVERAGE RAINFALL IN FEBRUARY, FROM 2009 TO 2020
RAINFALL AMOUNTS(MM)
60
50
40
30
20
10
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


AVERAGE RAINFALL IN MARCH, FROM 2009 TO 2020
RAINFLL AMOUNTS(MM)
200
180
160
140
120
100
80
60
40
20
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


AVERAGE RAINFALL IN APRIL, FROM 2009 TO 2020
RAINFALL AMOUNTS(MM)
250
200
150
100
50
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


AVERAGE RAINFALL IN MAY, FROM 2009 TO 2020
RAINFALL AMOUNTS (MM)
400,00
350,00
300,00
250,00
200,00
150,00
100,00
50,00
0,00
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


AVERAGE RAINFALL IN JUNE, FROM 2009 TO 2020
RAINFALL AMOUNTS (MM)
450,00
400,00
350,00
300,00
250,00
200,00
150,00
100,00
50,00
0,00
2009
2010
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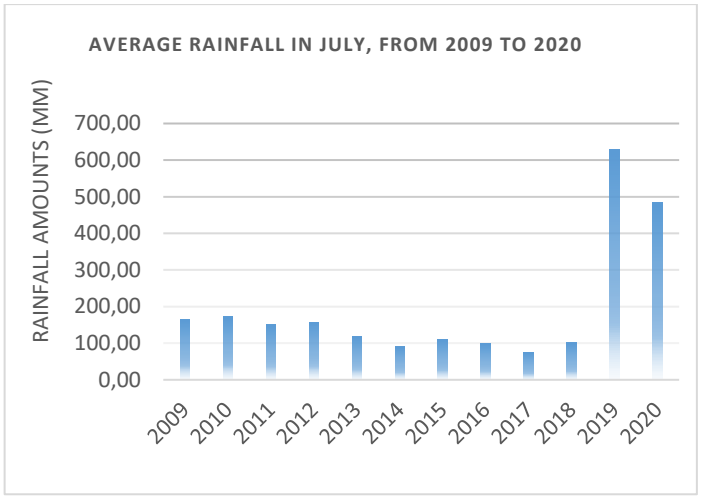
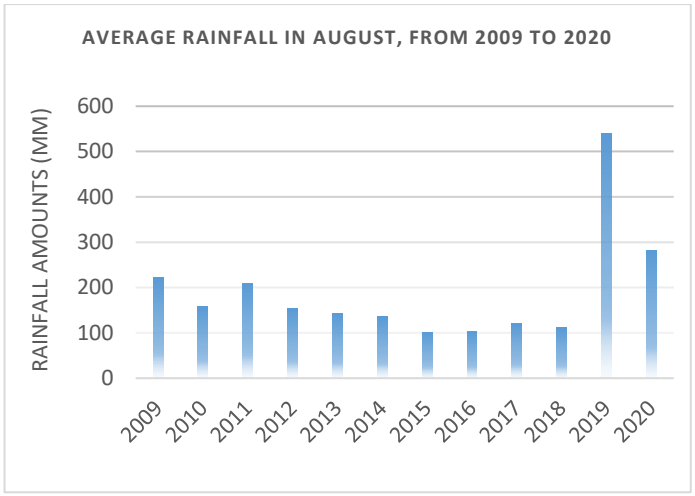
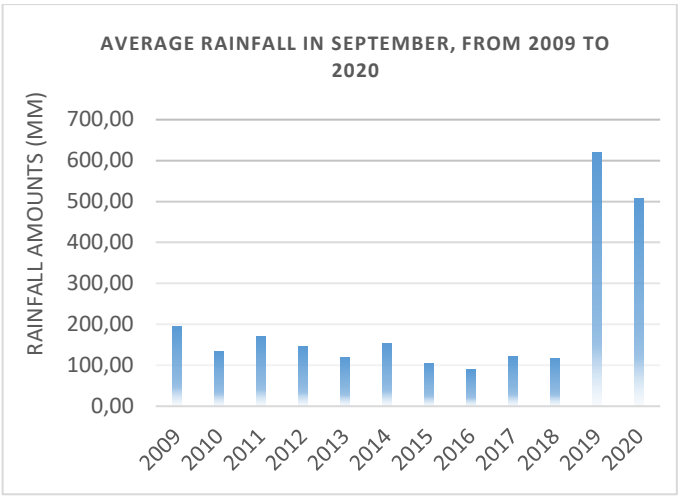
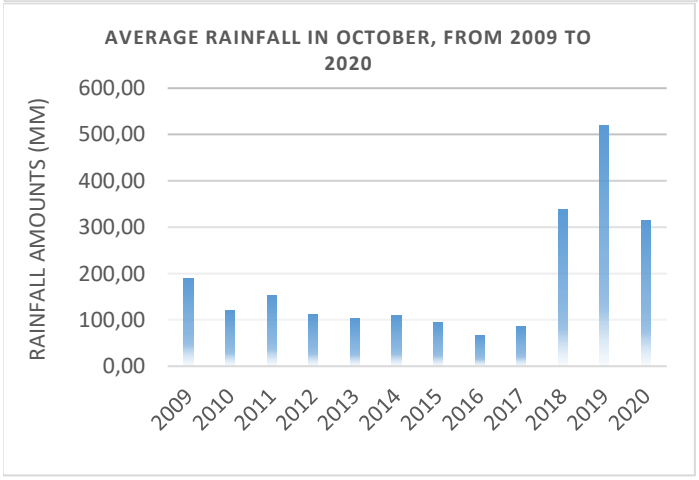
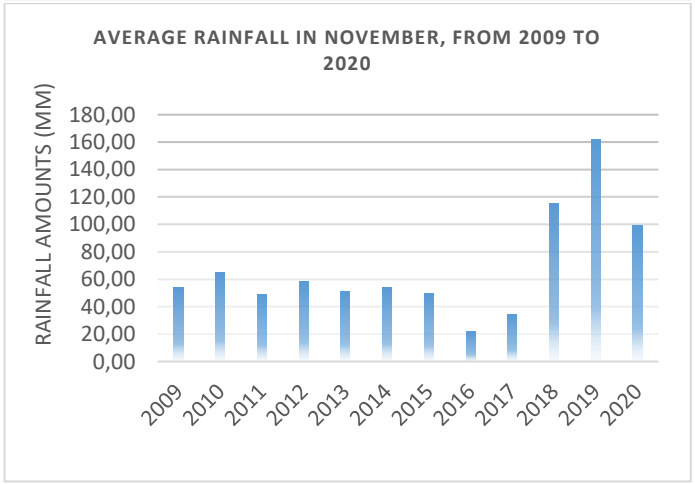
2020











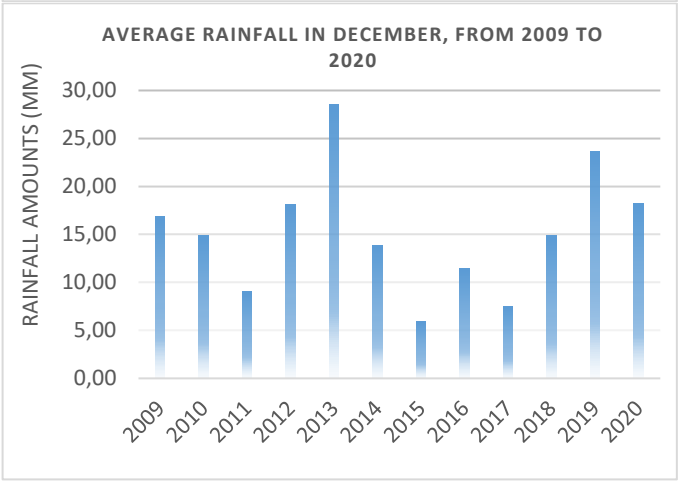


Figure 6: Evolution of monthly annual precipitation amounts in 2020 compared to the period 2009-2019

1.2.5 COMPARATIVE ANALYSIS OF RAINFALL DYNAMICS IN THE FIVE AGRO-ECOLOGICAL ZONES OF CAMEROON, BETWEEN THE HISTORICAL PERIOD AND 2020

Figure 6 above highlights the annual monthly variability of rainfall by agro-ecological zone between 1982 and 2019 compared to 2020.

A comparative analyses of rainfall histograms in the Sudano-Sahelian zone reveals a homogeneity of rainfall rates between the historical period and the volumes received in 2020. The dry season lasts for 5 months while the rainy season lasts for 7 months with the most significant peak in August.

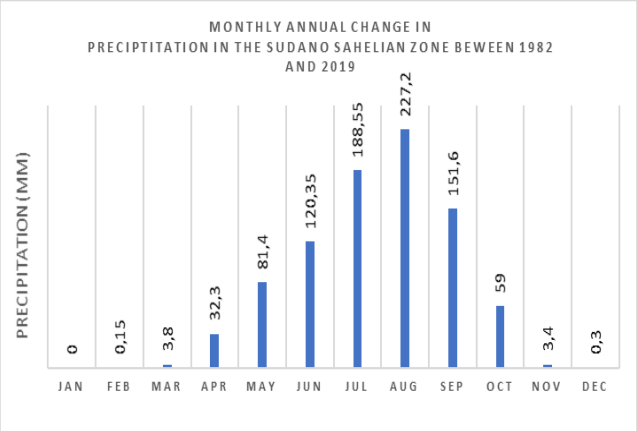
Just like the Sudano-Sahelian zone, the rainfall rate in the Guinean high savannah zone remains homogeneous, although there is a slight increase in rainfall amounts during the rainy season compared to that of the historical period under consideration. Most of the rainfall is concentrated between April and October, with a significant peak in October 2020, whereas for the historical period, the highest volume of rainfall was recorded in August.

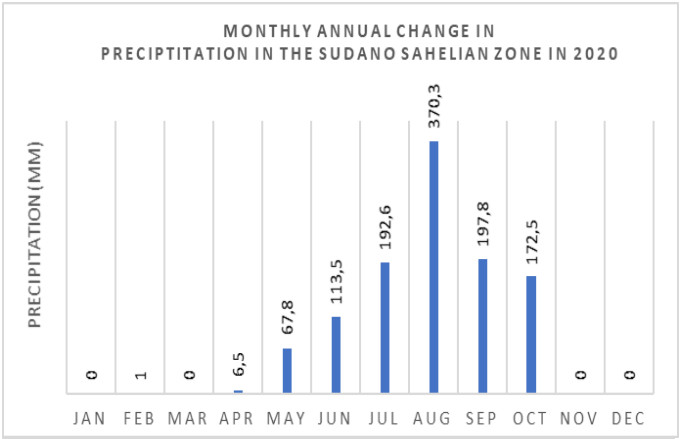
In the highlands zone, the rainfall histograms show similarities in the seasonal rate between the historical period and that of the year 2020. However, a comparative observation of the rainfall rate between the historical period and 2020 suggests a modification of the annual monthly evolutionary rate of rainfall amounts between the two periods, with a significant inflection during August 2020 compared to the historical period.

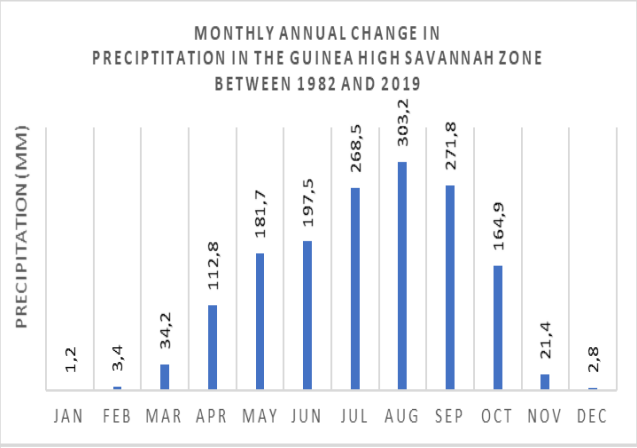
In the bimodal rain forest zone, a comparative analysis of the rainfall rate between the historical period and 2020 shows slight heterogeneity. The evolutionary rhythm in the historical period presents a well-dissected four-season profile, with the long dry season running from December to February, the short rainy season from March to May, the short dry season from June to July and the long rainy season from August to November. This distribution of the seasonal rate in 2020 seems to be much contrasted as there is a slight confusion between the short rainy season and the short dry season. Unlike the historical period, the cumulative rainfall during the short dry season is double the cumulative rainfall during the short rainy season, giving rise to a hint of a shift in the short rainy season during the short dry season. This observation corroborates that of AMOUGOU and al (2017), who observed during the period from 1991-2001, a parity of rainfall volumes for the two seasons, translating this slight difference.

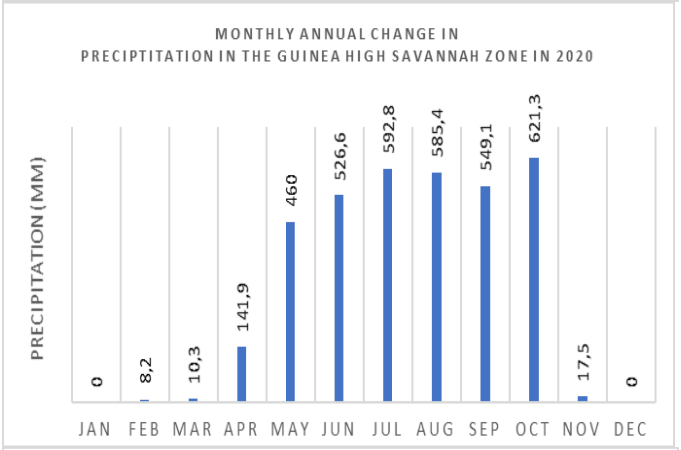
For the monomodal rainforest zone, the seasonal dynamics are homogeneous. According to the evolution of the histograms, they range from one rainy season to the next during the historical

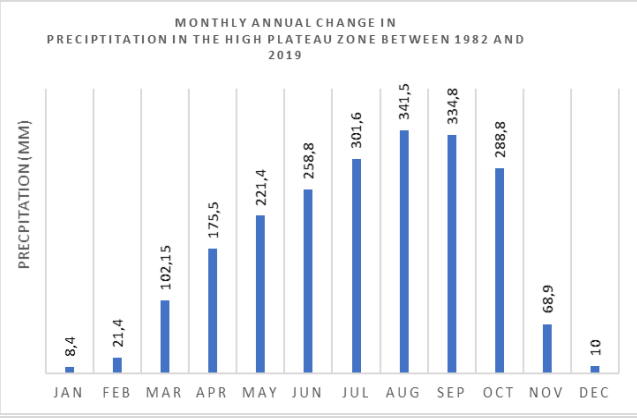
period and remains equal to that of 2020. However, unlike the historical period, where rainfall volumes are concentrated in August, there is a significant peak in July 2020.

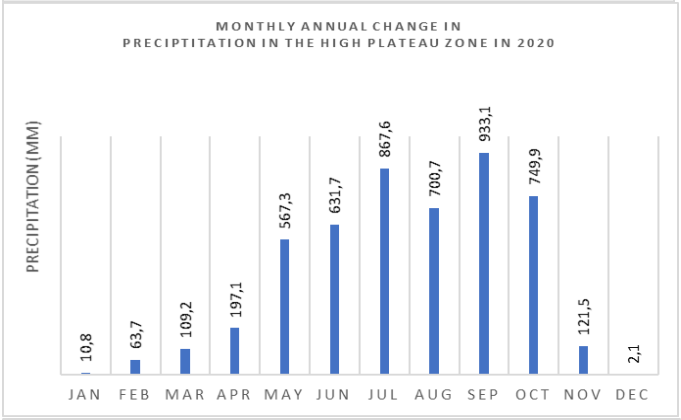


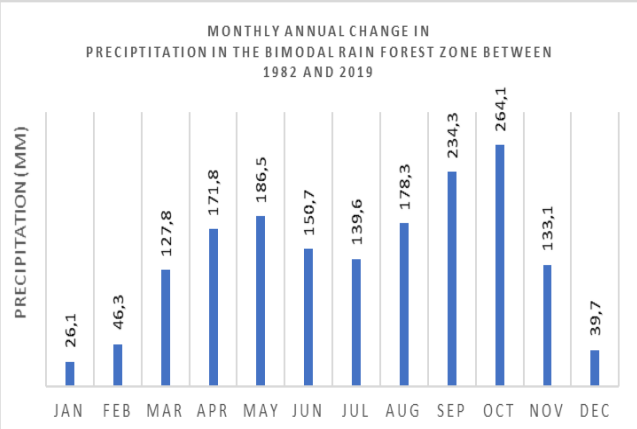


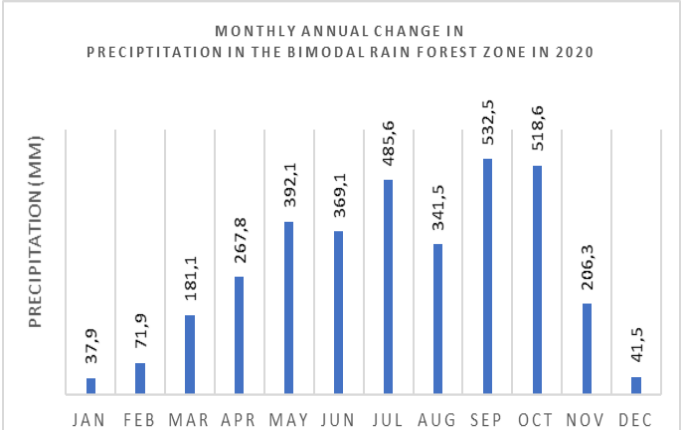


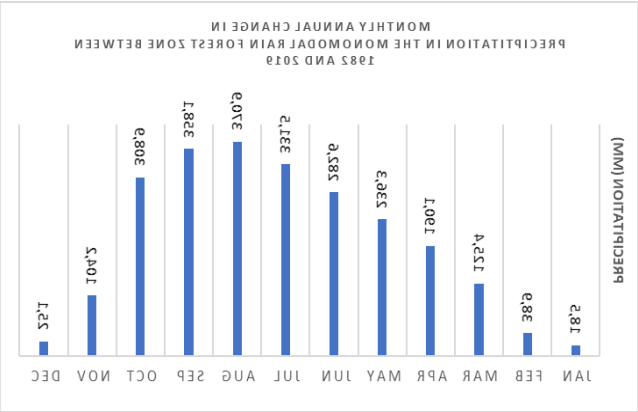












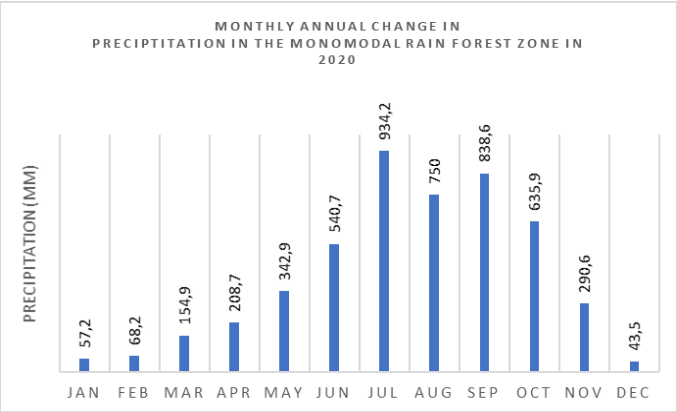


Figure 7: Rainfall dynamics in the five agro-ecological zones of Cameroon, between the historical period and 2020

1.2.6 ANALYSES OF DECADAL RAINFALL DYNAMICS IN CAMEROON BETWEEN 1982 AND 2020

The analyses of rainfall dynamics in several scientific publications and in NOCC's publications show a constant decrease in rainfall volumes on the national scale. In order to better appreciate the trends and evolutionary rhythm of rainfall in Cameroon, it seemed appropriate to study the characteristics of the variability of decadal rainfall amounts over the period from 1982-2020 compared to the central trend parameters for each decade.

Thus, Table 4 and Figure 8 below show that three out of the four decades that constitute our observation period show a decreasing trend in rainfall amounts. The average rainfall between 1982 and 1991 is around 1846.9mm, while the decrease over the decade and the interannual decrease are around 949.1mm and 94.4mm respectively. For the decade from 1992-2001, the average rainfall was 1757.1mm, while the decrease over the decade and the inter-annual decrease were around 45.8mm and 4.5mm respectively.

Despite the previous two decades, the decade from 2002 to 2011 shows an increasing rainfall trend with an average of around 1524.23mm with a rainfall recovery of around 234.3mm over the period, i.e. an interannual increase of around 23.4mm per year. The period from 2012 to 2020 shows a decreasing trend in rainfall amounts on the national scale, for the average over the nine years studied is around 1812.8mm, while the decrease over the decade and the interannual decrease are respectively around 14.1mm and 1.5mm of rainfall

Table 4: Decadal rainfall pattern in Cameroon from 1982 to 2020

Period / Characteristics	1982-1991	1992-2001	2002-2011	2012-2020
Average	1846,9	1757,1	1524,2	1812,8
Variability over the time period	-949,1	-45,8	234,3	-14,1
Interannual variability	-94,9	-4,5	23,4	-1,5
Trend	↘	↘	↗	↘

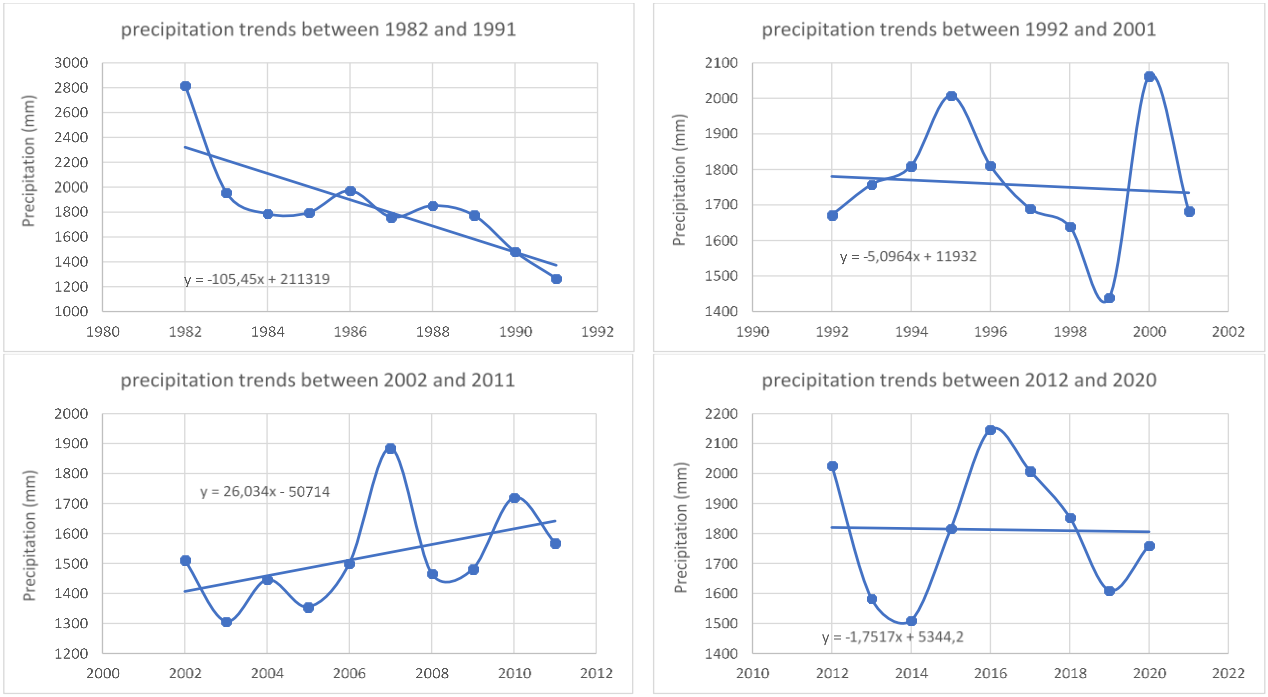


Figure 8: Decadal rainfall dynamics in Cameroon between 1982 and 2020.

1.3 TEMPERATURE CHANGE IN 2020 COMPARED TO THE PERIOD 1991-2019.

Global warming has been increasing undoubtedly over the years. However, despite the cooling effect of the La Niña phenomenon, 2020, according to the World Meteorological Organization (WMO), appears to be one of the three hottest years on record, after 2016 and 2019. With the past six years ranked as the warmest on record, the decade from 2011 to 2020 tops this threatening scenario. The average temperature is now 1.2°C warmer than pre-industrial temperatures. With a number of consequences on the planet, its ecosystems and our society.

Because of its ecological disparity, its longitudinal and latitudinal disposition, the vulnerability to temperature increase in Cameroon can be assessed at different levels.

Thus, the analysis of the temperature situation on a global scale, as presented below by the WMO, encourages a detailed analysis of the variability of temperatures in 2020 in relation to the historical period, in order to study and better document, within the framework of future productions, the temperature severity levels on the various socio-economic activities and sectors of development.

1.3.1 Change in average temperatures in 2020 compared to the historical period 1991-2019.

The consistency of reports from various international climate prediction centres on the temperature situation in 2020 raises awareness of the increase in average temperatures. The temperature data studied on a national scale reveals an increasing trend in average temperatures of about 1.2°C compared to the historical period 1991-2019, i.e. an interannual increase of about

0.9°C. The average annual temperature in 2020 is about 25.75°C. The highest average temperature was recorded in March being 27.86°C, while the lowest average temperature were recorded in July about 24.16°C. Over the entire 28-year period, the deviations from the average temperature in 2020 compared to the period 1991-2020 varied considerably. The least average variation of 0.83°C was observed in December and the highest in March was 1.77°C, as shown in figure (9) and table (5) below. This indicates that March 2020 was the warmest month of the year.

Table 5: Characteristics of average temperatures in 2020 compared to the historical period 1991-2019

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
RealAverage T°	25.29	26.73	27.83	27.66	26.92	25.42	24.16	24.58	24.65	25.25	25.69	24.86
Hist _Average	24.43	25.22	26.06	26.30	25.42	24.30	23.57	23.26	23.49	23.94	24.35	24.03
Average Difference	0.86	1.51	1.77	1.36	1.50	1.12	0.59	1.32	1.16	1.31	1.34	0.83

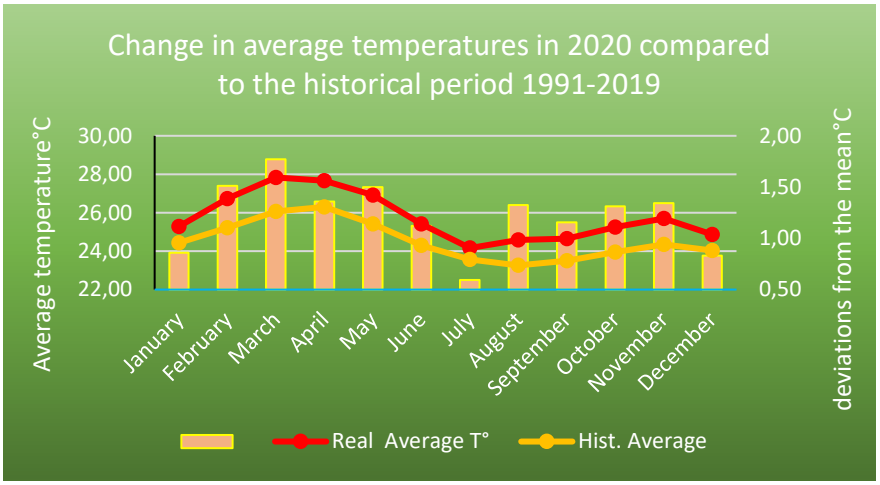


Figure 9: Evolution of average temperatures in 2020 compared to the historical period 1991-2019

1.3.2 Evolution of minimum temperatures in 2020 compared to the historical period 1991-2020

The variation of annual minimum temperatures between 1991-2020 shows a general decreasing trend. However, singularlyway, the year 2020, compared to the period 1991-2019, shows a slight increase in minimum temperatures, as shown in Table (6) and Figure (10).

Significant positive average differences are observed in March (2.09°C), April (2.78°C) and May (2.56°C), while negative average differences are observed in November (0.01°C), December (2.38°C) and January (1.58°C). On an annual scale, the average minimum temperature in 2020 is 20.42°C against 19.70°C for the period 1991-2019, thus an average increase of 0.72°C.

Table 6: Characteristic of minimum temperatures in 2020 compared to the historical period 1991-2019

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
R_Min_T	18.12	19.82	21.79	22.48	22.26	21.05	20.63	20.83	20.67	20.37	19.69	17.32
H_Min_T	18.59	19.47	20.70	21.14	20.85	20.13	19.74	19.51	19.42	19.44	19.05	18.39
Avrg Diff	-1.58	0.12	2.09	2.78	2.56	1.35	0.93	1.13	0.97	0.67	-0.01	-2.38

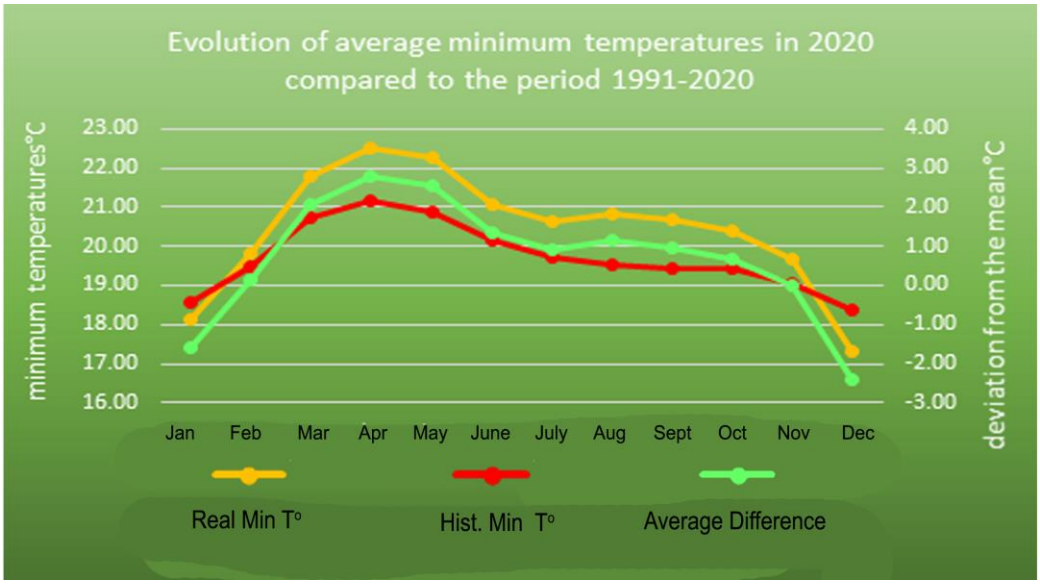


Figure 10: Evolution of average minimum temperatures in 2020 compared to the period 1991-2020

1.3.3 Evolution of maximum temperatures in 2020 compared to the historical period 1991-2019.

The profile of maximum temperatures in 2020 compared to historical temperatures gives evidence of an increasing trend in these temperatures, table (7) and figure (11).

The table below shows a strong variability in the monthly temperature differences between the temperatures recorded in 2020 and the historical temperatures. The significant positive deviations from the average, which reflects a great increase in maximum temperatures over the 28 years observed, are found between November and May, with very significant peaks in February and March, which show 4.28°C and 4.52°C respectively for February and March. Negative deviations from the average are noticeable between July and September, reflecting a slight decrease in maximum temperatures. This inflection lies between -0.72°C and -1.67°C. The decrease is justified by the position of the Intertropical Front which, during this period, lies over Lake Chad, allowing the monsoon winds to blow over the entire national territory.

The table indicates that in 2020, the average temperature is around 31.09°C, compared to 29.36°C, i.e., an increase of around 1.73°C.

Table 7: Characteristic of maximum temperatures in 2020 compared to the historical period 1991-2019.

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
R_Max_T	32.45	33.64	33.88	32.84	31.57	29.79	27.69	28.33	28.64	30.14	31.69	32.40
H_Max_T	30.26	30.97	31.42	31.46	29.98	28.46	27.40	27.01	27.57	28.45	29.65	29.66
Avr Diff	3.09	4.28	4.52	3.48	2.21	0.43	-1.67	-1.03	-0.72	0.78	2.33	3.04

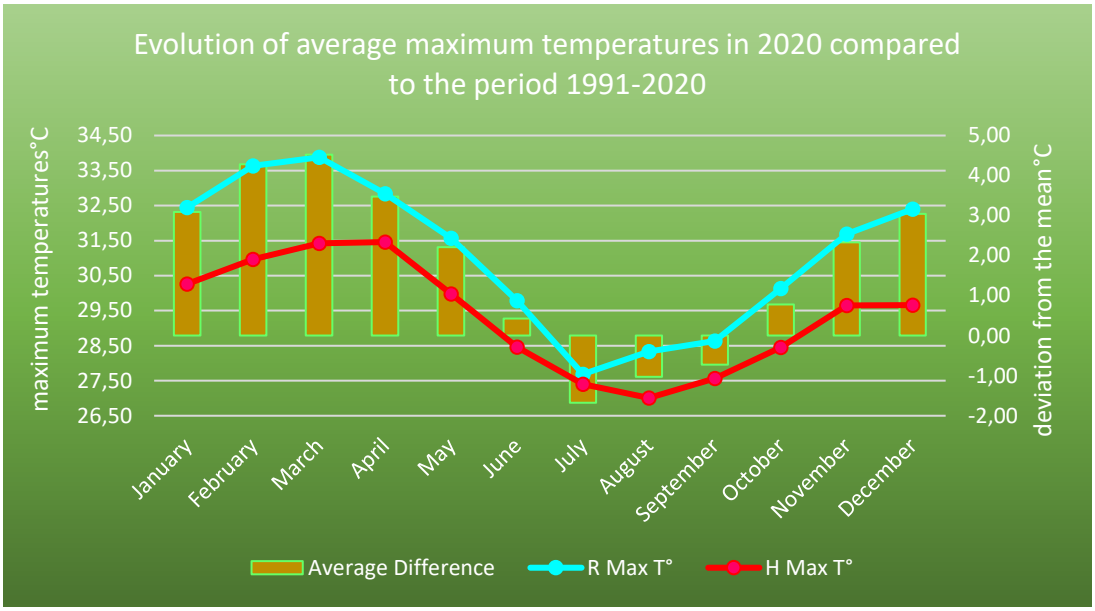
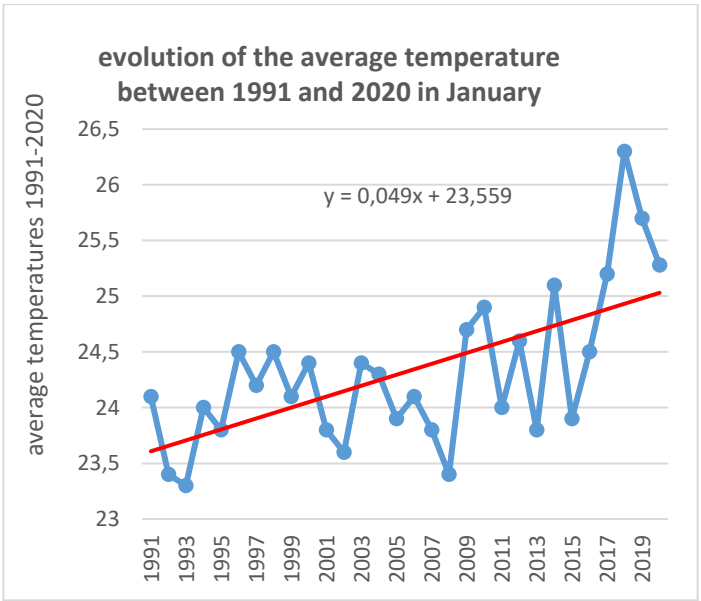
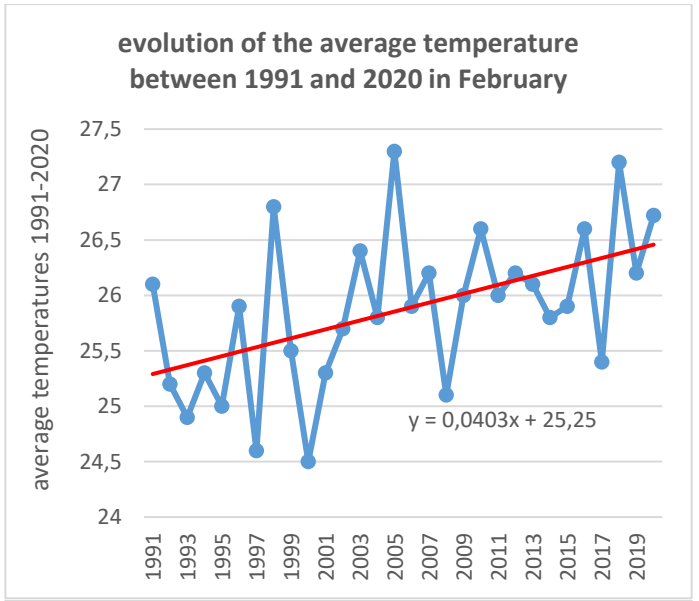


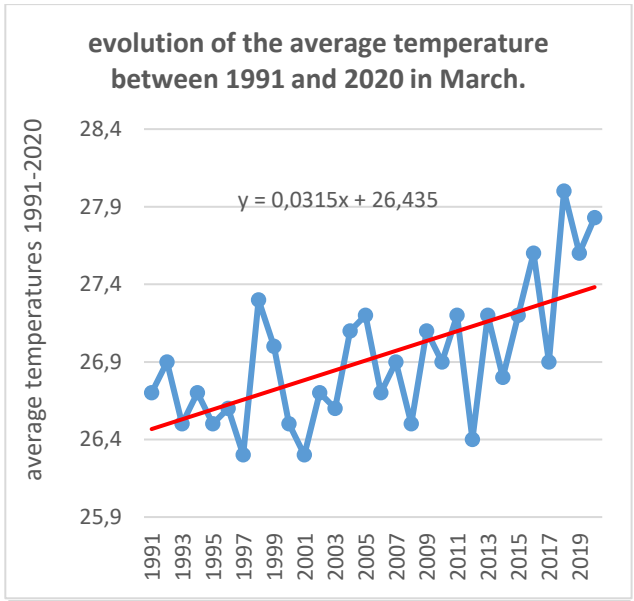
Figure 11: Evolution of average maximum temperatures in 2020 compared to the period 1991-2020

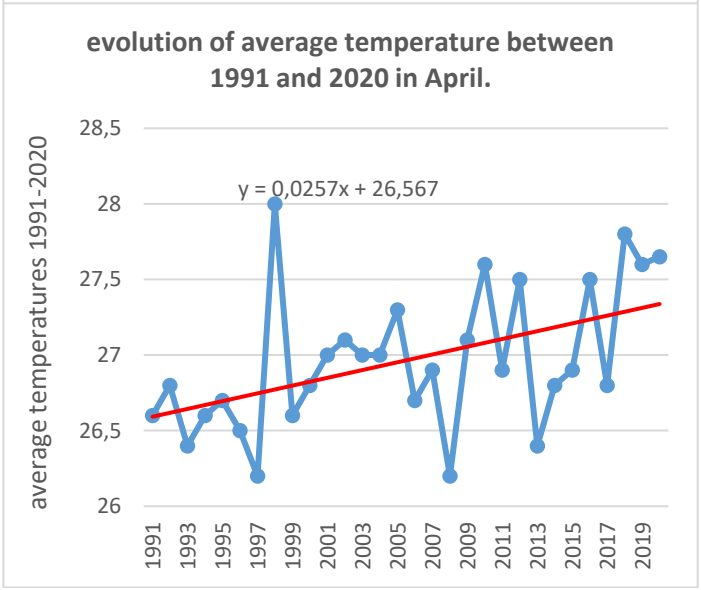
1.3.4 Monthly annual average temperature evolution from 1991-2019.

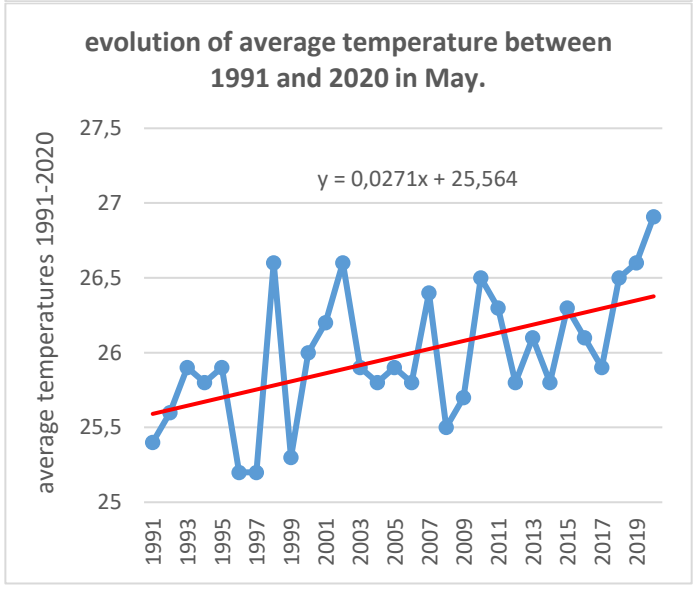
Figure (12) below illustrates the trend in average temperatures for each month over the 28 years. We can observe that over the twelve months of the year, and over the 28 years of observation, the trend is still increasing. This means that the increase to date has been around 1.2°C as compared to the historical period.

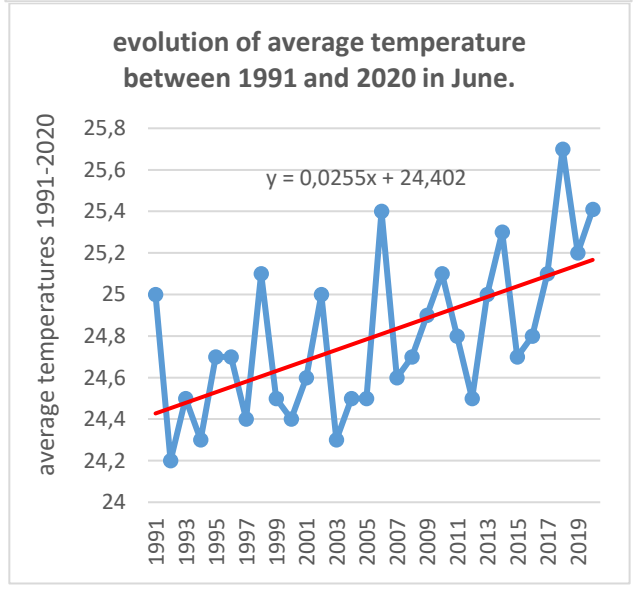

evolution of the average temperature between 1991 and 2020 in January
average temperatures 1991-2020
y = 0,049x + 23,559
26,5
26
25,5
25
24,5
24
23,5
23
1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019

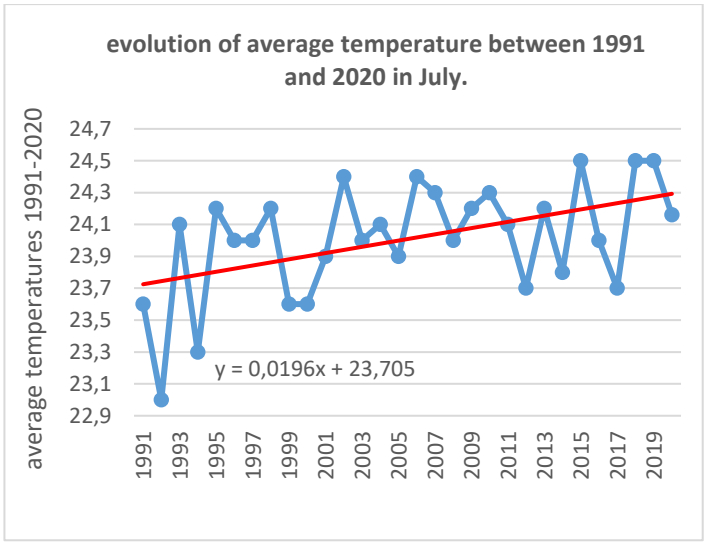

evolution of the average temperature between 1991 and 2020 in February
average temperatures 1991-2020
y = 0,0403x + 25,25
27,5
27
26,5
26
25,5
25
24,5
24
1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019

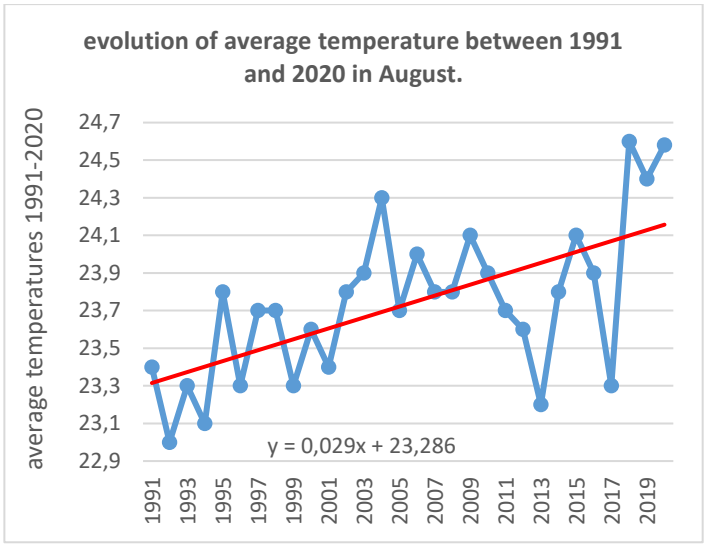

evolution of the average temperature between 1991 and 2020 in March.
average temperatures 1991-2020
y = 0,0315x + 26,435
28,4
27,9
27,4
26,9
26,4
25,9
1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019

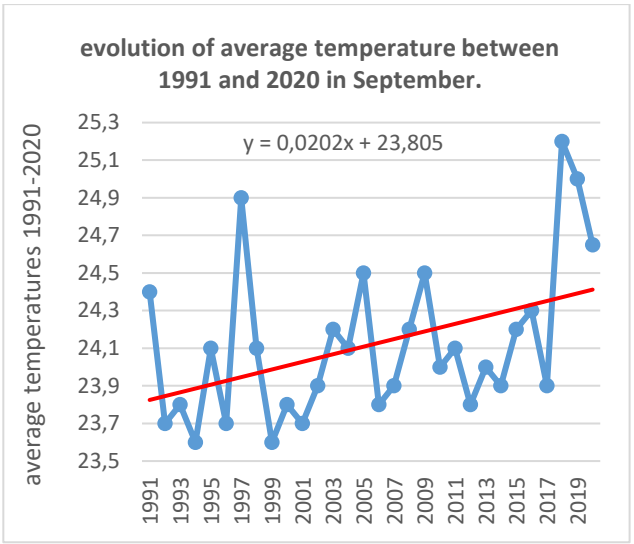

evolution of average temperature between 1991 and 2020 in April.
average temperatures 1991-2020
y = 0,0257x + 26,567
28,5
28
27,5
27
26,5
26
1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019

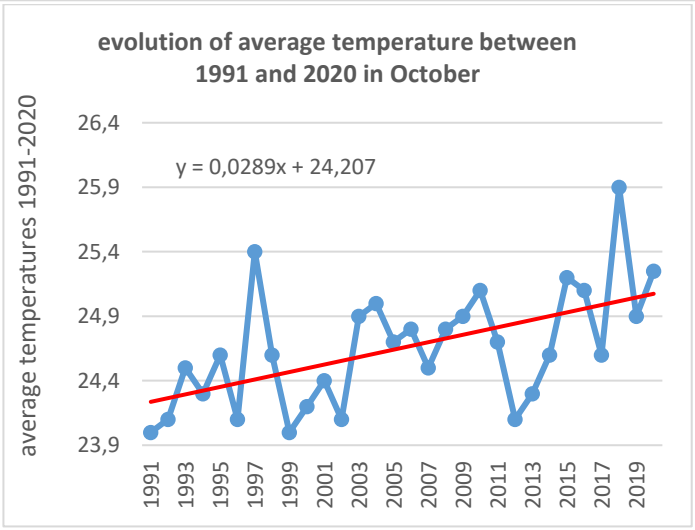

evolution of average temperature between 1991 and 2020 in May.
average temperatures 1991-2020
y = 0,0271x + 25,564
27,5
27
26,5
26
25,5
25
1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019

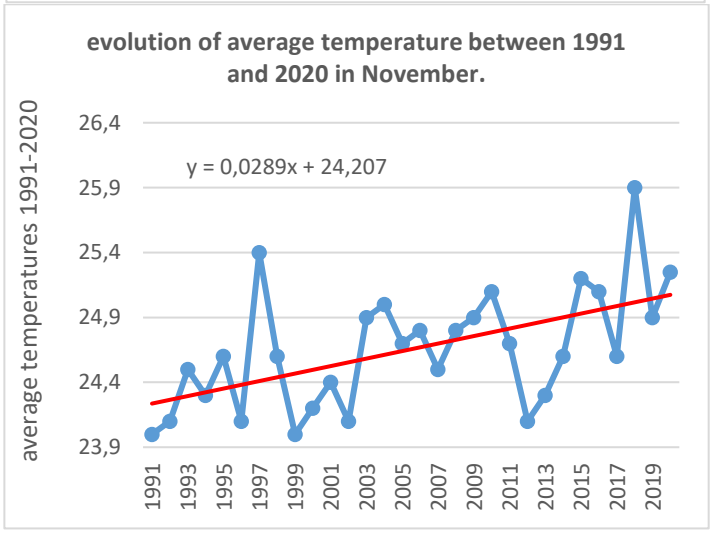

evolution of average temperature between 1991 and 2020 in June.
average temperatures 1991-2020
y = 0,0255x + 24,402
25,8
25,6
25,4
25,2
25
24,8
24,6
24,4
24,2
24
1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019











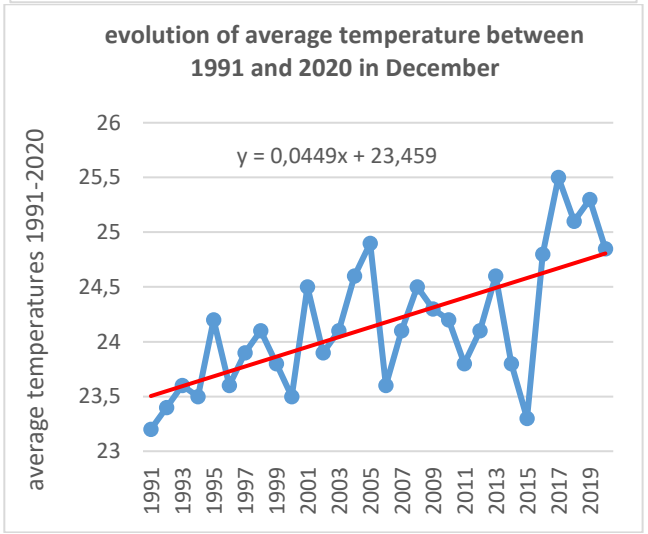


Figure 12: Evolution Annual-monthly average temperature from 1991-2019

1.3.5 Analyses of the dynamics of decadal average temperatures in Cameroon between 1991 and 2020

The analyses of the variability of average temperatures between 1991 and 2020 indicate a strong oscillation of temperatures over the national territory.

Analyses of the decadal dynamics (Table 8 and Figure 13) show that the general trend in average temperatures between 1991 and 2020 is constantly increasing. Thus, between 1991 and 2000, there was an increase of around 0.6°C over the period, with an average of 28.4°C. For the decade from 2001-2010, there was a real increase of around 1.4°C, with an average of 29.8°C. The decade from 2011-2020 shows an average of 30.4°C with an increase of 1.6°C.

The study of the analyses of the decadal dynamics of temperatures thus makes it possible to appreciate the trend in average temperatures as well as their interannual evolution rate. This allows the reference situation of the said parameter to be known for better planning and adaptation of socio-economic development activities to climate change.

Table 8: Decadal rainfall trend in Cameroon from 1982 to 2020.

Period / Characteristics	1991-2000	2001-2010	2011- 2020
Average	28.4	29.8	30.4
Interannual variability	0.6	1.4	1.6
Trend	↗	↗	↗

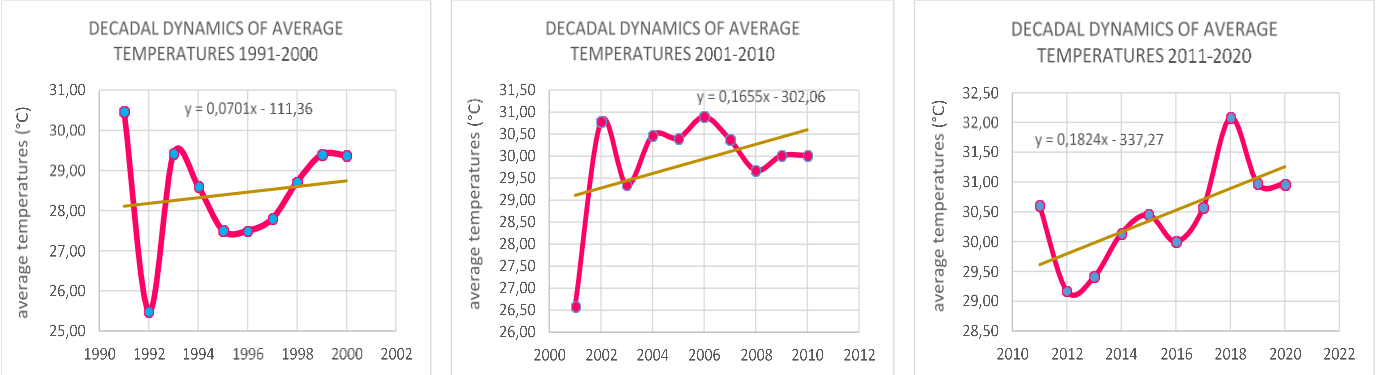


Figure 13: Decadal dynamics of average temperatures in Cameroon between 1991 and 2020

Warming temperatures or any change in climatic parameters will inevitably lead to impacts on the environment and socio-economic activity. Indeed, "sectors" such as agriculture, forestry, ecosystems, infrastructure, fisheries, water management, tourism, economic activity, energy production and demand, attest to their vulnerability to climate change with regard to the frequency of adverse events induced by climate disturbances nationwide. It should be recalled that in the course of its operational deployment, NOCC produced 36 dekadal forecast and early

warning bulletins during the year, the aim of which was to refine the accuracy of seasonal forecast bulletins.

These documents are produced as forecasts to appraise the climatic dynamics at a fine spatiotemporal scale in order to anticipate the risks and potential impacts that affect the various socio-economic development sectors in Cameroon. Unfortunately, the impacts predicted by the Observatory often occur with significant damages resulting in the mobilisation of considerable financial resources for the rehabilitation and reconstruction of infrastructures affected by climate change, or the compensation of people whose property has suffered from serious impacts. Figure 14 below illustrates the spatial distribution of impacts recorded in 2020 at the national scale.

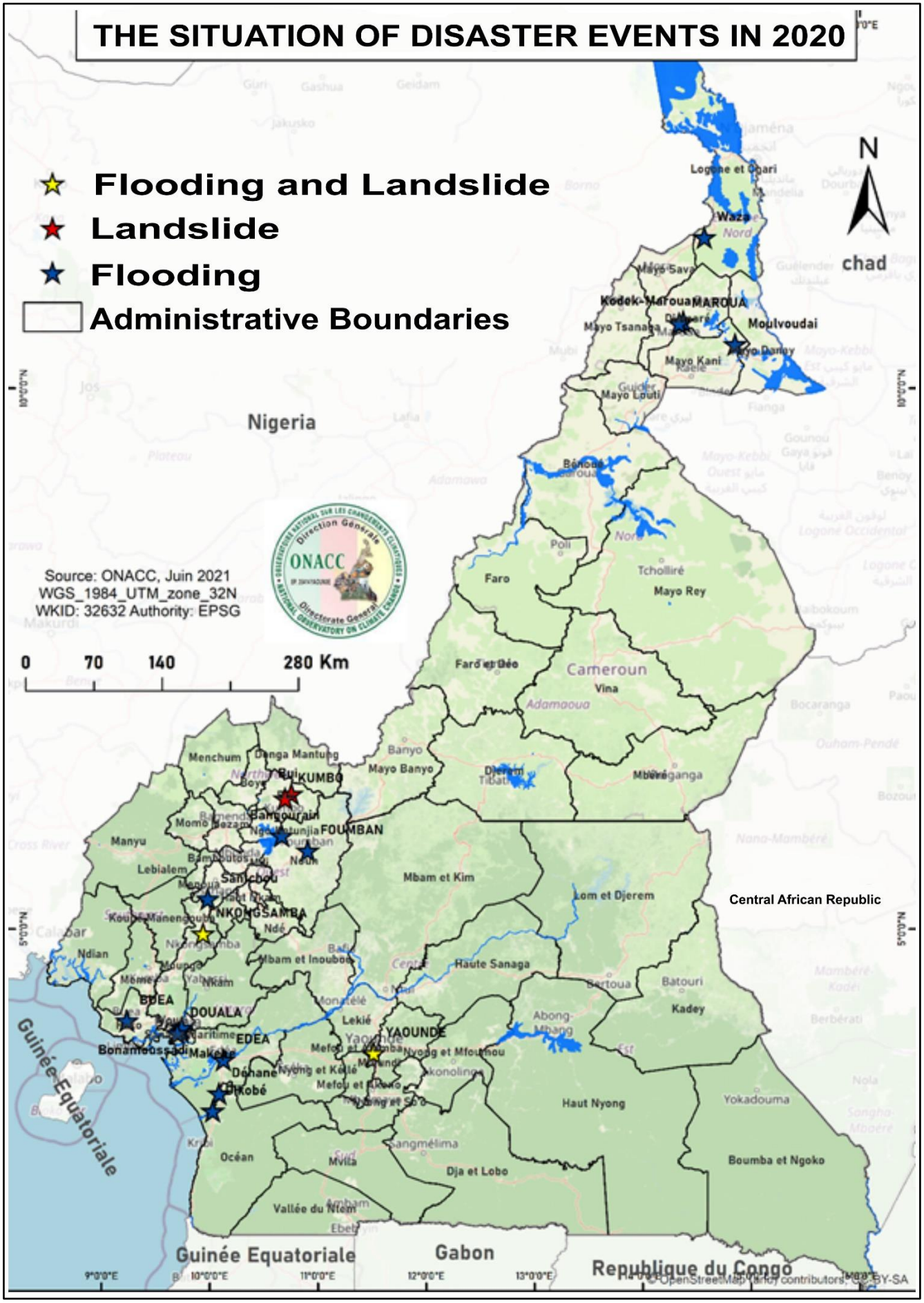


Figure 14: Map of impacts observed at the national level in 2020

PART 2:

ASSESSMENT OF THE RAINFALL SITUATION IN CAMEROON IN 2020.

2. ASSESSMENT OF THE RAINFALL SITUATION IN 2020 AS COMPARED TO THE PERIOD 1979-2019

2.1 ASSESSMENT OF THE RAINFALL SITUATION IN CAMEROON IN 2020.

At first glance, it can be seen that all the stations studied recorded significant amounts of rainfall, way above the historical mean of the stations for the period 1979-2018, see Figure 15 below. To be more precise, it appears that rainfall has significantly evolved from the southern part of the country to the Sudano-Sahelian zones, with some disparities from one agro-ecological zone to another, as illustrated by the isohyets in Figure 15 below. The combined effect of insolation in the coastal strip and the contrasting relief in the highland zones is enough reason which justifies rainfall peaks in the said zone, as well as the reduction in the intensity of rainfall as we move towards the continent.

Thus, a comparative analysis of the isohyets between the historical period and the evolution of rainfall amounts in 2019 and 2020 indicates that, despite the similar appearance of the isohyets, the years 2020 and 2019 remain less rainy than the historical period. More specifically, it appears that some localities in the Guinean High Savannah zone (Meiganga, Banyo, Yimbere and Nassarao), the bimodal rainforest zone (Batouri, Yokadouma, Ngoila, Mbalam, Mintoum, Abong Mbang, Akonolinga, Mbeka, Doume, Yoko, Ebolowa, Ambam, Kribi, Campo and Sangmelima), the Highlan ds zone (Munkep, Wum, Fundong, Widekum, Batibo, Bali, Bamenda, Santa, Bambalang, Dschang, Bafang, Nkambe, Nwa, Makam, Nkoumangba, Bafoussam, Bazou, Mbouda, Foumban and Foumbot), the monomodal rain forest zone (Mamfe, Munyenge, Mbanga, Muyuka, Mutengene, Tiko, Douala, Ndokama, Mouanko, Etuku, Bechati, Fontem and Melong) recorded rainfall amounts well below those of the two previous cases. The map besides shows a contrast in the temperature situation in the Sudano-Sahelian zone, as part of the normal average trends for the reference period 1979-2018, there was an increase of about 11.5mm of rainfall in 2019 compared to the reference period, followed by a decrease in 2020 of about 42.5mm of rainfall as compared to the same reference period.

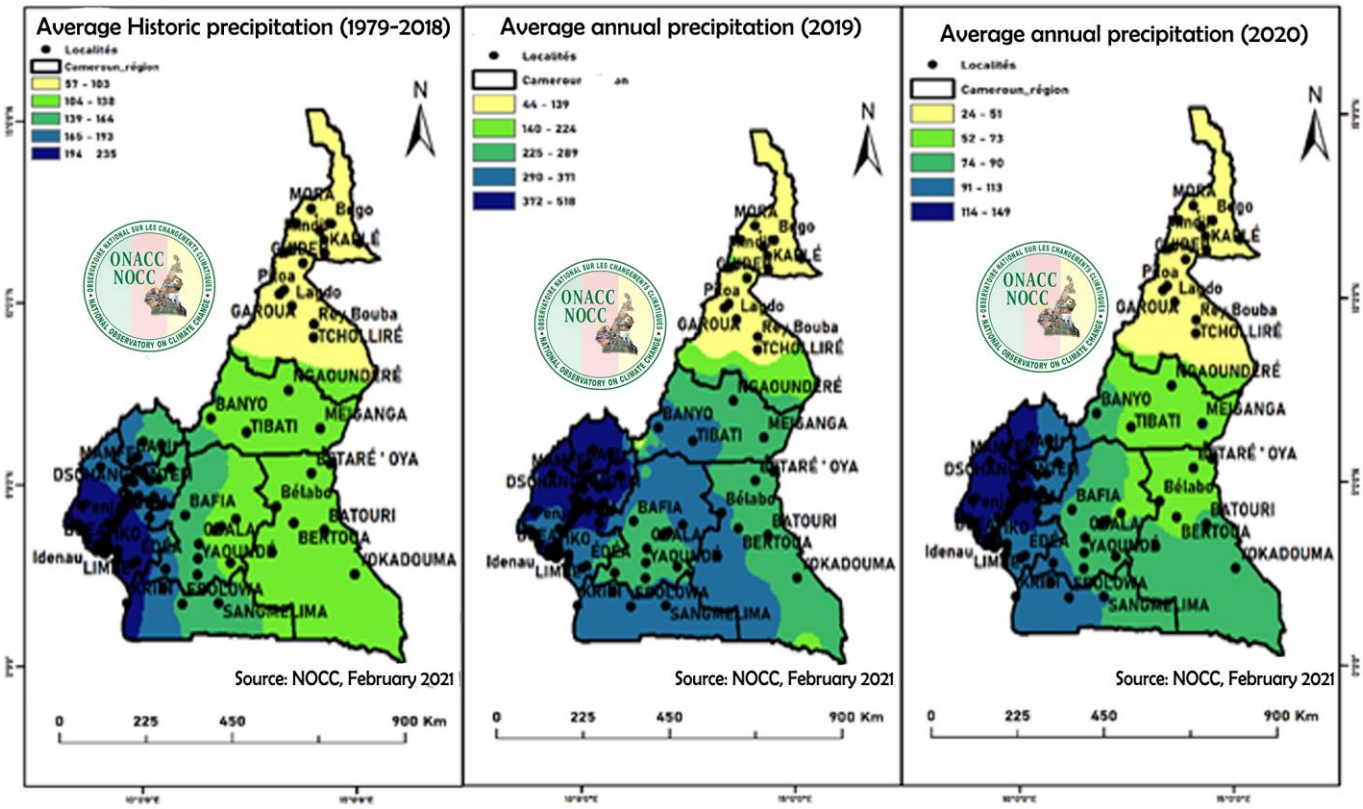


Figure 15: Spatial distribution of precipitation in 2020 over the national territory compared to historical values 1979-2018 and 2019.

2.2 Annual Assessment of the rate of evolution of rainfall between the period 1979-2018 and 2020.

For a detailed assessment of the rainfall dynamics in 2020 at the national scale, it was necessary to evaluate the recorded rainfall amounts by locality, and then categorize them into classes according to their percentages in relation to the historical values of 1979-2018.

In this way, the first class groups the localities whose cumulative annual rainfall amount is less than 50% of the rainfall percentage recorded during the above-mentioned historical period. Table 9 and Figure 16 below show that 57% of the stations studied in 2020 recorded rainfall amounts below the historical average. However, it appears that in this category, localities such as Bamusso, Buea and Edea, remain the rainiest, while localities such as Douala and Tchollire recorded a negative deviation of 17mm, i.e. a percentage of -0.6% of the historical volume recorded for the locality of Douala, and a negative deviation of 22mm, i.e. a percentage of -1.8% of the historical volume for the locality of Tchollire.

Table 9: Stations with rainfall amounts below 50% of the historical average

Localities	Hist_Total (1979-2018)	Total_2020 (mm)	Diff (mm)	Percentage (%)
BAFIA	1739	2540	801	46.1
BAMUSSO	2544	3783	1239	48.7
BAZOU	2090	3062	972	46.5
BELABO	1515	2212	697	46.0
BERTOUA	1496	2202	706	47.2
BETARE OYA	1532	1962	430	28.1
BOGO	763	894	131	17.2
BUEA	2787	3820	1033	37.1
DIZANGUE	2515	3381	866	34.4
DOUALA	2825	2808	-17	-0.6
EDEA	2515	3518	1003	39.9
ESEKA	2207	2749	542	24.6
GAROUA	1012	1112	100	9.9
GAROUA BOULAI	1525	2057	532	34.9
GUIDER	899	927	28	3.1
KAELE	820	868	48	5.9
KRIBI	2381	2988	607	25.5
KUMBA	2515	3467	952	37.9
LAGDO	983	1018	35	3.6
LIMBE	2787	3506	719	25.8
MAROUA	774	846	72	9.3
MBANDJOK	1626	2186	560	34.4
MBANGA	2825	2890	65	2.3
MINDIF	819	907	88	10.7
MOKOLO	805	1142	337	41.9
MORA	682	746	64	9.4
MUTENGENE	2787	3300	513	18.4
MUYUKA	2787	3083	296	10.6
NANGA EBOKO	1563	2167	604	38.6
NGAOUNDERE	1443	2031	588	40.7
NKOTENG	1563	2230	667	42.7
OBALA	1626	2284	658	40.5
PENJA	2456	3357	901	36.7
PITOA	1012	1014	2	0.2
REY BOUBA	1083	1106	23	2.1
TCHOLLIRE	1206	1184	-22	-1.8
TIBATI	1564	2077	513	32.8
TIKO	2787	2990	203	7.3
TONGA	2025	2879	854	42.2
YAGOUA	834	907	73	8.8

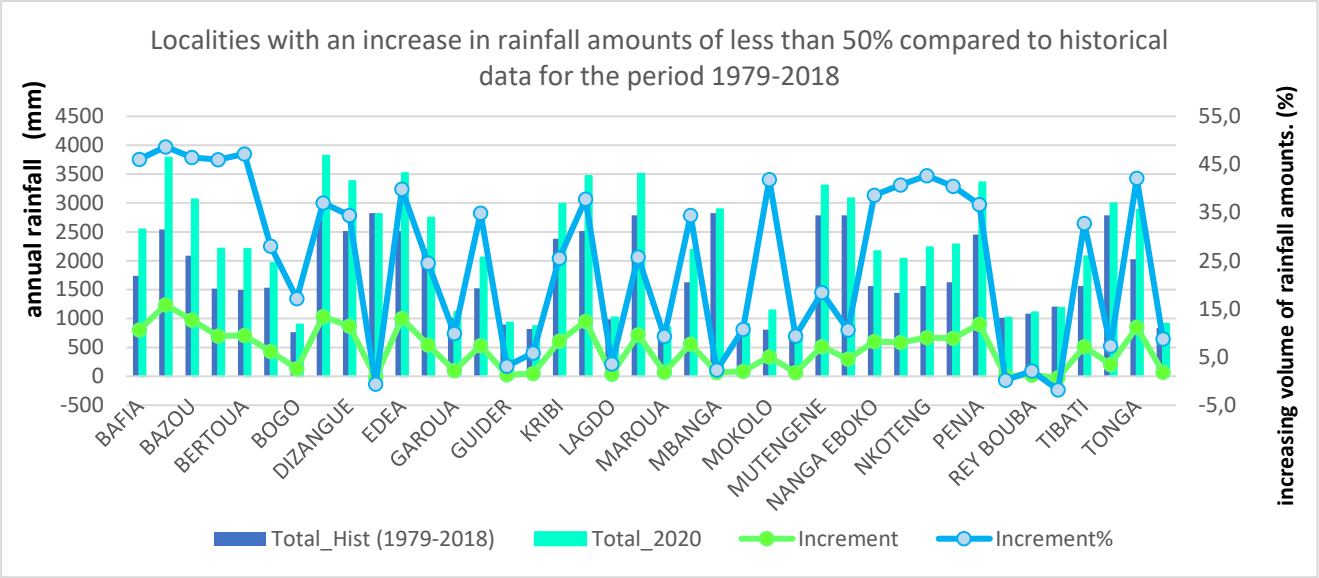


Figure 16: Stations with less than 50% rainfall amounts in 2020

The second category is that of 50-74% interval which indicates that 29% of the stations studied recorded less than 75% of the annual rainfall volume in 2020, compared to their respective historical volumes. The most significant peak is observed in Manjo, a locality in the Littoral Region, where the cumulative annual rainfall amount is 4159mm, thus a difference of 1703mm compared to historical data, representing a percentage of about 69.3% of the total volume compared to historical data. However, only Loum has the lowest percentage of rainfall amount within the range of 50.3%.

Table 10: Stations with rainfall amounts ranging from 50 to 74% of the historical average

Localities	Hist_Total (1979-2018)	Total_2020 (mm)	Diff (mm)	Percentage (%)
ABONG MBANG	1523	2357	834	54.8
AKONOLINGA	1571	2526	955	60.8
BAFOUSSAM	2090	3241	1151	55.1
BANGANGTE	1964	3268	1304	66.4
BANYO	1605	2442	837	52.1
BATOURI	1492	2529	1037	69.5
EBOLOWA	1890	2981	1091	57.7
FOUMBAN	1856	2993	1137	61.3
FOUMBOT	1856	3071	1215	65.5
KUMBO	1815	3000	1185	65.3
LOLODORF	2169	3353	1184	54.6
LOUM	2459	3697	1238	50.3
MAMFE	2320	3696	1376	59.3
MANJO	2456	4159	1703	69.3
MBALMAYO	1733	2661	928	53.5
MBOUDA	2030	3102	1072	52.8
MEIGANGA	1469	2253	784	53.4
SANGMELIMA	1746	2771	1025	58.7
YAOUNDE	1733	2724	991	57.2
YOKADOUMA	1538	2451	913	59.4

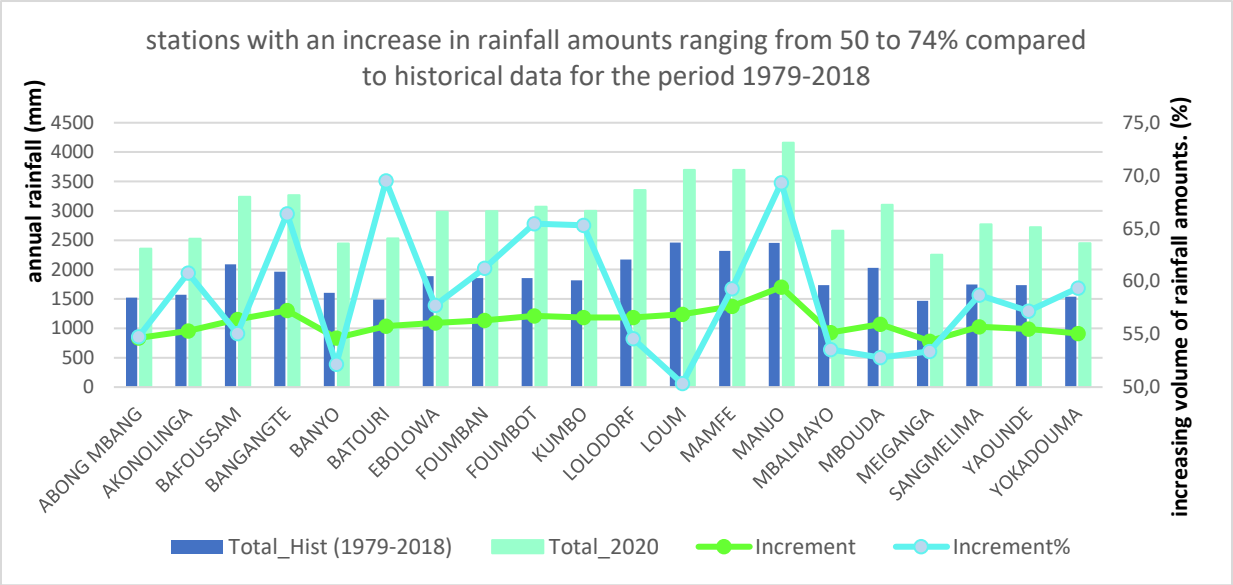


Figure 17: stations with rainfall amounts between 50 and 74% in 2020 compared to the historical average.

In the third category, Table 11 and Figure 18below, we observe that 14% of the localities studied have rainfall amounts ranging from 75 to 100% compared to historical amounts. Nkonsamba in the Littoral region is identified as the rainiest locality with 4492mm of rainfall in 2020 compared to 2456mm of rainfall in the historical value. However, the highest percentage was recorded in Dschang with 2091mm of rainfall based on the historical data, against 4064mm of rainfall in 2020, for a percentage of 94.4%, indicating that the rainfall intensity was heavier in Dschang than in all the localities studied within this range.

Table 11: Stations with rainfall amounts between 75 and 100% of the historical average

Localities	Hist_Total (1979-2018)	Total_2020 (mm)	Diff (mm)	Percentage (%)
BAFANG	2090	3912	1822	87.2
BAMENDA	2030	3718	1688	83.2
DSCHANG	2091	4064	1973	94.4
FONTEM	2308	4148	1840	79.7
FUNDONG	1894	3567	1673	88.3
IDENAU	2544	4564	2020	79.4
MELONG	2308	4192	1884	81.6
MUNDEMBA	2502	4428	1926	77.0
NKONGSAMBA	2456	4492	2036	82.9

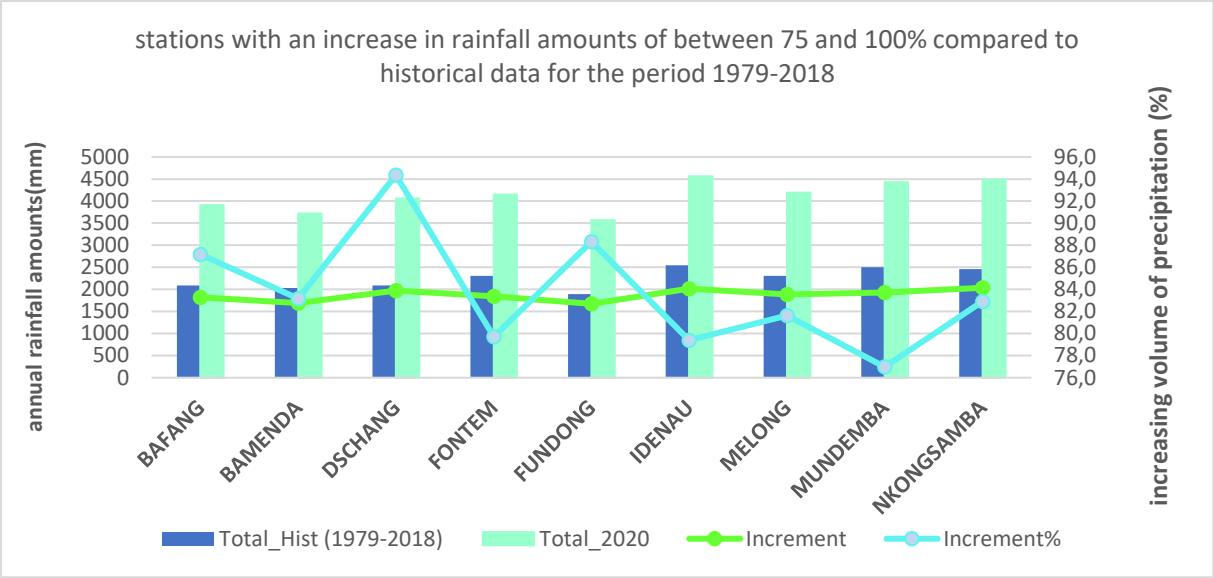


Figure 18: stations with rainfall amounts between 75 and 100% in 2020 compared to the historical average.

The analysis of these rainfall dynamics for the year 2020 has made it possible to isolate three exceptional cases. They include the localities of Bali, Douala and Tchollire, which show two opposite trends. The locality of Bali in the North West Region has the most significant rainfall peak of 4586mm in 2020 compared to the rest of the stations in the national territory, as against 2192mm for the historical period, a difference of 2394mm and a percentage of 109.21% of rainfall, representing the share of this locality on the historical average. On the other hand, the rainfall deficit in 2020 is more pronounced in Tchollire and Douala whose combined deficit value is 39mm compared to the historical period representing -2.42% of the rainfall amount compared to the historical average.

Table 12: Stations in exceptional situations

Localities	Hist_Total (1979-2018)	Total_2020 (mm)	Diff (mm)	Percentage (%)
BALI	2192	4586	2394	109.21
DOUALA	2825	2808	-17	-0.60
TCHOLLIRE	1206	1184	-22	-1.82

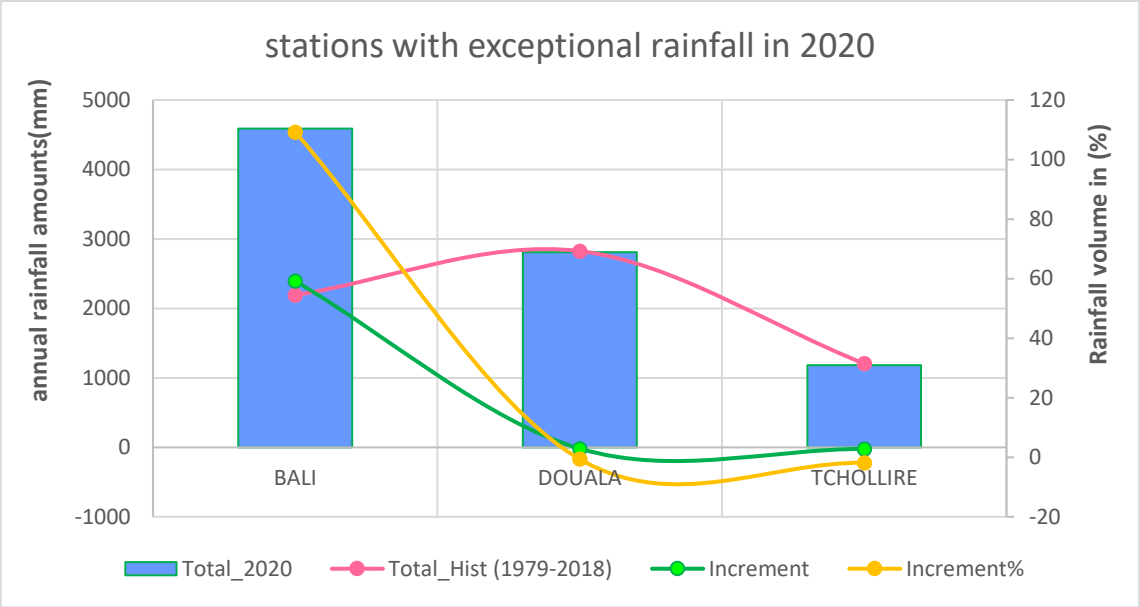


Figure 19: stations with exceptional rainfall in 2020

2.3. SPATIAL EVOLUTION OF MONTHLY RAINFALL IN CAMEROON IN 2020

2.3.1. Assessment of rainfall in January

The average rainfall amount for January 2020 (17mm) was slightly above the historical average (14mm). 27 out of 70 weather stations recorded rainfall amounts above the historical mean value for January 2020. They include Douala (29mm), Dizangue (41mm), Edea (42mm), Loum (31mm), Manjo (34mm), Melong (32mm), Nkongsamba (41mm), Penja (23mm) in the Littoral region; Fontem (20 mm), Idenau (75 mm), Limbe (37 mm), Mundemba (45 mm), Mutengene (37 mm), Muyuka (33 mm), Tiko (53 mm) Bamusso (47 mm) and Buea (48 mm) in the South-West region; Ebolowa (51 mm), Kribi (57 mm), Lolodorf (59 mm), Sangmelima (23 mm) in the South region; Bafang (26 mm), Bazou (20 mm), Dschang (20 mm) in the West region; Eseka (39 mm), Mbalmayo (20 mm), Yaounde (21 mm) in the Centre region; and Lagdo (18 mm) in the North region.

The remaining 43 recorded amounts are below the monthly average value for January. The stations of Adamawa (Banyo, Meiganga, Ngaoundere, Tibati); North (Garoua, Guider, Pitoa, Rey Bouba, Tchollire) and Far-North (Bogo, Kaele, Maroua, Mindif, Mokolo, Mora, Yagoua), did not record rainfall amounts in January 2020. In the East region, Betare Oya and Garoua Boulai did not record any rainfall, while Abong Mbang (14mm), Batouri (3mm), Belabo (2mm), Yokadouma (15mm) did. In the Centre region, Akonolinga (8mm), Bafia (7mm), Mbandjock (7mm), Nanga Eboko (8mm), Nkoteng (9mm), Obala (9mm). In the West,

Foumban and Foumbot did not record any rainfall, Bafoussam (2mm), Bangangte (12mm), Mbouda (2mm), and Tonga (11mm). In the Littoral Region, Mbanga (10mm). In the South West region Kumba and Mamfe recorded 16mm and 8mm respectively. Finally, in the North West region, Bali (13mm), Bamenda (5mm), Fundong (3mm), and Kumbo (1mm) recorded average rainfall for January 2020.

2.3.2. Spatial distribution of rainfall in January

Figure 16 below shows the distribution of rainfall amounts in January 2020 compared to the historical values for the same month. We observe that an increase in rainfall amounts was recorded in the Centre (Eseka and Doume), Littoral in the localities of Melong, Manjo, Loum, Penja, Douala, Nkongsamba, Edea, and Dizangue, the North (Lagdo), the West in the localities of Dschang, Bafang and Bazou, the South (Lolodorf, and Ebolowa) and the South-West region (Mundemba, Bamusso, Idenau, Buea, Tiko, Limbe, Fontem, and Mutengene). While a slight decrease was recorded in the Centre, South, East, West, South-West, North-West and Littoral regions. 27 of the 70 stations recorded a decrease in the number of rainy days in January 2020. They include Akonolinga (5 days), Bafia (2 days), Bafoussam (1 day), Bali (1 day), Bamenda (1 day), Belabo (1 day), Betare Oya (0 day), Ebolowa (10 days), Fontem (2 days), Foumban (0 day), Foumbot (0 day), Garoua Boulai (0 day), Kribi (21 days), Kumba (6 days), Lolodorf (16 days), Mamfe (2 days), Mbalmayo (4 days), Mbandjok (4 days), Mbanga (4 days), Mundemba (8 days), Nkoteng (5 days), Obala (4 days), Penja (8 days), Sangmelima (3 days), Tonga (2 days), Yaounde (5 days) and Yokadouma (2 days). 23 stations maintained their historical level of rainy days: Abong Bang, Bafang, Banyo, Batouri, Bertoua, Bogo, Dschang, Garoua, Guider, Kaele, Kumbo, Maroua, Mbouda, Meiganga, Mindif, Mokolo, Mora, Ngaoundere, Pitoa, Rey Bouba, Tibati, and Yagoua. Finally, 20 stations recorded an increase in the number of rainy days in January 2020. They include Bamusso, Bangangte, Bazou, Buea, Dizangue, Douala, Edea, Eseka, Fundong, Idenau, Lagdo, Limbe, Loum, Manjo, Melong, Mutengene, Muyuka, Nanga Eboko, Nkongsamba, and Tiko.

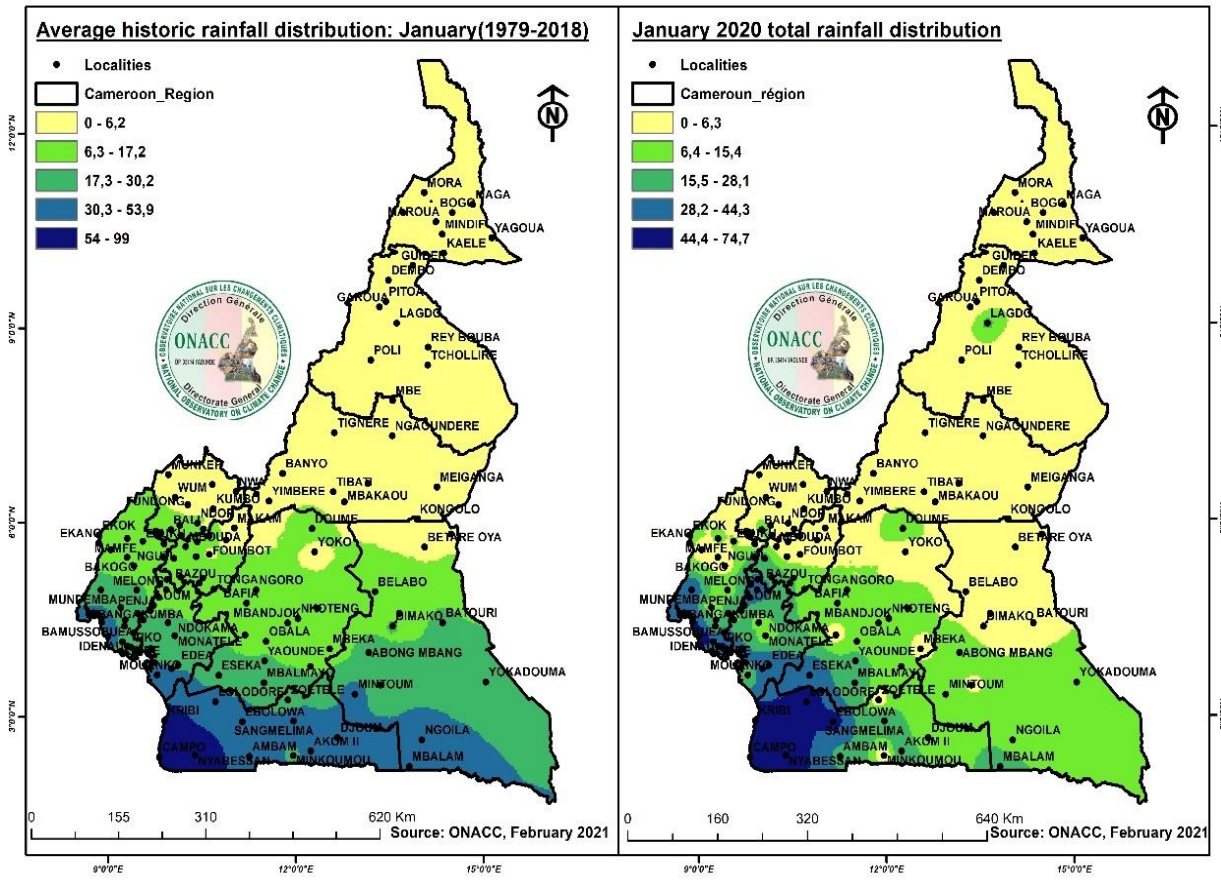


Figure 20: Variation in precipitation compared to historical values in January 2020

2.3.3. Assessment of the number of rainy days in January 2020.

Figure 21 below shows the spatial distribution of the number of days recorded in January 2020. It shows that most of the Littoral and South West regions recorded an increase in the number of rainy days, except for a few stations that had a constant average number of days. Three of the four stations in the South region recorded an increase in the number of rainy days. Most of the Centre, East, West, North West, Adamawa, North and Far-North regions recorded a decrease in the number of rainy days, except for a few localities in the North (Lagdo) and Centre (Eseka) regions, which had an above average number of rainy days.

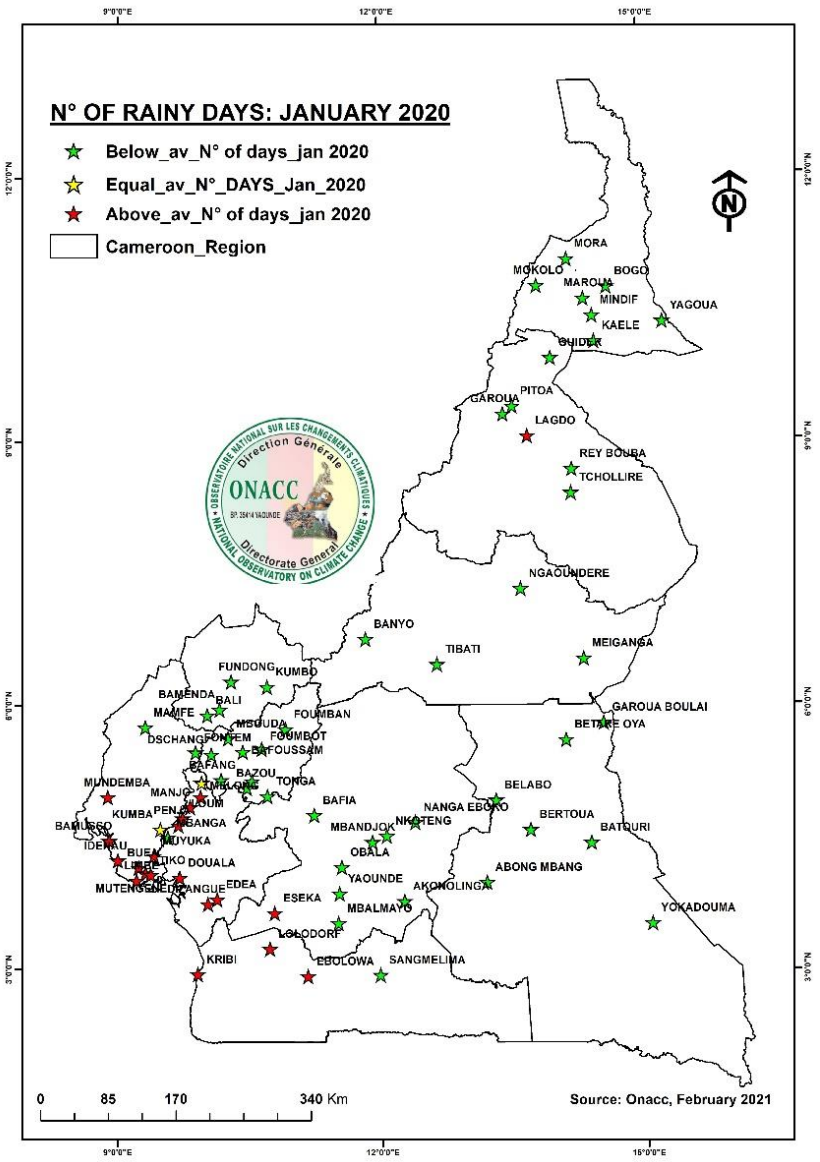


Figure 21: Evaluation of the number of rainy days in January over the entire national territory.

2.3.4. Assessment of rainfall situation in February

80% (56 stations) of the stations recorded rainfall amounts below their historical average for February 2020. They include Abong Mbang, Akonolinga, Bafang, Bafia, Bafoussam, Bali, Bamenda, Bamusso, Bangangte, Banyo, Batouri, Bazou, Belabo, Bertoua, Betare Oya, Bogo, Buea, Dizangue, Douala, Dschang, Ebolowa, Edea, Eseka, Fontem, Foumban, Foumbot and Fundong, Garoua Boulai, Kribi, Kumba, Kumbo, Limbe, Lolodorf, Loum, Mamfe, Manjo, Mbalmayo, Mbandjok, Mbanga, Mbouda, Meiganga, Melong, Mundemba, Mutengene, Muyuka, Nanga Eboko, Nkongsamba, Nkoteng, Obala, Penja, Sangmelima, Tibati, Tiko, Tonga, Yaounde, Yokadouma.

Garoua, Guider, Kaele, Lagdo, Maroua, Mindif, Mokolo, Mora, Ngaoundere, Pitoa, Rey Bouba, Tchollire, Yagoua maintained their historical average of 0 mm each. And the remaining station (Idenao) recorded an increase in rainfall amount compared to its historical amount.

2.3.5. Spatial distribution of rainfall in February

The spatial distribution of rainfall based on the historical values presented in Figure 22 below indicates that average rainfall amounts were maintained in the South region (Nyabissan, Lolodorf), the Centre (Mbeka), the North West region (Nwa), including the entire northern part (Adamawa, North and the Far North), except Mbe (Adamawa), which recorded rainfall amounts below the historical average. A general decrease in the amount of rainfall compared to the historical average was observed in the Bimodal Rain Forest Zone of Nyabessan and Lolodorf, except for the localities in the Highlands Zone, as well as in the Monomodal Rain Forest Zone.

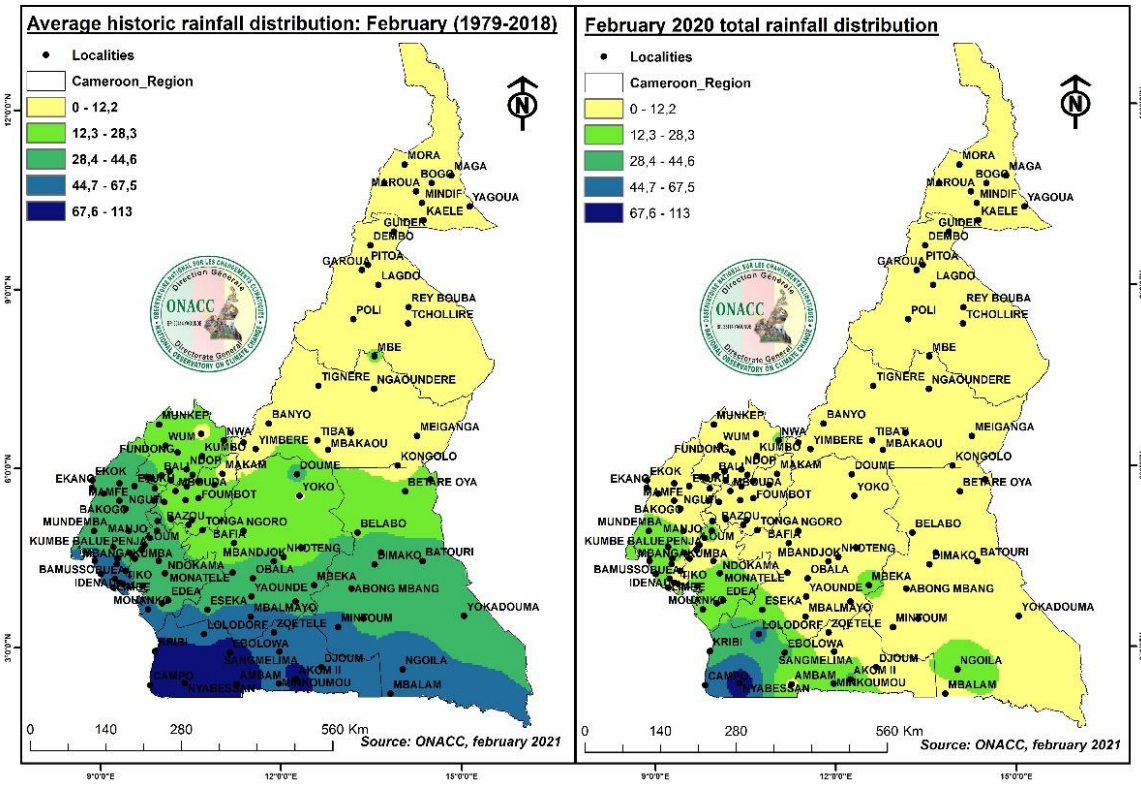


Figure 22: Spatial distribution of rainfall for the month of February 2020.

2.3.6. Evolution of the number of rainy days in February 2020.

The number of rainy days in February did not vary much. Six (06) of the 70 stations observed were above their historical number of rainy days in February 2020. They include Kribi, Ebolowa, Lolodorf, Edea, Dizangue, and Idenau. While three (03) recorded a number of days equal to their average during this month, notably Douala, Bamusso, and Mundemba.

61 stations recorded a decrease in rainy days in February 2020. The stations that recorded a decrease in the number of rainy days were Abong Mbang, Akonolinga, Bafang, Bafia, Bafoussam, Bali, Bamenda, Bamusso, Bangangte, Banyo, Batouri, Bazou, Belabo, Bertoua, Betare Oya, Bogo, Buea, Douala, Dschang, Eseka, Fontem, Foumban, Foumbot, Fundong, Garoua, Garoua Boulai, Guider, Kaele, Kumba, Kumbo, Lagdo, Limbe, Loum, Mamfe, Manjo, Maroua, Mbalmayo, Mbandjok, Mbanga, Mbouda, Meiganga, Melong, Mindif, Mokolo, Mora, Mutengene, Muyuka, Nanga Eboko, Ngaoundere, Nkongsamba, Nkoteng, Obala, Penja, Pitoa, Rey Bouba, Sangmelima, Tchollire, Tibati, Tiko, Tonga, Yagoua, Yaounde and Yokadouma.

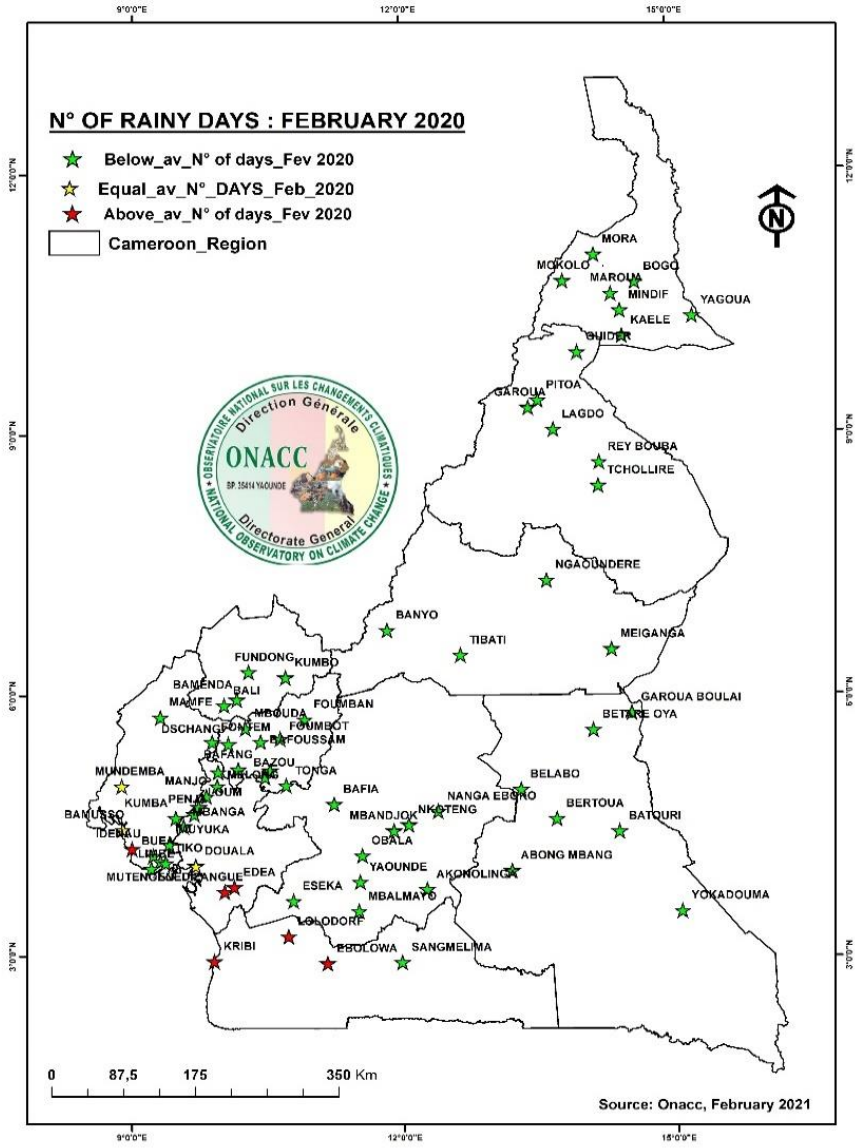


Figure 23: Evolution of the number of rainy days in February over the national territory.

2.3.7. Evolution of rainfall in March.

The situation in March 2020 presented a slightly different scenario for the distribution of rainfall in terms of amount and number of rainy days. 41 stations recorded an increase in rainfall amounts in March 2020. This ranged from 13mm in Mokolo to 342mm in Bali. Other stations that experienced an increase in rainfall amounts were Mokolo, Banyo, Meiganga, Ngaoundere, Tibati, Mbalmayo, Nanga Eboko, Nkoteng, Yaounde, Belabo, Betare' Oya, Garoua Boulai, Yokadouma, Ebolowa, Lolodorf, Sangmelima, Bafang, Bafoussam, Bangangte, Bazou, Dschang, Foumbot, Mbouda, Tonga, Bali, Bamenda, Kumbo, Fundong, Loum, Melong, Manjo, Mbanga, Nkongsamba, Penja, Buea, Fontem, Idenao, Kumba, Mamfe and Mundemba. The remaining 29 stations (Bogo, Kaele, Maroua, Mindif, Mora, Yagoua, Garoua, Guider, Lagdo, Pitoa, Rey Bouba, Tchollire, Akonolinga, Bafia, Mbandjok, Obala, Abong Mbang, Batouri, Bertoua, Kribi, Foumban, Dizangue, Douala, Edea, Buea, Mutengene, Muyuka, Limbe and Tiko) recorded rainfall amounts below their historical average values.

2.3.8. Spatial distribution of rainfall in March 2020

Figure 20 below shows the spatial distribution of rainfall amounts in March. Considerable increases were observed in the Highland zones (North West and West regions), the Monomodal rain forest zone (South West and northern part of the Littoral), the Bimodal rain forest zone (East region), with some areas in the Sudano-Sahelian zone (Bogo in Far-North and Dembo in North). An increase was observed in Batouri, Ngoila, Belabo, Mbeka, Mbalmayo, Yaounde, Minkoumou, Mintoum, Nyabessan, Ambam, Ebolowa, Zoetele in the bimodal rain forest zone, in Nwa, Nkambe, Wum, Batibo, Dschang, Bafang, Bangangte, Fundong in the Highlands zone, Etuku, Bakogo, Nguti, Bechati, Fontem, Mundemba, Kumbe Balue, Loum, Manjo, Nkongsamba, Melong, Kumba in the monomodal rain forest zone. Buea, Douala, Dizangue, Dikome Bafaw in the monomodal zone, Bafia, Mbandjok, Obala, Monatele, Kribi, Campo, Mbalam, Mindourou in the bimodal rain forest zone recorded a decrease in rainfall amounts.

35 stations (Bafang, Bafoussam, Bali, Bamenda, Bamusso, Bangangte, Batouri, Bazou, Buea, Dizangue, Douala, Dschang, Ebolowa, Edea, Eseka, Fontem, Kribi, Limbe, Lolodorf, Loum, Mamfe, Manjo, Mbouda, Mundemba, Mutengene, Nkongsamba, Penja, Tiko, Tonga, Mokolo, Tchollire, Yokadouma, Meiganga, and Mbanga) recorded a number of days above their historical averages in March 2020. 29 stations (Abong Mbang, Akonolinga, Bafia, Banyo, Belabo, Bertoua, Betare Oya, Bogo, Foumban, Foumbot, Fundong, Garoua, Guider, Kumbo, Kribi, Lagdo, Mbalmayo, Mbandjok, Melong, Muyuka, Nanga Eboko, Ngaoundere, Nkoteng,

Obala, Pitoa, Sangmelima, Tiko and Yaounde) recorded a decrease in the number of rainy days, while Kaele, Maroua, Mindif, Mora, Rey Bouba and Yagoua maintained their historical number of rainy days during this month.

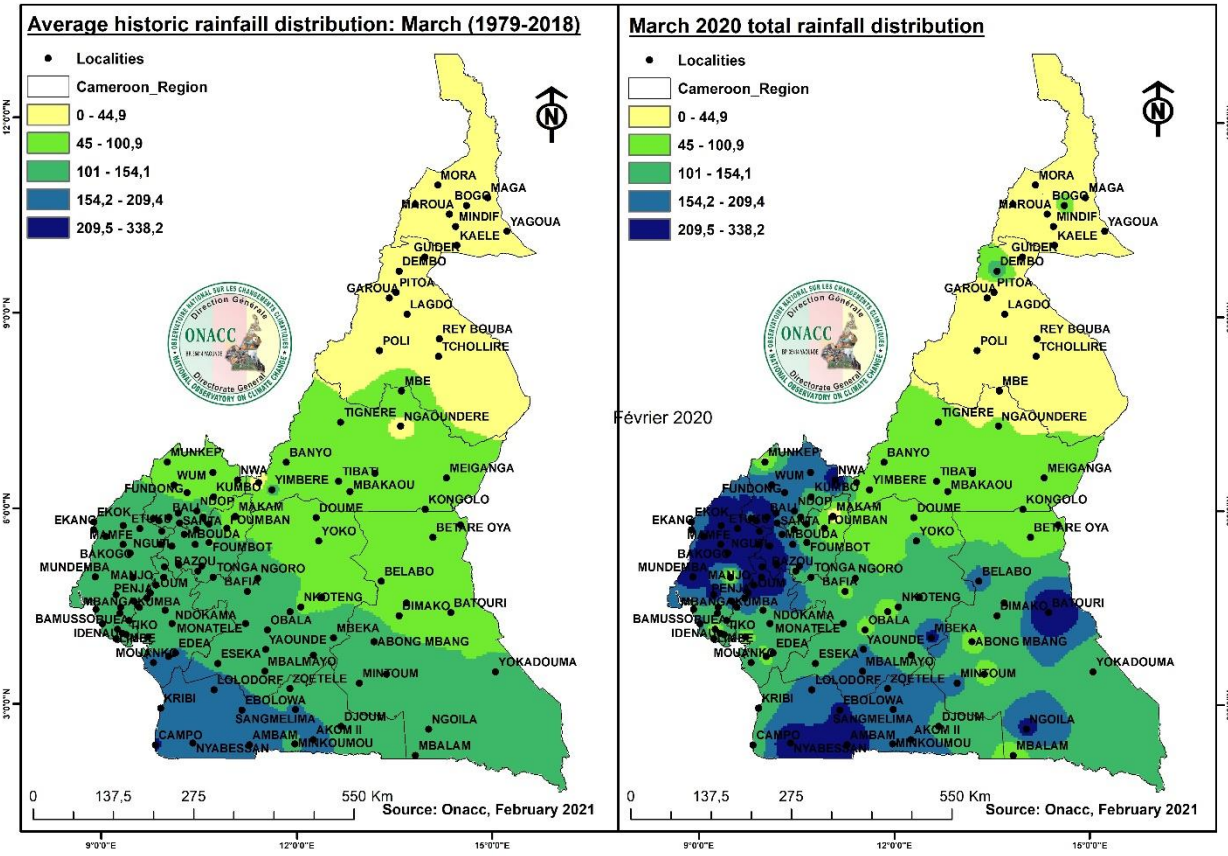


Figure 24: Spatial distribution of rainfall in March 2020

2.3.9. Evolution of the number of rainy days in March 2020

The spatial distribution of the number of rainy days for March indicates that the increase in the number of rainy days was recorded in some localities in the Centre, South, Littoral, South West, North-West and West regions, as shown in Figure 25 below. Most of the stations in the Far-North, North, Adamawa, Centre and East regions, with a few in the North-West and West, recorded a complete decrease in the number of rainy days. However, the average number of rainy days was maintained by a few stations (03) in the Centre and East regions.

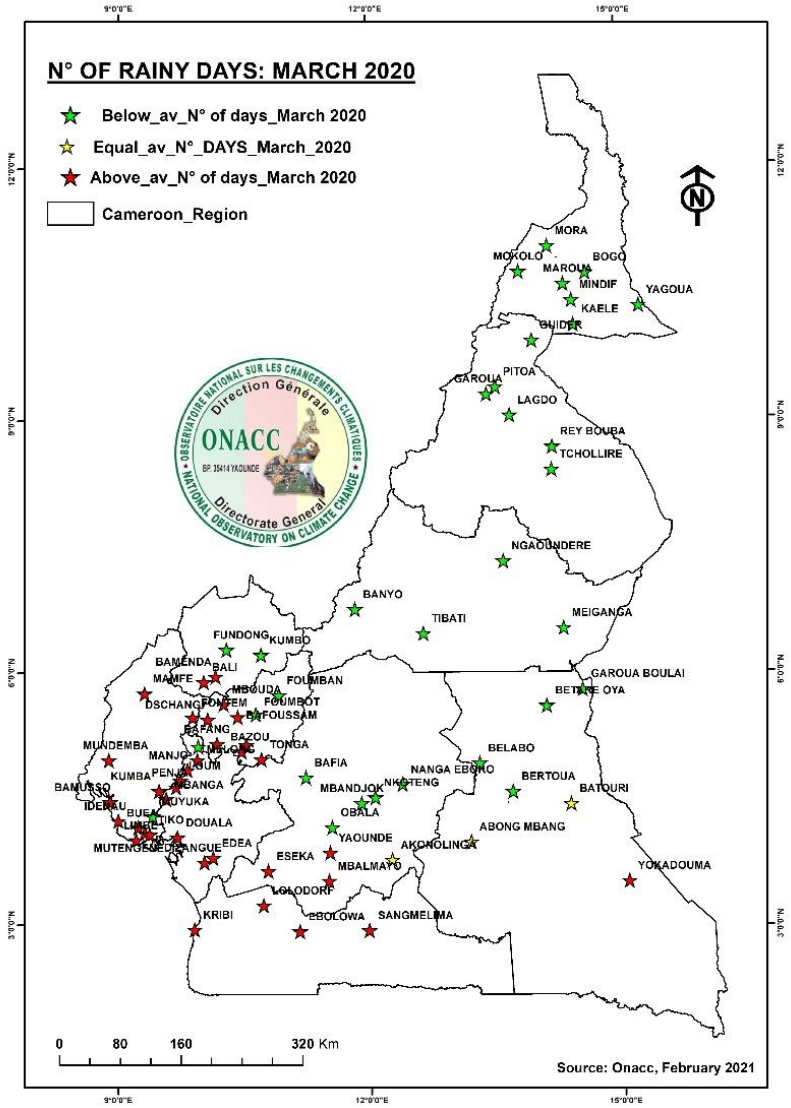


Figure 25: Evolution of the number of rainy days in March over the national territory

2.3.10. Evolution of rainfall amounts in April

The distribution of rainfall amounts in April 2020 varied from one locality to another in terms of amount and number of rainy days. Most localities (44 stations) experienced an increase in the total amount of rainfall compared to the historical rainfall average. They include 1 station in the Far-North (Mokolo), Garoua and Lagdo in the North region, and all the stations in the Centre region (Akonolinga, Bafia, Eseka, Mbandjok, Mbalmayo, Nanga Eboko, Nkoteng, Obala and Yaounde), all the stations equally in the East region (Abong Mbang, Batouri, Belabo, Bertoua, Betare'Oya, Garoua Boulai and Yokadouma), Ebolowa, Lolodorf and Sangmelima in the South, all the stations in the West region (Bafang, Bafoussam, Bangangte, Bazou, Dschang, Foumban, Foumbot, Mbouda and Tonga), 4 stations in the North-West region (Bali, Bamenda, Kumbo and Fundong), Loum, Melong, Manjo, Mbanga, Nkongsamba and Penja in the Littoral

region, Buea, Fontem, Idenau, Kumba, Mamfe and Mundemba in the South-West region. During the same period, 27 out of 70 stations recorded rainfall amounts below the historical average, notably Bogo, Kaele, Maroua, Mindif, Mora and Yagoua in the Far-North region, Guider in the North region, Pitoa, Rey Bouba and Mundemba in the West region, Pitoa, Rey Bouba and Tchollire), Kribi in the South region, the North-West region (Bamusso), Dizangue, Douala and Edea in the Littoral region and the South-West region (Mutengene, Muyuka, Limbe and Tiko).

2.3.11. Spatial distribution of rainfall amounts in April

According to Figure 26, the spatial distribution of rainfall amounts in April, significant increases (Figure 26 B) were observed in the Highlands zone, the Guinean high savannah zone, part of the Bimodal rainforest zone and the Monomodal rainforest zone. It also appears that Mbe and Poli in the Adamawa, Djoum in the south, Mbalam and Mindourou in the east, and Munkep in the North-West recorded a decrease in rainfall amounts.

58 weather stations (Abong Mbang, Akonolinga, Bafang, Bafia, Bafoussam, Bali, Bamenda, Bangangte, Banyo, Batouri, Bazou, Belabo, Bertoua, Betare'Oya, Buea, Dizangue, Dschang, Ebolowa, Edea, Eseka, Fontem, Foumban, Foumbot, Fundong, Garoua, Garoua Boulai, Idenau, Kumba, Kumbo, Lagdo, Limbe, Lolodorf, Loum, Mamfe, Manjo, Mbalmayo, Mbanga, Mbouda, Meiganga, Melong, Mundemba, Mutengene, Muyuka, Nanga Eboko, Ngaoundere, Nkongsamba, Nkoteng, Obala, Penja, Pitoa, Rey Bouba, Tchollire, Tiko, Tonga, Yaounde, Yokadouma) recorded an increase in the number of rainy days in April 2020, the number of rainy days decreased by three (03) days in Bamusso, Mindif, two (02) days in Maroua, Bogo and one (01) day in Douala, Mbandjock and Yagoua. Four (04) stations (Guider, Mokolo, Mora, Sangmelima, and Tibati) maintained their historical values of rainy days in April 2020.

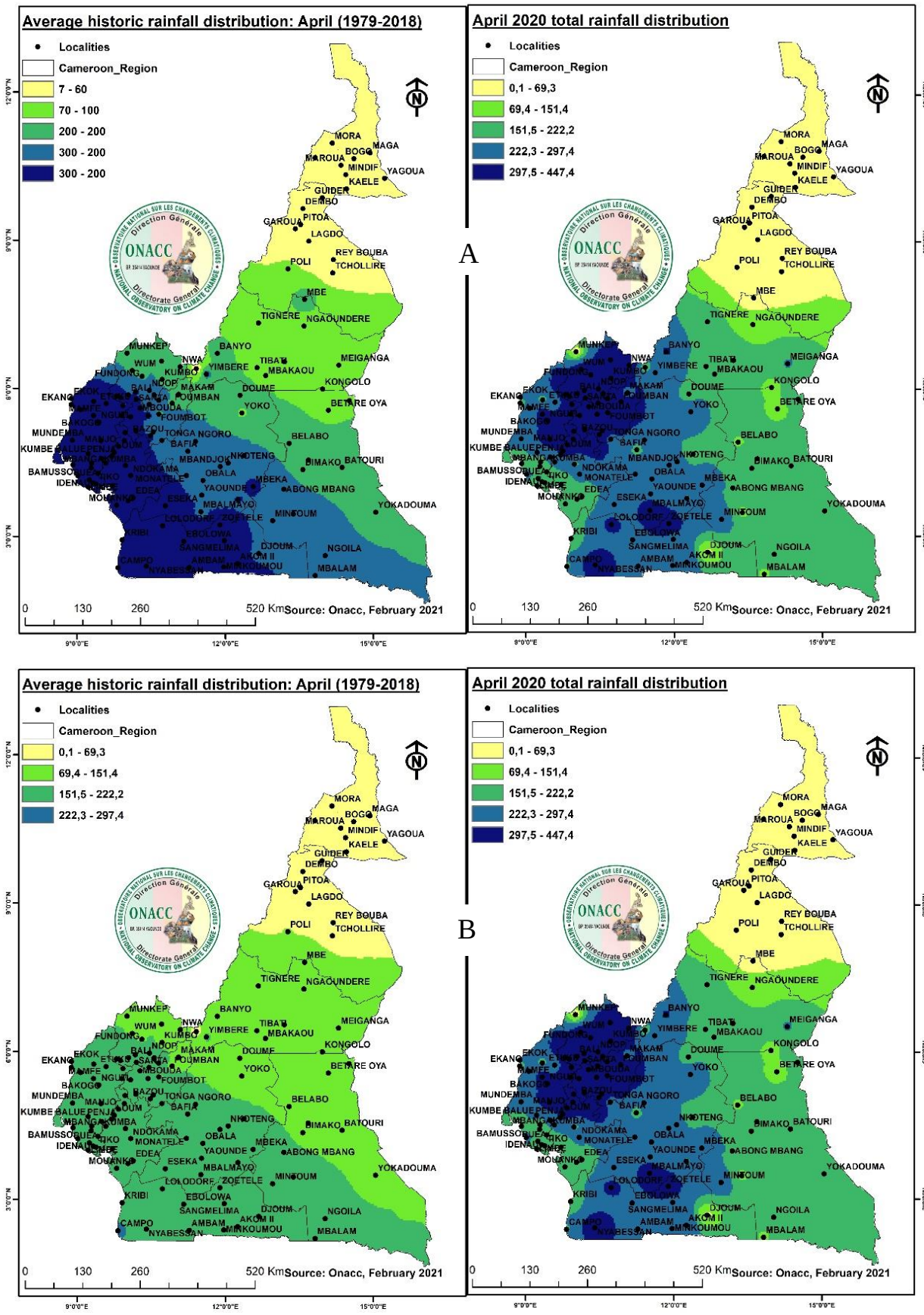


Figure 26: Spatial distribution of rainfall amounts in April 2020

2.3.12. Evolution of the number of rainy days in April 2020

The spatial distribution of the number of rainy days, as presented in Figure 27 below, shows that most or all the stations in the Centre, South, East, West, South-West, North West, Littoral and a major part of the Adamawa regions recorded an increase in the number of rainy days. While the North, Far-North and a minor part of the Adamawa regions experienced a decrease in the number of rainy days in April 2020.

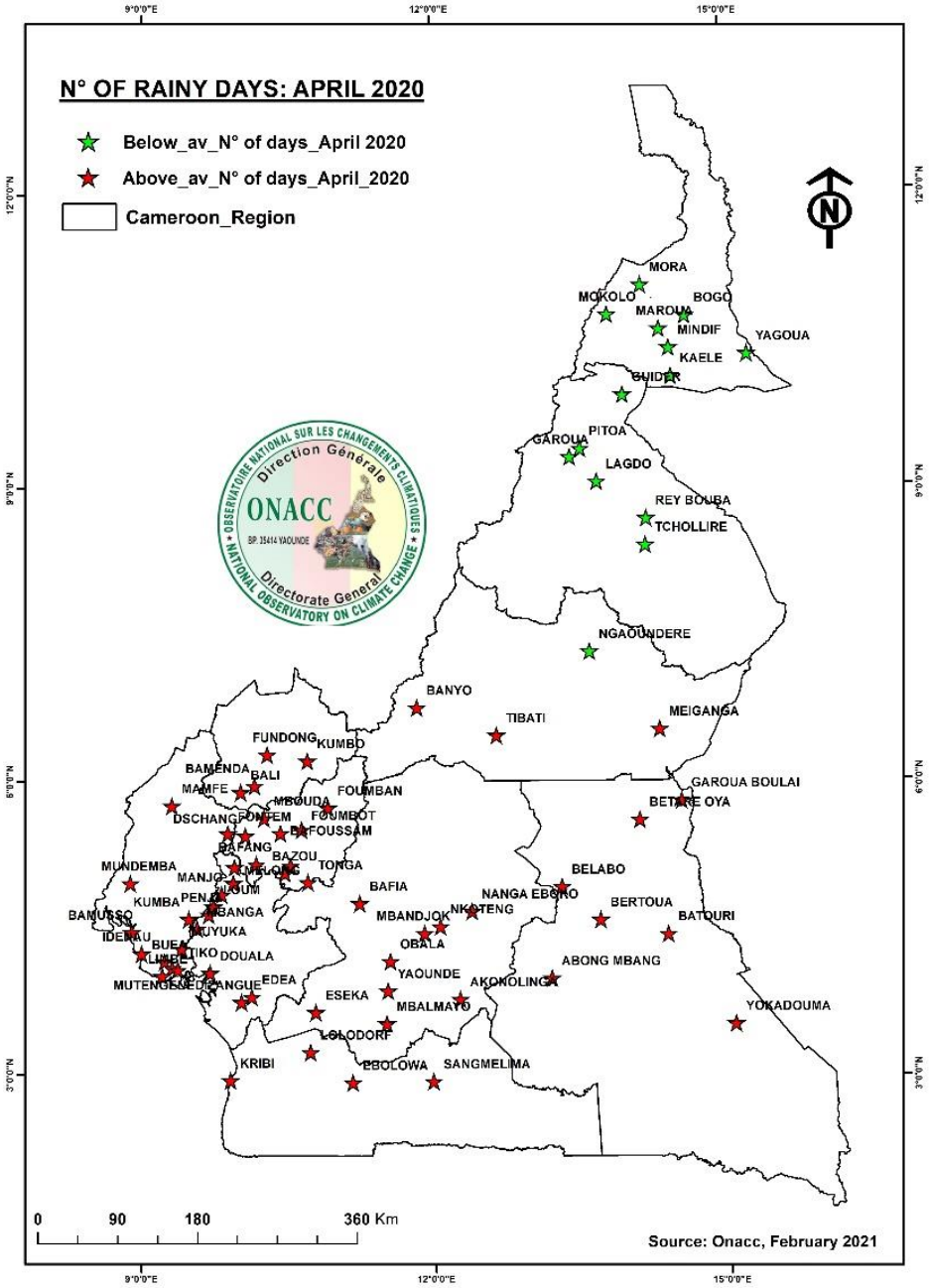


Figure 27: Evolution of the number of rainy days in April over the national territory.

2.3.13. Evolution of rainfall in May 2020

The month of May 2020 recorded a general increase in the total rainfall amount in the Guinean High Savannah, Bimodal Rain forest and Monomodal Rain forest zones compared to the historical average rainfall amounts. 51% (56 stations) are above the historical average rainfall amounts, they include Banyo, Meiganga, Ngaoundere and Tibati in the Adamawa region, Akonolinga, Bafia, Eseka, Mbandjock, Mbalmayo, Nanga Eboko, Nkoteng, Obala and Yaounde in the Centre region In the East we have Abong Mbang, Batouri, Belabo, Bertoua, Betare Oya, Garoua Boulai and Yokadouma, Ebolowa, Kribi, Lolodorf and Sangmelima in the South region, Bafang, Bafoussam, Bangangte, Bazou, Dschang, Foumban, Foumbot, Mbouda and Tonga in the West region, and Bamusso in the North-West region Dizangue, Douala, Edea, Loum, Melong, Manjo, Mbanga, Nkongsamba and Penja in the Littoral region, Buea, Fontem, Idenau, Kumba, Mamfe, Mundemba, Mutengene, Muyuka, Limbe and Tiko in the South-West region) contrary to that, only 22% (15 stations out of 70) recorded rainfall amounts below the historical average, Kaele, Maroua, Mindif, Mokolo, Mora and Yagoua in the Far-North region, Garoua, Guider, Lagdo, Pitoa, Rey Bouba and Tchollire in the North region, and finally Bamusso in the North West region.

2.3.14. Spatial distribution of rainfall amounts in May

A comparison of the spatial distribution of rainfall amounts in May with the historical values for the same month (Figure 28 below) shows that rainfall amounts increased in the North-West, Centre, East, South and West regions. A decrease was observed around Akom II (South) as well as in the Sudano-Sahelian zone in the North region.

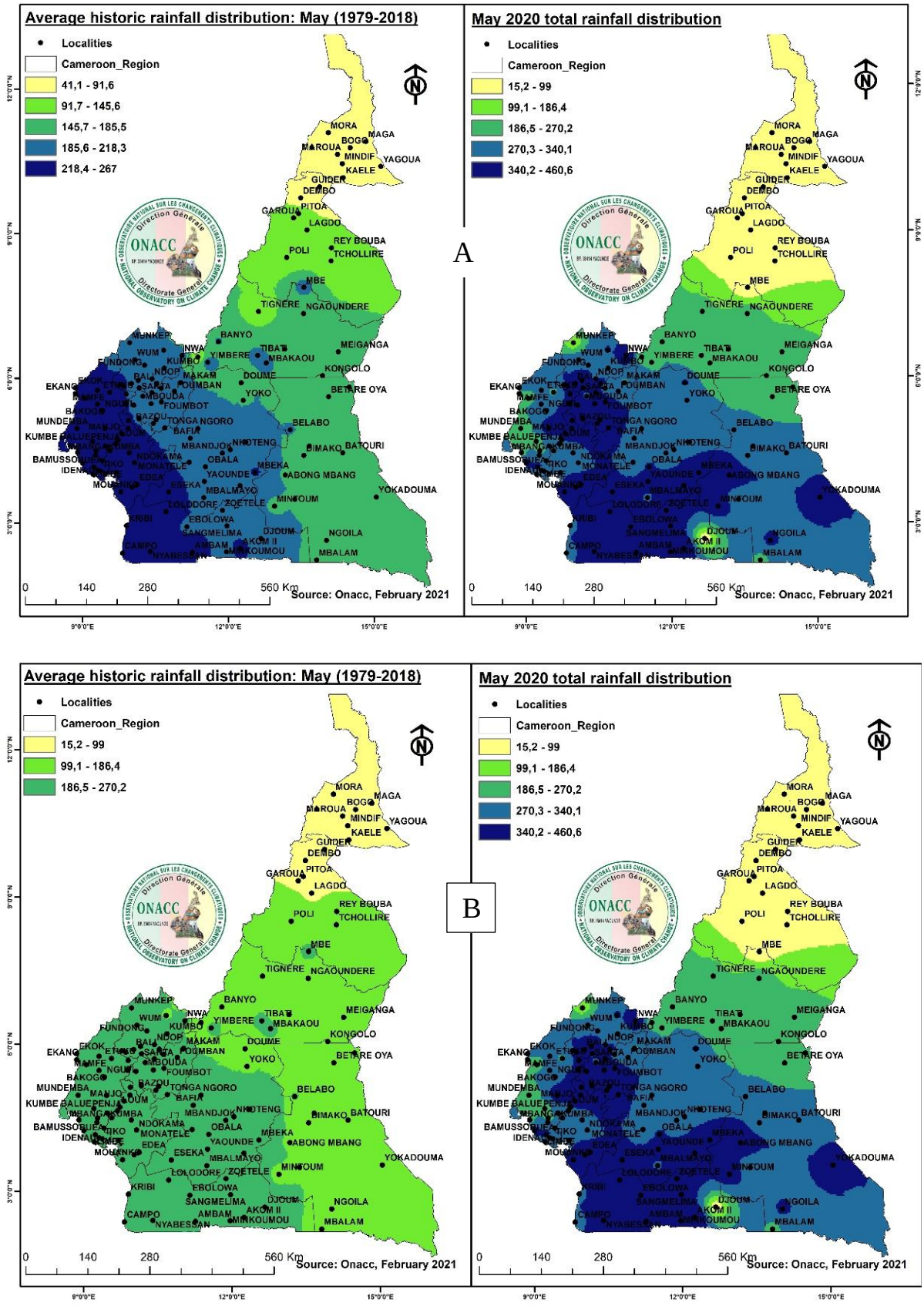


Figure 28: Spatial distribution of rainfall amounts in May 2020.

2.3.15. Evolution of the number of rainy days in May 2020

According to Figure 29 below, most weather stations recorded an increase in the number of rainy days. 59 of the 70 stations observed recorded an increase of at least one day in May 2020, of which 24 recorded an increase of 7 days (Akonolinga, Bafang, Bafoussam, Bali, Bamenda, Bangangte, Bazou, Buea, Douala, Dschang, Ebolowa, Fontem, Limbe, Lolodorf, Loum, Manjo, Mbanga, Melong, Mutengene, Nkongsamba, Nkoteng, Penja and Yokadouma). 18 stations recorded an increase of 6 days (Abong Mbang, Batouri, Belabo, Bertoua, Betare Oya, Eseka, Kumba, Kumbo, Mamfe, Mbalmayo, Mbandjok, Mbouda, Muyuka, Ngaoundere, Obala, Tiko, Tonga and Yaounde). 12 stations recorded an increase of three to five days of rainfall (Bafia, Bamusso, Banyo, Dizangue, Edea, Foumban, Foumbot, Garoua Boulai, Idenau, Meiganga, Mundemba, Nanga Eboko, and Tibati). A decrease in the number of rainy days occurred especially in the Sudano-Sahelian zone.

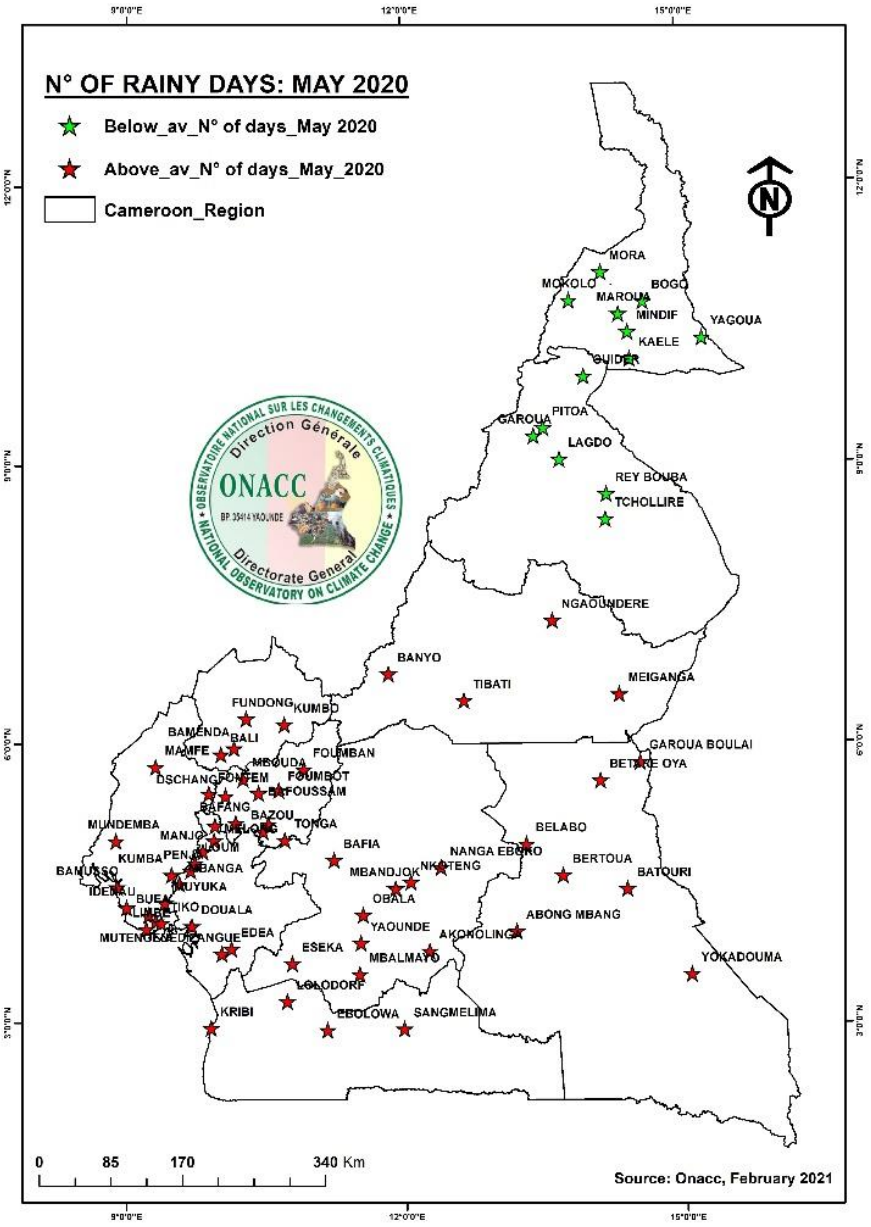


Figure 29: Evolution of the number of rainy days in May over the national territory

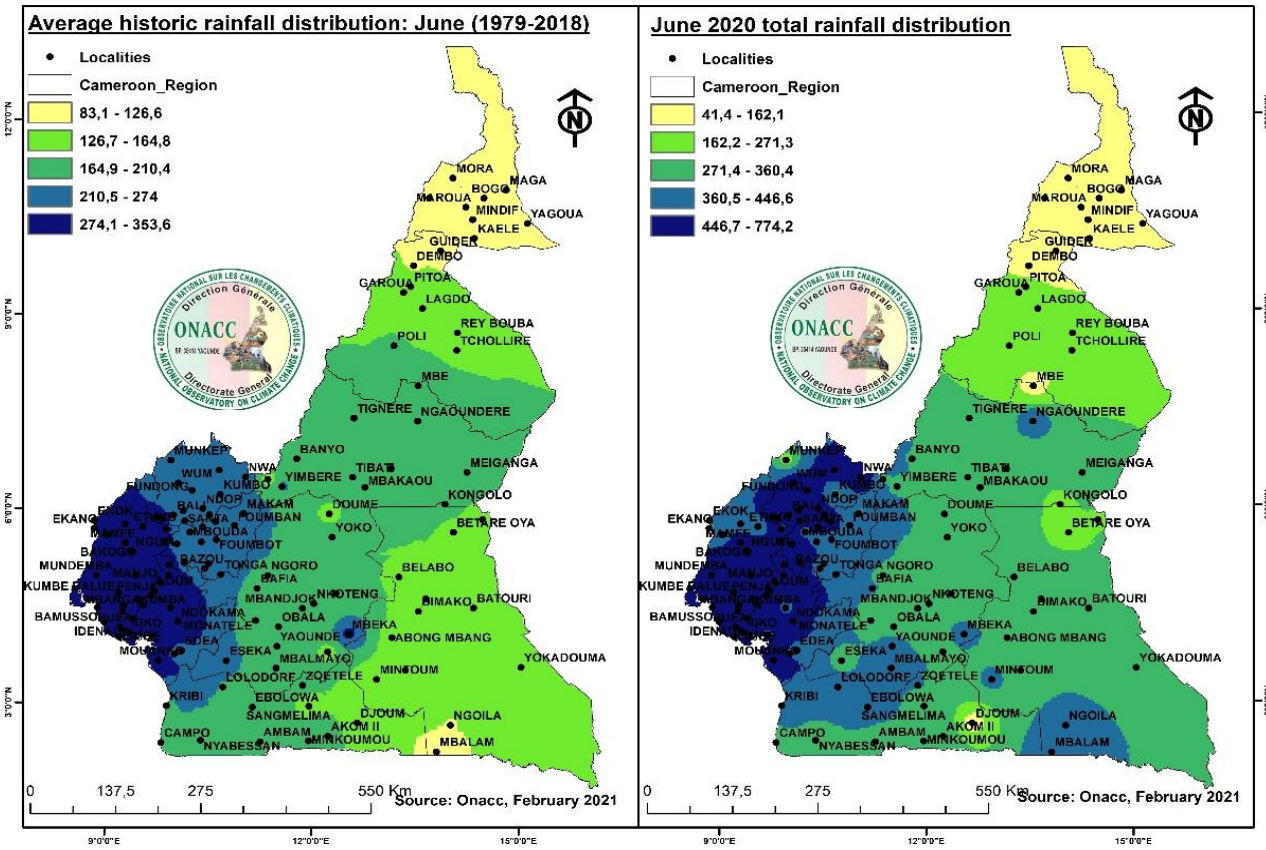
2.3.16. Evolution of rainfall amounts in June 2020

The month of June 2020 was characterized by a continuous increase in rainfall amounts in the Guinean High Savannah Zone, the Bimodal Rainforest Zone, the Monomodal Rainforest Zone and the Highlands Zone. 67 stations out of 71, or 93% of the stations, recorded rainfall amounts above the historical average. They include Kaele, Maroua, Mindif and Yagoua in the Far North, Garoua, Lagdo, Pitoa, Rey Bouba and Tchollire in the North, and all the stations in the Adamawa region (Banyo, Meiganga, Ngaoundere and Tibati) Akonolinga, Bafia, Eseka, Mbandjok, Mbalmayo, Nanga Eboko, Nkoteng, Obala and Yaounde in the Centre region, Abong Mbang, Batouri, Belabo, Bertoua, Betare Oya, Garoua Boulai and Yokadouma in the

East, Ebolowa, Kribi, Lolodorf, Sangmelima in the South, Bafang, Bafoussam, Bangangte, Bazou, Dschang, Foumban, Foumbot, Mbouda and Tonga in the West region, Bali, Bamenda, Bamusso, Kumbo and Fundong in the North-West, Dizangue, Douala, Edea, Loum, Melong, Manjo, Mbanga, Nkongsamba and Penja in the Littoral region, Buea, Fontem, Idenau, Kumba, Mamfe, Mundemba, Mutengene, Muyuka, Limbe and Tiko in the South-West region). However, only four stations recorded values below the historical average, notably Bogo, Mora and Mindif in the Far North and Guider in the North region.

2.3.17. Spatial distribution of rainfall amounts in June 2020

The spatial distribution of rainfall amounts, as presented in Figure 30 below, shows that most of the increase in rainfall amounts occurred in the Highland zones of Cameroon (North-West, West, some in the South-West with a small part of the Adamawa). Part of the Littoral region recorded a slight decrease in the amount of rainfall during this month. A slight increase was also recorded in the Bimodal rainforest zone (the Centre, South and part of the East regions).



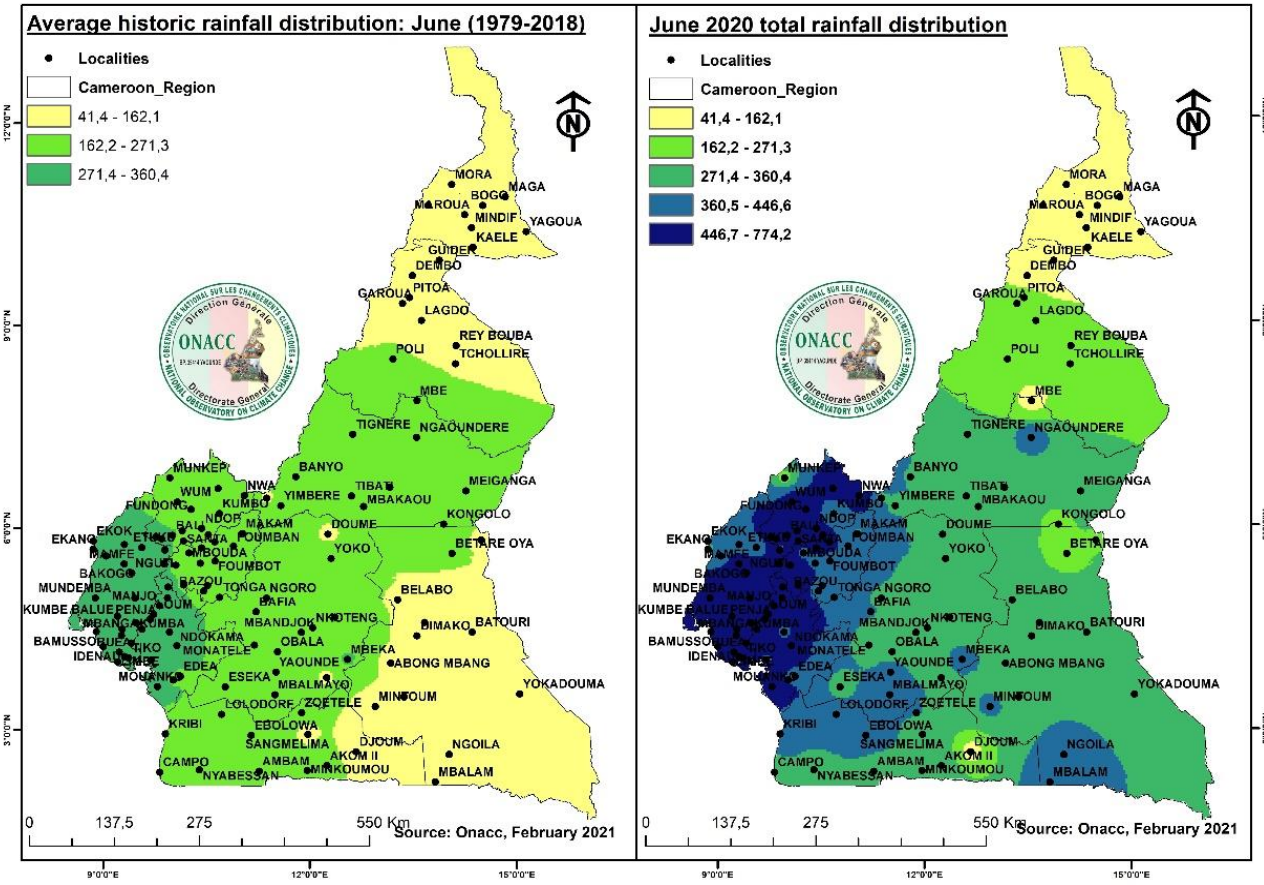


Figure 30: Spatial distribution of rainfall amounts in June 2020

2.3.18. Evolution of the number of rainy days in June 2020

According to Figure 31 below, in June 2020 most of the weather stations recorded an increase in the number of rainy days. 62 of the 70 stations observed recorded an increase of at least one day, of which 43 recorded an increase of 6 days (Abong Mbang, Bafia, Bafang, Bafoussam, Bali, Bamenda, Bamusso, Banyo, Bangangte, Batouri, Bazou, Belabo, Bertoua, Buea Dschang, Ebolowa, Eseka, Fontem, Foumban, Foumbot, Fundong, Garoua Boulai, Idenau, Kumbo, Lolodorf, Loum, Mamfe, Manjo, Mbanga, Mbouda, Meiganga, Melong, Mundemba, Nanga Eboko, Ngaoundere, Nkongsamba, Obala, Penja, Sangmelima, Tibati, Tonga) 11 stations recorded an increase of 5 days (Akonolinga, Betare Oya, Dizangue, Edea, Limbe, Kumba, Mbalmayo, Mbandjok, Mutengene, Muyuka, Nkoteng, Tiko). 7 stations recorded an increase of one to four rainy days (Douala, Garoua, Kribi, Lagdo, Pitoa, Rey Bouba, and Tchollire). The decrease in the number of rainy days was recorded mainly in the Sudano-Sahelian zone.

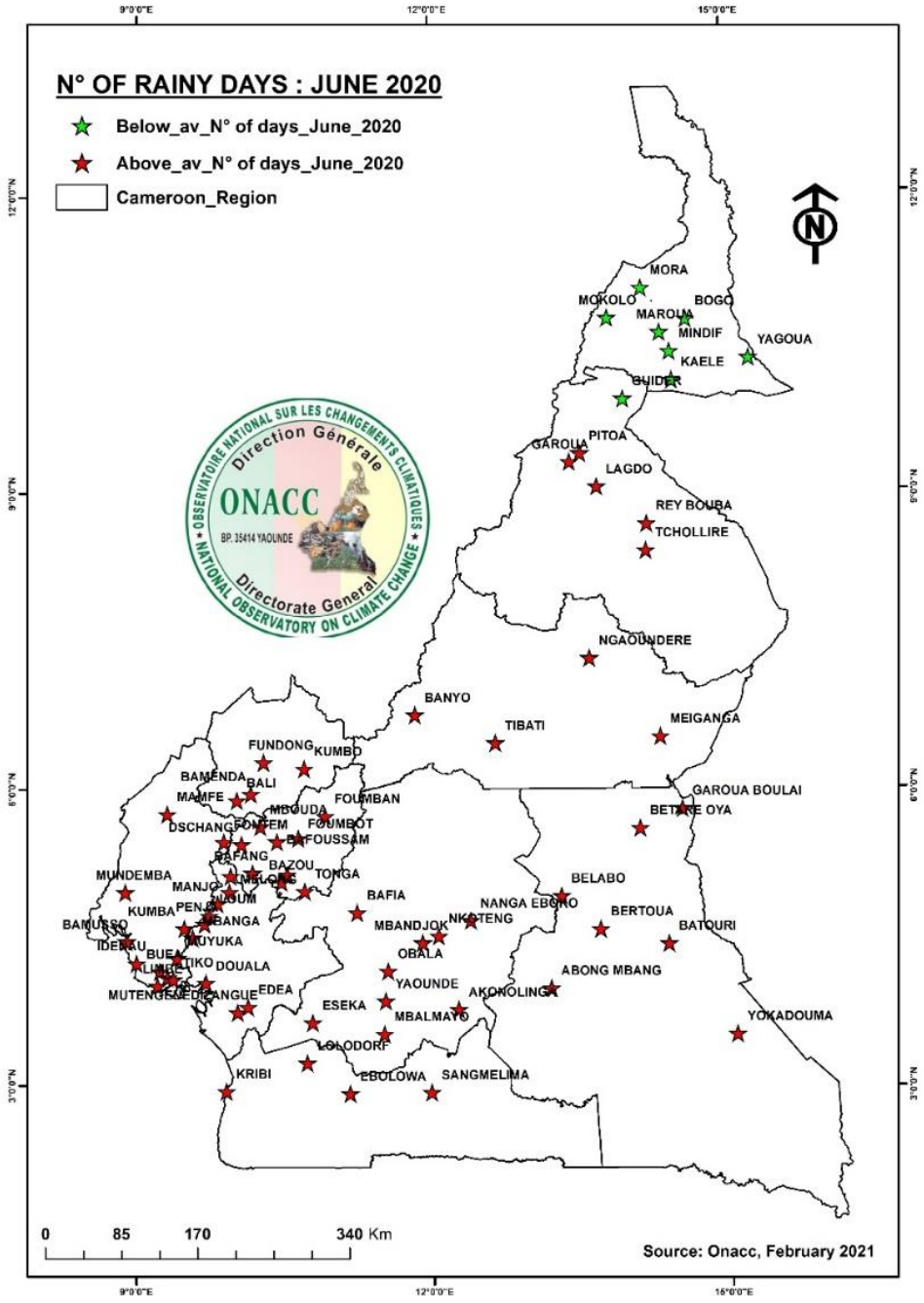


Figure 31: Evolution of the number of rainy days in June over the national territory

2.3.19. Evolution of rainfall in July 2020

The rainfall pattern in July 2020 varies from one locality to another. Generally, July is considered to be a wet month in four agro-ecological zones except for the Bimodal Rain Forest Zone, which experiences a short dry season. According to Figure 32(A), average rainfall amounts are well above the historical average in all agro-ecological zones, except for the Sudano-Sahelian zone, where some localities (Kaele, Maroua, Mindif and Mora in the Far-

North region) record rainfall amounts below the historical average. A different scenario occurs for the Bimodal Rainforest Zone with the absence of the short dry season.

2.3.20. Spatial distribution of rainfall in July

Based on historical precipitation values figure 33 shows that, there was an almost overall increase in the amount of precipitation over the entire national territory in July 2020. Almost all the 70 stations recorded an increase in rainfall amount during this month. Increases of less than 80mm were recorded in the Far-North region (Mokolo, Mora, Maroua, Yagoua, Kaele, Bogo, Mindif), the Centre (Akonolinga, Mbandjok, Eseka, Bafia, Nkoteng, Mbalmayo, Obala, Yaounde), the East region (Bertoua, Betare'Oya, Belabo, Yokadouma, Batouri, Abong Mbang, Garoua Boulai), in the north region (Garoua, Tchollire, Guider, Pitoa, Lagdo, Rey Bouba), in the south (Ebolowa, Sangmelima, Lolodorf, Kribi), in the Adamawa region (Meiganga, Tibati, Ngaoundere), in the west (Tonga). Increases of between 80mm and 100mm were recorded in the Adamawa region (Ngaoundere, Banyo), in the west region (Mbouda, Bafoussam, Foumban, Dschang, Bazou, Foumbot), in the North-West region (Fundong, Kumbo, Bali, Bamenda), in the South-West region (Mamfe, Fontem) and the Littoral region (Dizangue, Edea, Melong, Nkongsamba). The remaining stations in the South-West region (Mundemba, Idenau, Bamusso, Kumba, Muyuka, Mutengene, Limbe, Tiko), the Littoral (Douala, Mbanga) are the only stations that recorded an increase of more than 250 mm of rainfall.

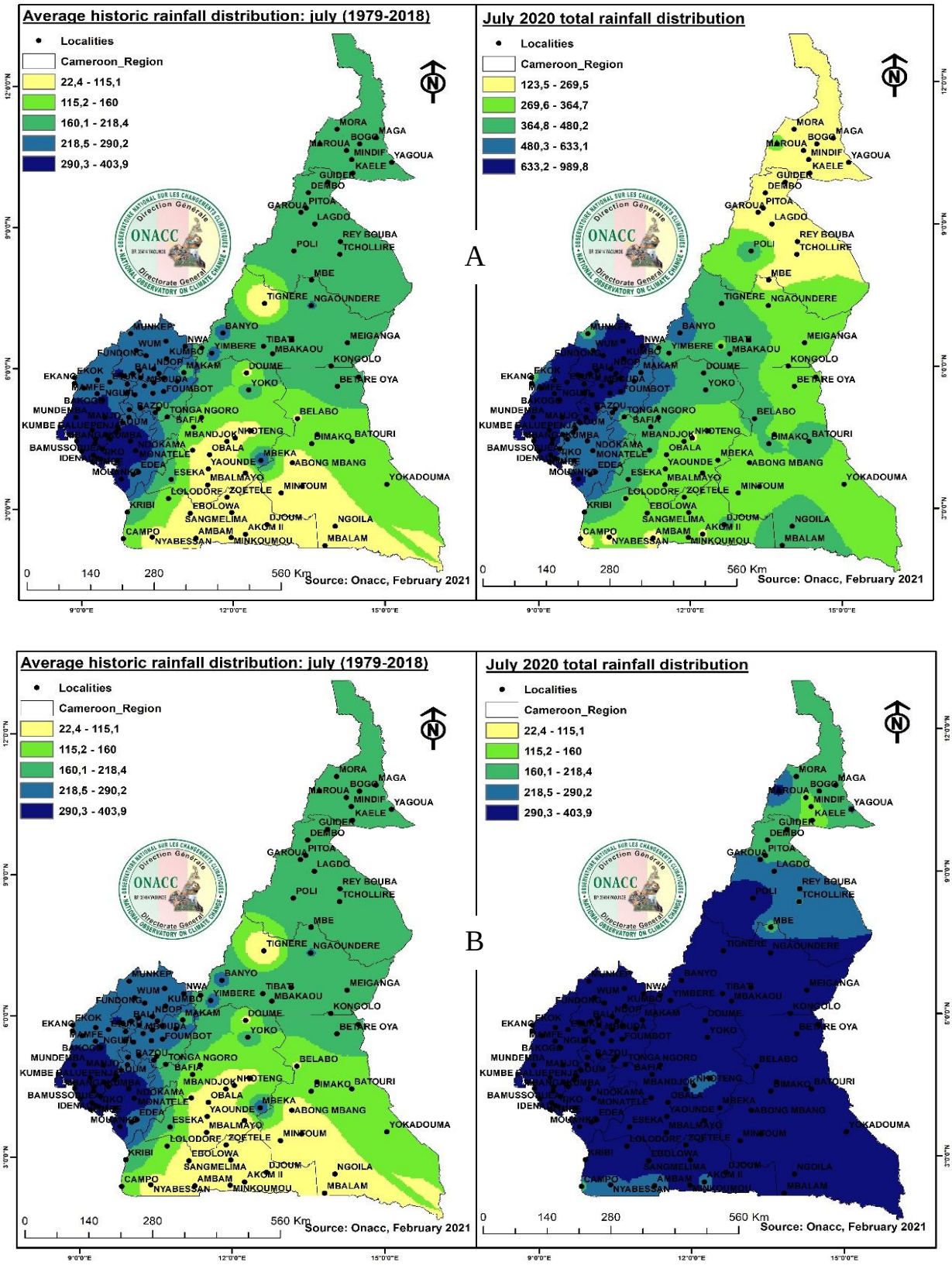


Figure 32: Spatial distribution of rainfall in July 2020

2.3.21. Evolution of the number of rainy days in July 2020

The number of rainy days also increased significantly in most of the localities over the national territory. Up to 63 stations recorded an increase in the number of rainy days, one station maintained its number of rainy days and 6 stations recorded a decrease in their number of days in July 2020. As shown in Figure 29 below, the only station that maintained its number of rainy days is Guider in the North region. A significant increase of at least 10 days was recorded in the Centre region (Akonolinga, Eseka, Mbalmayo, Obala, Yaounde), in the Far-North (Mokolo), in the North region (Pitoa, Rey-Bouba, Tchollire, Lagdo, Garoua). Increases (+1 day) were observed in the Far-North region (Yagoua, Mora, Mindif, Kaele, Maroua, Bogo), in the Adamawa (Meiganga, Tibati, Banyo), in the East (Abong Mbang, Belabo, Bertoua, Batouri, Betare Oya, Garoua Boulai, Yokadouma), the Centre (Bafia, Nanga Eboko, Nkoteng, Mbandjok), and the South (Kribi, Lolodorf, Ebolowa, Sangmelima) The lowest numbers of days (0 days) were recorded in the North-West region (Bali, Bamenda, Fundong), South-West region (Mamfe), Adamawa (Ngaoundere), Centre region (Nkoteng, Nanga Eboko). The locality of Guider (North Cameroon) maintained its average number of rainy days in July 2020.

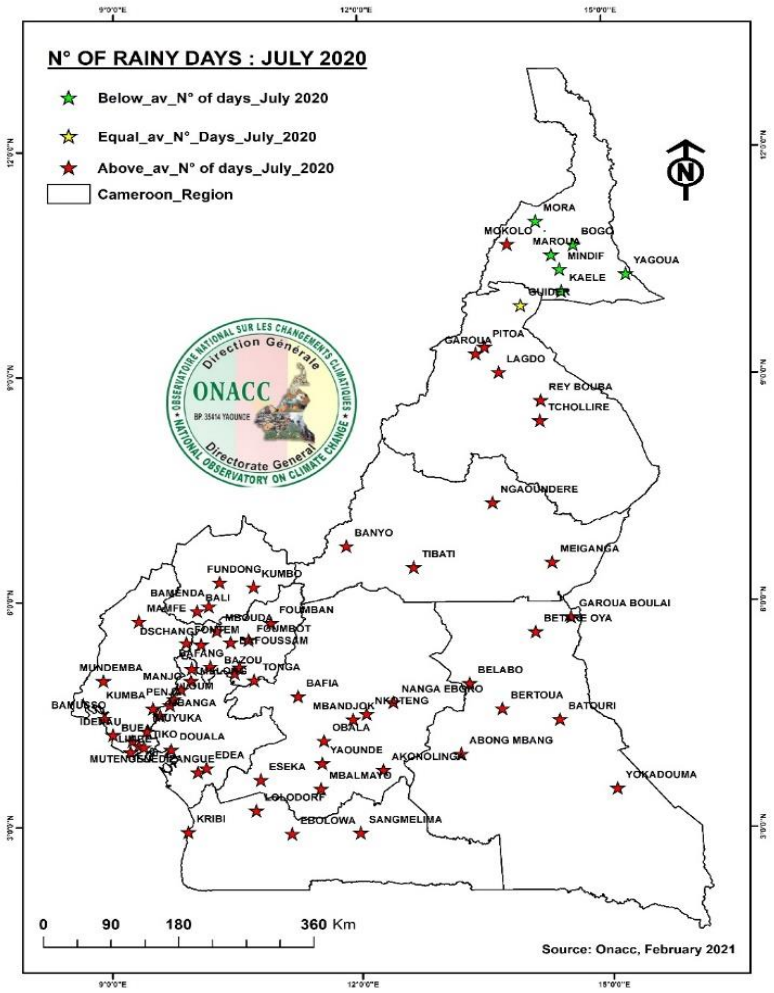


Figure 33: Evolution of the number of rainy days in July over the national territory

2.3.22. Evolution of rainfall in August 2020

The highest decrease in rainfall amounts (285mm) was recorded in Douala and a general decrease over the national territory was recorded in August relative to its historical average. A total of 29 out of 70 stations notably (Yokadouma, Batouri, Abong bang, Belabo, Garoua Boulai) in the East region, (Bafia, Obala, Akonolinga, Yaounde, Mbalmayo, Nanga Eboko, Nkoteng) in the Centre region, (Sangmelima, Ebolowa, Kribi) in the South region, Tibati in the Adamawa region, (Mokolo, Mora, Mindif, Maroua) in the Far-North region, (Mamfe, Mundemba) in the South-West region, (Fundong, Bali, Kumbo) in the North-West region, (Melong) in the Littoral region recorded an increase in rainfall amounts for this month in 2020. The lowest value of 4mm was recorded in Maroua, while the highest of 110mm was recorded in Sangmelima. No station maintained its historical rainfall average for August. In addition, 41 stations (Bogo, Yagoua, Kaele) in the Far-North region, (Guider, Pitoa, Garoua, Lagdo, Rey Bouba, Tchollire) in the North region, (Ngaoundere, Meiganga, Banyo) in the Adamawa region, (Betare' Oya, Bertoua) in the East region, (Mbandjock, Eseka) in the Centre region, (Lolodorf)

in the South region, (Mbouda, Bafoussam, Bafang, Bangangte, Bazou, Tonga, Dschang) in the West region, (Manjo, Loum, Penja, Mbanga, Douala, Edea, Dizangue) in the Littoral region, (Kumba, Buea, Muyuka, Limbe, Tiko, Mutengene , Bamusso, Idenau) in South-West region recorded below average rainfall amounts in August the lowest (1mm) was recorded in the Adamawa (Banyo) and East region (Betare' Oya).

2.3.23. Spatial distribution of rainfall in August

According to Figure 34 (A) below, the spatial distribution of total rainfall indicates a slight decrease in rainfall amounts in some localities. The historical average of rainfall for August generally varies between 97mm and 514.9mm for August (1979-2018) and in August 2020 a slight change occurred from 124.1mm to 477.3mm. In the Far-North region, Yagoua, Kaele, Maga, Bogo and Maroua recorded a decrease in rainfall amounts. While the other part is divided between an increase (Mokolo) and a stable average rainfall amount. The north region (Tchollire, Rey Bouba, Lagdo, Garoua, Pitoa, Dembo, Guider), registered low rainfall amounts, around the historical average. In addition, the Far North remains exceptionally rainier than the North region. According to the same figures, the South-West region recorded more rainfall amounts than the North-West, as shown in the historical pattern.

Based on the spatial distribution of historical rainfall amounts, there was a general decrease in total rainfall in the five agro-ecological zones as shown in Figure 34 (B) below, with some slight increases in some regions. We therefore observe a normal situation in the South and Adamawa regions. The monomodal agro-ecological zones (Littoral, South West), the Highlands (North-West, West), the Sudano-Sahelian (Far North, North), and the Guinean High Savannah (Adamawa) recorded a decrease in total rainfall. Increases in total rainfall amounts were more observed in the Highlands, Sudano-Sahelian, Bimodal (South, East), and the Guinean High Savannah zone (Adamawa).

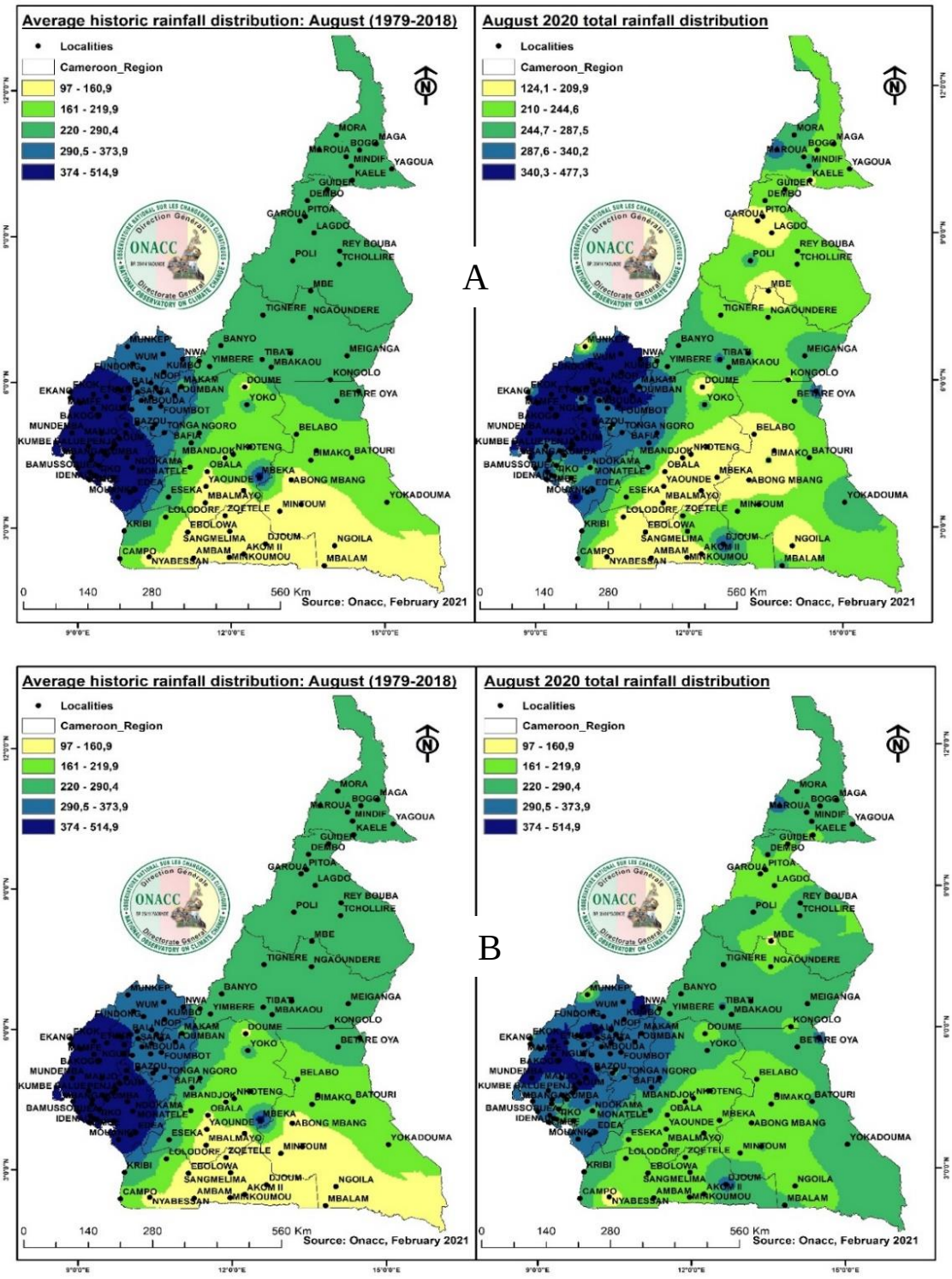


Figure 34: Spatial distribution of precipitation in August 2020

2.3.24. Evolution of the number of rainy days in August 2020

The number of rainy days in August 2020 varied from one region to another. 38 stations out of 70 recorded an increase in the number of rainy days in August 2020 (Figure 35 below), notably Bogo and Yagoua in the Far-North region; Tchollire in the North; Banyo and Tibati in the

Adamawa region; Fundong, Kumbo, Bali and Bamenda in the North-West region; Foumban, Mbouda, Bafoussam, Bafang, Bangangte, Bazou, Dschang in the West region; Mamfe, Bamusso, Idenau, Kumba, Limbe in the South-West region; Nkongsamba, Manjo, Melong, Loum, Mbanga, Edea, Dizangue in the Littoral region; Bafia, Yaounde, Eseka in the Centre region; Kribi in the South and the East we have Batouri, Yokadouma, Garoua Boulai, Belabo. 12 stations (Bafia, Yaounde) in the Centre region, Bafoussam in the West region, Mbanga in the Littoral, (Kumba, and Limbe) in the South-West region, (Bali, Bamenda) in the North-West region recorded 1 additional rainy day. The largest increases (4 days) in the number of rainy days were recorded at Foumban in the West region and Melong in the Littoral Region. 7 stations (Bafang, Bazou, Dschang, Mbouda) in the West Region, (Nkongsamba) in the Littoral Region, and (Yokadouma) in the East region maintained their historical number of rainy days for of August.

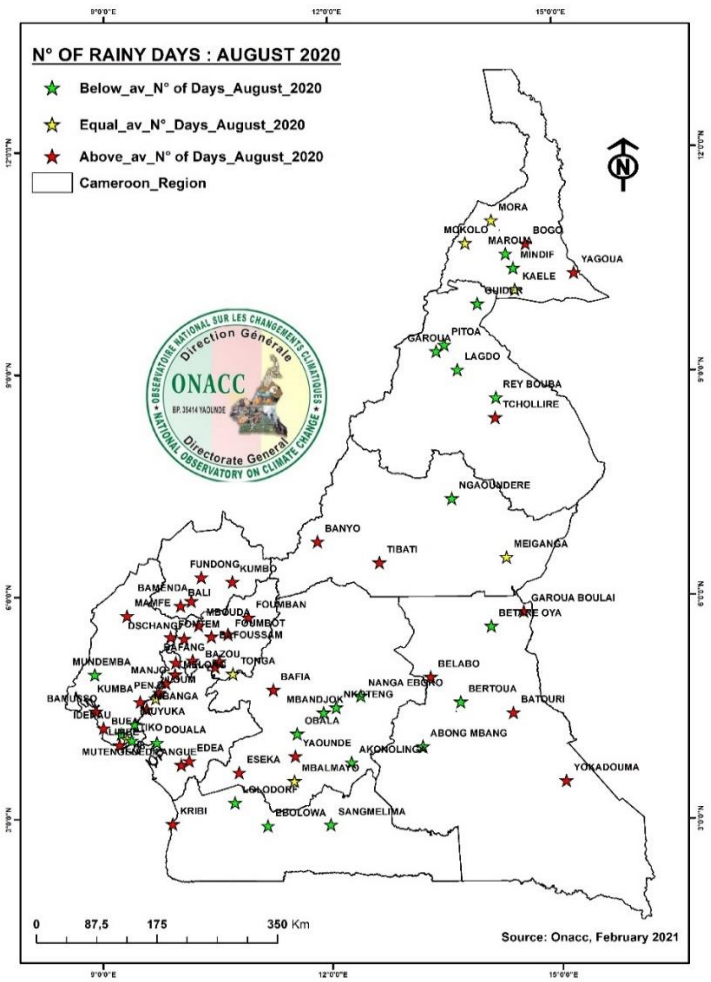


Figure 35: Evolution of the number of rainy days in August over the national territory

2.3.25. Evolution of rainfall in September

A general increase in rainfall amounts was observed in all the stations (70 stations), with amounts ranging from 1mm in Douala in the Littoral region to 952mm in Mundemba in the South-West region. 16 stations recorded an increase of less than 100mm of rainfall (Bogo, Douala, Guider, Lagdo, Maroua, Mbalmayo, Mbanga, Mokolo, Mora, Obala, Pitoa, Rey Bouba, Tchollire, Sangmelima, Tonga, Yagoua and Yaounde). Nkoteng is the only locality that recorded 100mm of rainfall during this month. In addition, 29 stations recorded rainfall amounts ranging from 100mm to 200mm notably: Abong Mbang, Bafia, Bafoussam, Bangangte, Banyo, Batouri, Bazou, Belabo, Bertoua, Betare'Oya, Ebolowa, Eseka, Foumbot, Garoua, Garoua Boulai, Kaele, Kribi, Kumbo, Mbandjok, Mbouda, Mindif, Muyuka, Nanga Eboko, Ngaoundere, Nkongsamba, Penja, Sangmelima, Tiko, and Yokadouma. While Akonolinga, Bafang, Bali, Bamenda, Bamusso, Buea, Dizangue, Dschang, Edea, Fontem, Foumban, Fundong, Idenau, Kumba, Limbe, Lolodorf, Loum, Mamfe, Manjo, Meiganga, Melong, Mundemba, Mutengene, Tibati recorded increases of more than 200mm in September 2020.

2.3.26. Spatial distribution of rainfall in September

From the individual maps in Figure 36A, rainfall distribution in the month of September 2020 was not very different from the historical pattern where the wettest localities remain in the same Agro-ecological Zones.

The comparative study of the September 2020 rainfall distribution and the historical rainfall distribution indicates a strong increase in the amount of rainfall for the month of September 2020 over the entire national territory, as shown in Figure 36B below. As a result, an above-normal situation was recorded in September 2020.

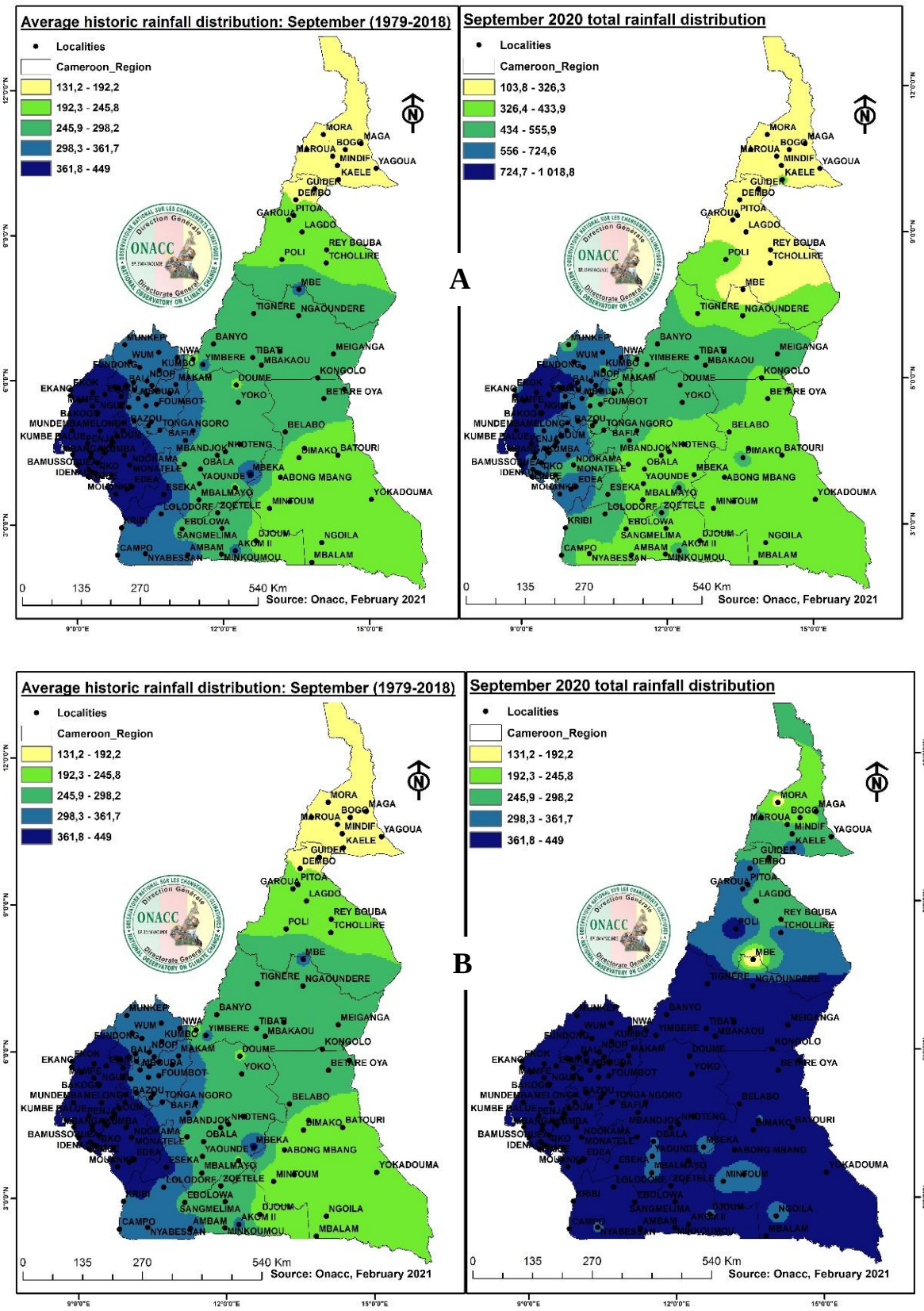


Figure 36: Spatial distribution of precipitation in the month of September 2020

2.3.27. Evolution of the number of rainy days in August 2020

The number of rainy days also varied from one agro-ecological zone to another during September 2020. Most localities (65 stations) recorded an increase in the number of rainy days, while the other 5 stations (Bali, Bamenda, Fundong, Kumba) in the North West region, (Mamfe) in the South West region maintained their historical number of rainy days. Figure 20 below shows that only two (02) stations (Yagoua, Bogo) in the Far-North Region, Rey Bouba in the North Region, recorded the same number of rainy days compared to the historical ones. 65 stations (Mokolo, Kaele, Guide, Pitoa, Garoua, Lagdo, Tchollire, Ngaoundere, Meiganga, Banyo, Tibati, Fundong, Bali, Bamenda, Mamfe, Kumbo, Mbouda, Foumban, Bafoussam, Dschang, Bafang, Bangangte, Tonga, Foumbot, Mamfe, Bamusso, Idenau, Buea, Mutengene, Tiko, Limbe, Melong, Nkongsamba, Manjo, Loum, Penja, Mbanga, Muyuka, Bafia, Douala, Edea, Dizangue, Mbandjock, Nkoteng, Nanga Eboko, Akonolinga, Bafia, Obala, Eseka, Mbalmayo, Yaounde, Lolodorf, Kribi, Ebolowa, Sangmelima, Belabo, Abong Mbang, Yokadouma, Bertoua, Betare' Oya and Garoua Boulai) recorded an increase in the number of rainy days in September 2020.

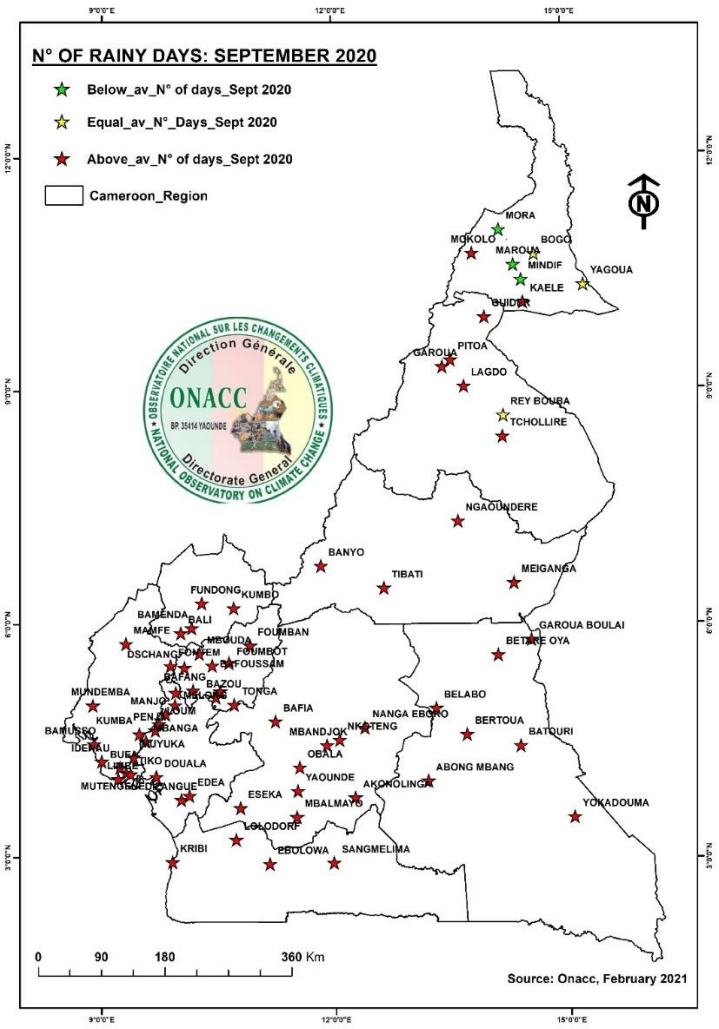


Figure 37: Evolution of the number of rainy days in September over the national territory.

2.3.28. Evolution of rainfall in October 2020

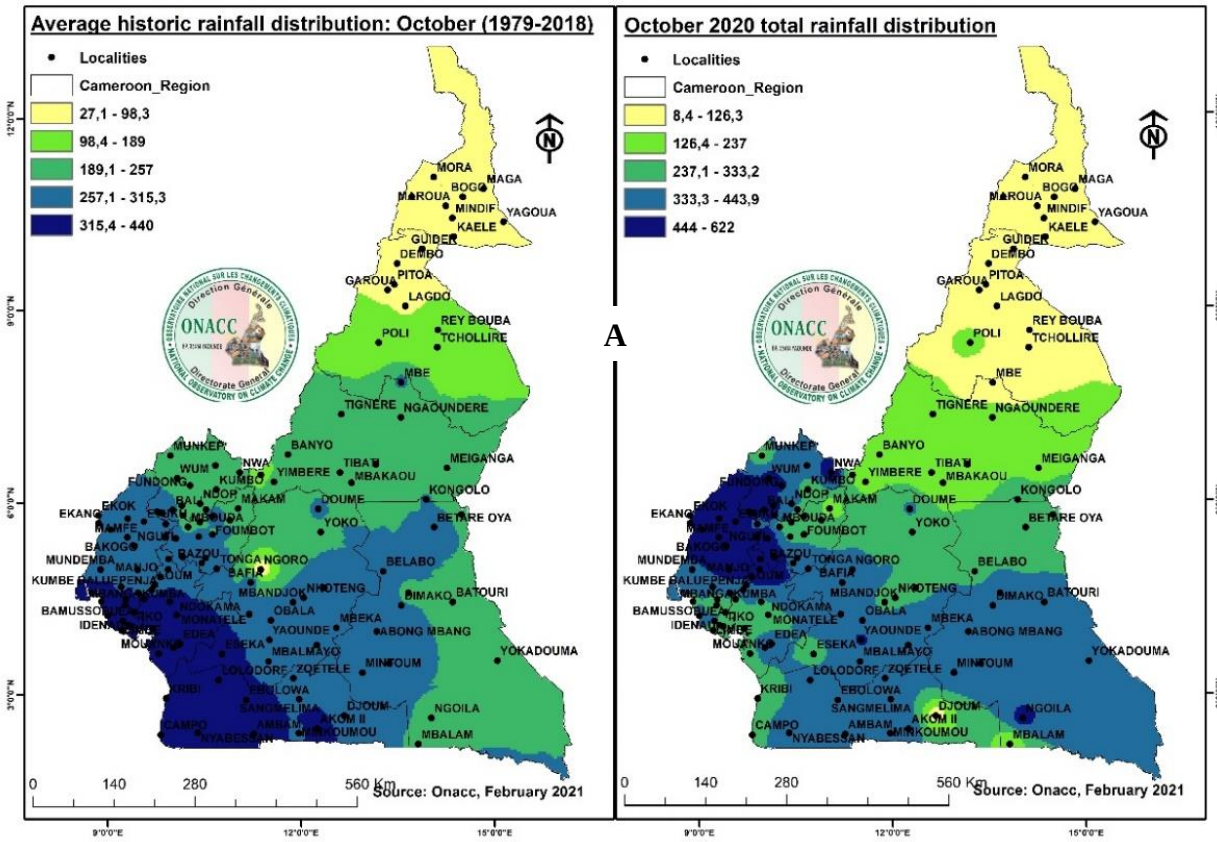
The month of October is often considered as a seasonal transition month in some agro-ecological zones. For October 2020, rainfall amounts were generally above normal in most localities in the agro-ecological zones (3/5). 45 stations out of 70, notably in the Far-North region (Bogo, Maroua, Mindif, Mokolo), in the East region (Garoua Boulai, Bertoua, Batouri, Abong Mbang, Yokadouma, Belabo, Betare' Oya), in the South region (Ebolowa, Sangmelima), in the Littoral region (Dizangue, Penja, Loum, Manjo, Nkongsamba, Melong), in the West region (Mbouda, Fontem, Bafoussam, Bangangte, Bazou, Tonga, Foumbot, Dschang, Bafang), (Fundong, Bamenda, Bali) in the North-West, (Mamfe, Mundemba, Idenau, Buea) in the South-West recorded increases ranging from 2 mm to 319 mm.

According to Figure 38(A) below, the rainfall amount has always varied normally from 27.1 mm to 440 mm in October, but October 2020 was exceptional as there was a more or less

positive fluctuation in the rainfall amount in the southern part (Bimodal rain forest, Monomodal rain forest, Highlands agro-ecological zone) of Cameroon, which ranged from 8.4 mm to 622 mm. The pattern also changed in the Adamawa region and the North region, while the Far-North region maintained its historical distribution pattern.

2.3.29. Spatial distribution of rainfall in October

Based on the historical rainfall amounts for October, the spatial distribution of rainfall amounts indicates that only the Far-North region, the northern part of the North region, parts of the Southern region and the Littoral region maintained their normal rainfall distribution ranges. A considerable increase in rainfall amounts was recorded in the Highlands agro-ecological zone, in a major part of the monomodal zone, as well as in the Bimodal rainforest zone. A slight decrease was observed in the High Savannah zone as well as in the Sudano-Sahelian zone (North).



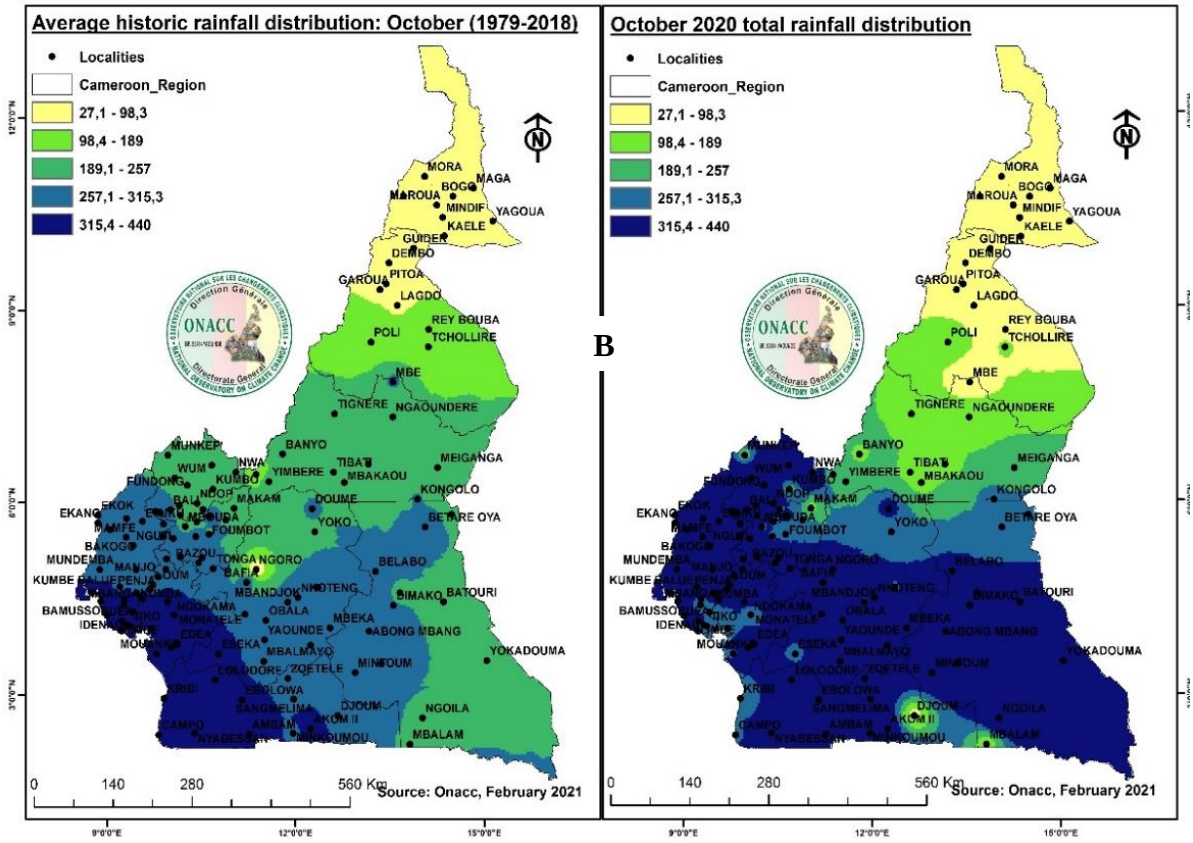


Figure 38: Spatial distribution of rainfall in October 2020

2.3.30. Evolution of the number of rainy days in October 2020

An increase in the number of rainy days was recorded by 56 stations (Abong Mbang, Akonolinga, Eseka, Mbalmayo, Mbandjok, Nanga Eboko, Nkoteng, Obala, Yaounde) in the Centre region, (Bali, Bamenda, Fundong, Kumbo) in the North West region, (Bangangte, Dschang, Tonga, Bazou) in the West region, (Dizangue, Douala, Edea, Mbanga, Melong, Nkongsamba, Penja, Manjo) in the Littoral region, (Bamusso, Buea, Fontem, Idenau, Kumba, Limbe, Mundemba, Mutengene, Muyuka, Tiko) in the South West region, (Garoua, Pitoa, Rey Bouba, Tchollire, Lagdo) in the North, in the Far North region (Bogo, Maroua, Mokolo, Yagoua), (Batouri, Belabo, Bertoua, Betare'Oya, Garoua Boulai, Yokadouma) in the East region, and (Ebolowa, Lolodorf) in South Cameroon. These rises vary from 1 to 6 days of rainfall. Ten stations (Bafoussam, Foumban, and Foumbot) in the west region, (Banyo, Meiganga, Ngaoundere, and Tibati) in the Adamawa, (Guider) in the north, (Kaele, Mindif) in the Far-North recorded a decrease in the number of rainy days. The others maintained their number of days compared to the historical record. According to Figure 35 below, all the stations (53 stations) in the southern part of the country (Centre, South, East, West, Littoral, South-West and North-West regions) received a number of days above the historical average, while almost

the entire northern part (Adamawa, North and the Far North) recorded a number of days below the historical average, except Banyo (Adamawa), which had a number of days equal to the historical average in October 2020.

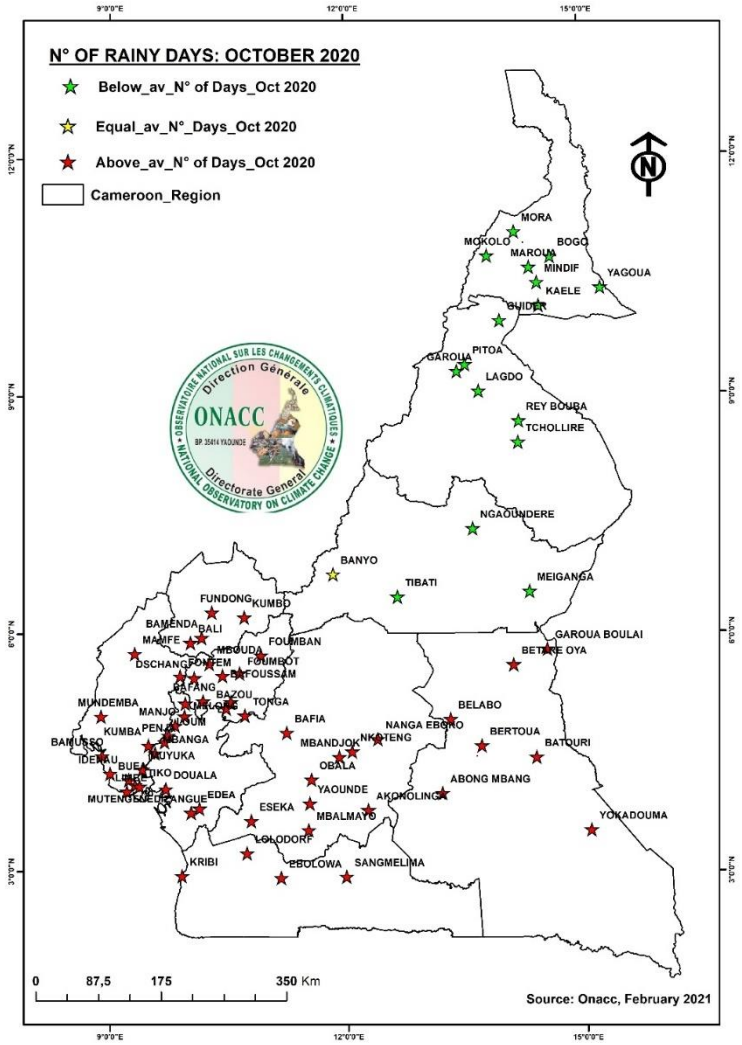


Figure 39: Evolution of the number of rainy days in October over the national territory

2.3.31. Evolution of rainfall in November 2020

47% of the 70 stations recorded above-average rainfall in November 2020. Significant increases of more than 100mm were recorded in Mundemba and Idenau in the South West region, Loum and Dizangue in the Littoral region, Lolodorf in the South Cameroon region.

Slighter increases of 100mm and below were recorded in Bafang, Bangangte, Bazou, Dschang, Foumban, and Tonga in the West region, Yaounde, Nkoteng, Mbalmayo and Eseka in the Centre region, Bali in the North West region, Bamusso, Buea, Fontem, Idenau, Kumba, Limbe, Mundemba, Mutengene, Muyuka and Tiko in the South-West region, Kribi, Sangmelima and

Lolodorf in the South region, Douala, Dizangue, Edea, Loum, Manjo, Mbanga, Melong, Nkongsamba and Penja in the Littoral region, and Mindif in the Far-North region

However, 11 stations recorded rainfall amounts equal to their historical amounts. This rainfall occurred mainly in the Far-North (Bogo, Kaele, Maroua, Mokolo, Mora and Yagoua), North (Pitoa, Lagdo, Guider and Garoua), and North-West (Fundong). 26 stations were below their historical rainfall average in November 2020. They include Abong Mbang, Akonolinga, Mbandjok, Nanga Eboko and Obala in the Centre region, Yokadouma, Garoua Boulai, Betare' Oya, Bertoua, Belabo and Batouri in the East region, Bamenda and Kumbo in the North-West region, Mamfe in the South-West, Rey Bouba and Tchollire in the North region, Tibati, Meiganga, Ngaoundere and Banyo in the Adamawa region.

2.3.32. Spatial distribution of rainfall in November

The spatial distribution pattern of rainfall in November 2020 was almost similar to its historical pattern. The coastal zone remained the wettest in November 2020. Ngoila in the East also maintained its usual scenario in terms of moisture regime. The least rainy zones in the historical scenario remained the least rainy in November, with some additional localities, as shown in Figure 40 (A) below.

In conclusion, the spatial distribution of rainfall in November 2020 indicated a general increase in rainfall amounts based on the historical values for November, especially in the southern part of the country which is generally more humid than the northern part at this time of the year, as shown in Figure 36 (B) below. Significant increases were also recorded in the monomodal, bimodal, and highlands agro-ecological zones. The Guinean high savannah zone slightly decreased and the Sudano-Sahelian zone maintained its rainfall this year as compared to the historical record.

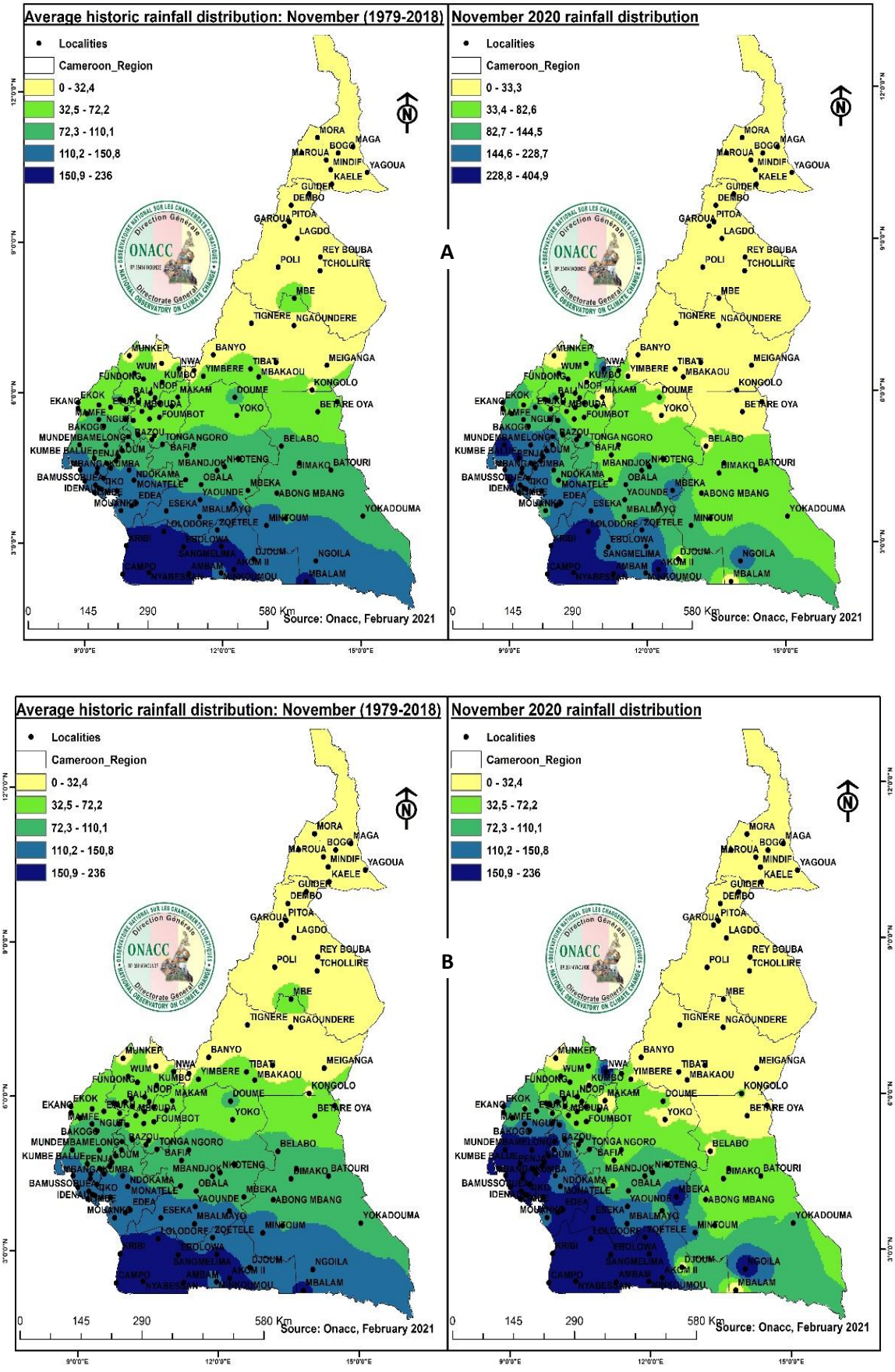


Figure 40: Spatial distribution of rainfall in November 2020

2.3.33. Evolution of the number of rainy days in November 2020

The number of rainy days varied from one locality to another over the entire national territory. More than 46% of the stations (32 stations) recorded an increase in the number of rainy days in November 2020, as shown in Figure 37 below. The increase in the number of rainy days ranged from 1 to 11 days, with the least increases (1 day) in the number of rainy days observed in Eseka in the Centre region, Lolodorf in the South Region and Mindif in the Far-North Region. The highest increases (11 days) in the number of rainy days were recorded in Bazou in the West region. Only Sangmelima in the South region maintained its average number of days as compared to the historical average.

The remaining 37 stations (Bertoua, Betare'Oya, Garoua Boulai, Belabo, Batouri, Abong Mbang, Yokadouma) in the East region, (Meiganga, Ngaoundere, Tibati, Banyo) in the Adamawa region, (Tchollire, Rey Bouba, Lagdo, Garoua, Pitoa, Guider) in the North region, (Mokolo, Bogo, Maroua, Mora , Mindif, Kaele, Yagoua) in the Far-North region, (Mbouda, Bafoussam, Foumbot, Foumban) in the West region, (Fundong, Bamenda, Kumbo) in the North West region, Mamfe in the South-West region and Nkongsamba in the Littoral region recorded a decrease in the number of rainy days in November 2020. 10 of the 37 stations recorded a decrease of only 1 rainy day during this month.

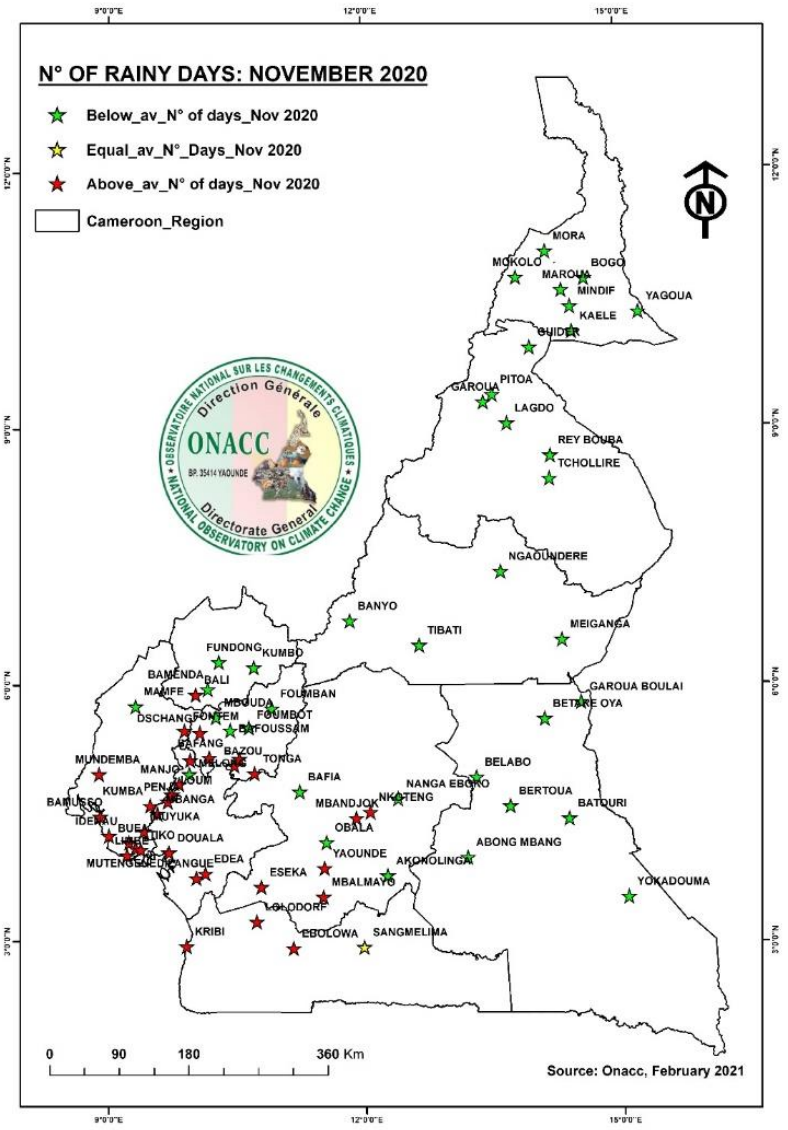


Figure 41: Evolution of the number of rainy days in November over the national territory

2.3.34. Evolution of rainfall in December 2020

31.42% of the 70 weather stations sampled for December 2020 recorded above-average rainfall amounts. These increases were recorded in Bafang and Bazou in the West Region, Bali in the North-West, Mamfe, Mundemba, Bamusso, Idenau, Kumba in the South-West Region, Mbanga, Penja, Loum, Manjo, Douala, and Edea in the Littoral Region, Eseka, Yaounde and Mbalmayo in the Centre, Kribi, Lolodorf and Ebolowa in the South, and Yagoua in the Far-North Region. Increases recorded this month ranged from 3 mm to 101 mm. Douala in the Littoral region recorded the lowest increase in rainfall amounts (3 mm) while Lolodorf in the South region recorded the highest increase (101 mm) in rainfall amounts, followed by Edea in the Littoral region with 63 mm.

14 of the 70 stations (Mora, Bogo, Mokolo, Maroua, Mindif, Kaele and Yagoua) in the Far-North region, (Guider, Pitoa, Garoua, Lagdo, Rey Bouba and Tchollire) in the North region and finally (Banyo and Ngaoundere) in the Adamawa region recorded rainfall amounts equal to their historical averages in December 2020.

A deficit in the amount of rainfall in December 2020 was recorded in 34 out of 70 stations. These stations are those based in Garoua Boulai, Belabo, Bertoua, Batouri, Abong Mbang, Yokadouma in the East region, Sangmelima in the South, Obala, Akonolinga, Nkoteng, Mbandjock, Bafia in the Centre region, Dizangue, Melong and Nkongsamba in the Littoral region, Buea, Limbe, Mutengene, Tiko in the South-West region, Fundong, Kumbo, Bamenda in the North-West region, Mbouda, Dschang, Bafoussam, Foumbot, Foumban, Bangangte and Tonga in the East region, Tibati and Meiganga in the Adamawa region.

2.3.35. Spatial distribution of rainfall in December

The pattern of the spatial distribution of rainfall amounts indicates that the southern part of the country is generally more humid than the northern part of the country and this scenario is maintained in the December 2020 rainfall distribution. We observe a slight shift of drought towards the south from the northern part of the country, as shown in Figure 42(A) below.

Based on historical rainfall amounts, most of this increase occurred along the southern part of Cameroon's coastal zone, while a decrease from the North-East to the south of the East was observed in December 2020, as shown in Figure 42 (B) below. A visible decrease in rainfall amounts was observed in the Centre, East, North West and West regions.

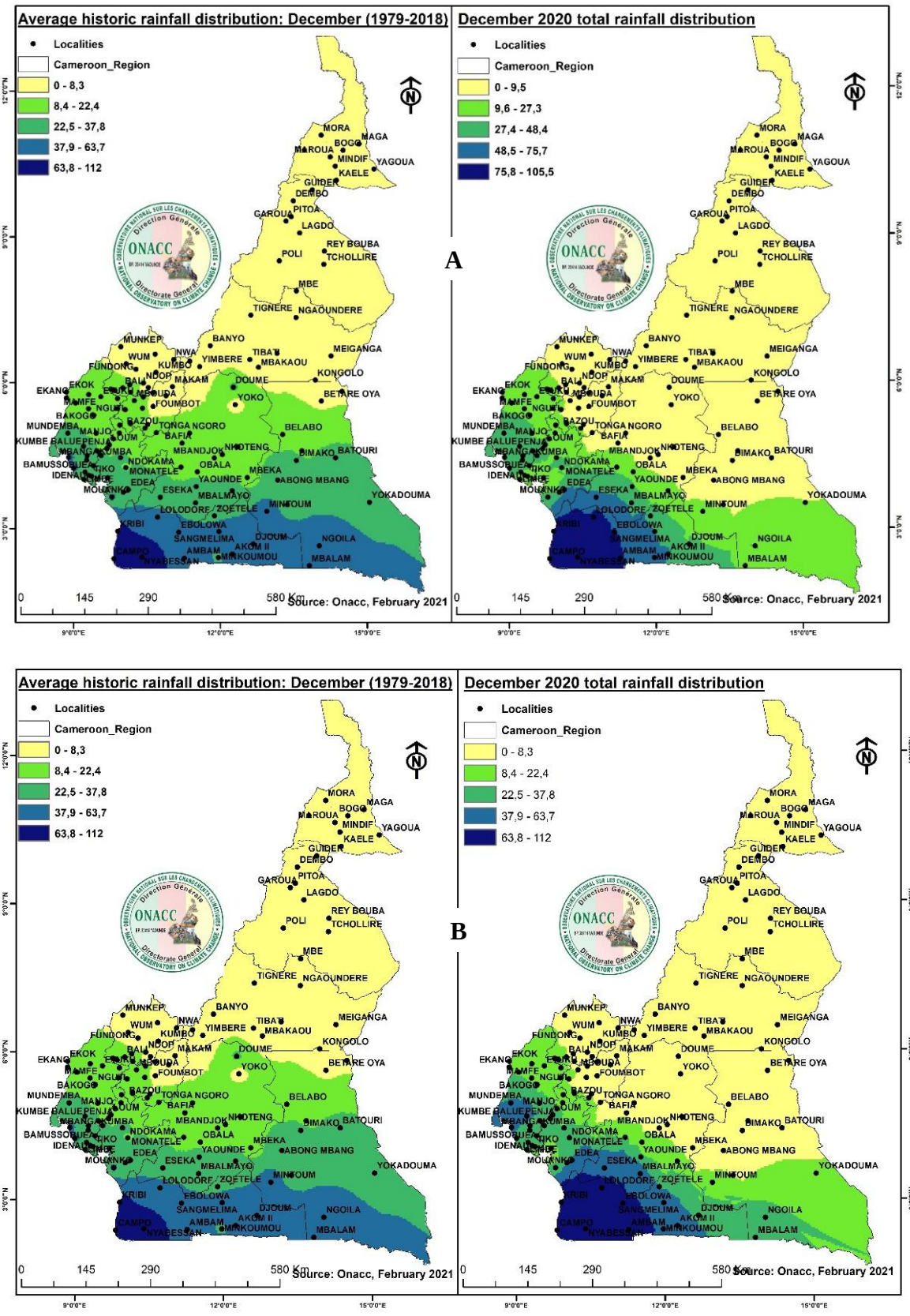


Figure 42: Spatial distribution of rainfall in December 2020

2.3.36. Evolution of the number of rainy days in December 2020

The number of rainy days for December 2020 also varied from one region to another. 31 localities (Ngaoundere and Tibati) in the Adamawa region, (Fundong and Kumbo) in the North West region, (Buea, Muyuka, Mutengene, Tiko, Limbe) in the South West region, (Mbouda, Foumban, Foumbot, Bafoussam and Tonga) in the West, (Melong, Nkongsamba and Dizangue) in the Littoral, (Bafia, Obala, Mbandjock, Akonolinga, Nkoteng and Nanga Eboko) in the Centre region, Sangmelima in the South, Betare' Oya, Garoua Boulai, Belabo, Bertoua, Batouri and Abong Mbang) in the East region experienced a decrease in the number of rainy days in December 2020. This decrease in the number of rainy days ranged from 1 to 15 days. 6 of these 31 stations recorded a decrease of only one rainy day, while Obala was the only station that recorded a decrease of 15 days. 17 stations maintained their historical number of rainy days during the month.

The remaining 22 stations experienced an increase in the number of days during the month. According to Figure39 below, the stations that recorded an above-average number of rainy days were (Kribi, Lolodorf, Ebolowa and Sangmelima) in the South region, Yaounde, Mbalmayo, Eseka) in the Centre region, (Mundemba, Bamusso, Kumba, Idenau, Mutengene) in the South-West region, (Edea, Douala, Mbanga, Penja, Loum and Manjo) in the Littoral region, (Bafang and Bazou) in the West region. The increase in the number of rainy days ranged from 1 to 16 days. Apart from Mamfe, Mbalmayo, Bangangte, Bamenda and Yaounde, most of them recorded more than one rainy day. Edea is the only locality to have recorded an increase of 16 days of rainfall.

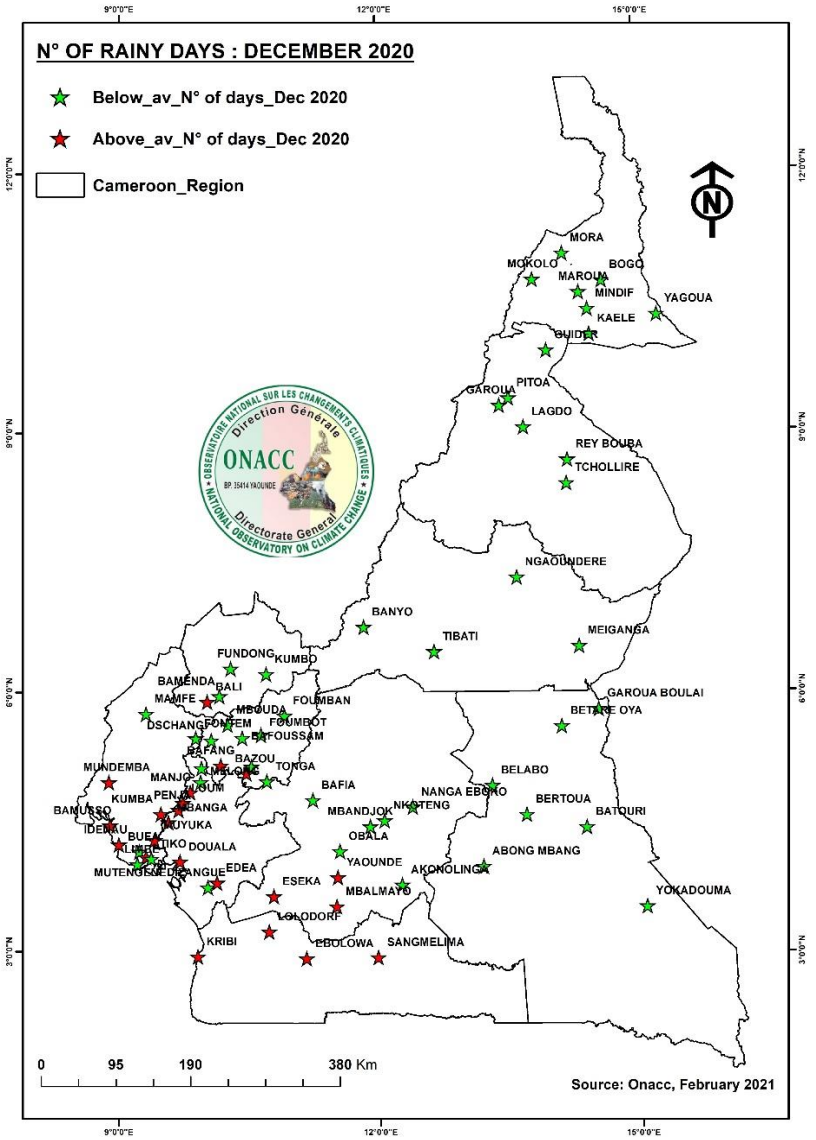


Figure 43: Evolution of the number of rainy days in December over the national territory

PART 3

ASSESSMENT OF THE TEMPERATURE SITUATION IN 2020

EVOLUTION OF MINIMUM, MAXIMUM AND AVERAGE TEMPERATURES FOR THE YEAR 2020

The year 2020 was the warmest as most localities witnessed total average temperature variations well above their annual historical mean values (1979-2018). The different temperatures (minimum. maximum and average) varied within the different agro-ecological zones; different regions as well as different localities. According to the statistics obtained per station, the overall average historical temperature for Cameroon from the 70 different stations distributed across the national territory, recorded an increased average temperature making the year 2020 the warmest.

3.1 SUDANO-SAHELIAN ZONE

3.1.1 Variations in seasonal temperatures in the Sudano-Sahelian zone

a- Evolution of maximum temperatures

Maximum temperatures in the Sudano-Sahelian zone show seasonal average temperatures of 36.5°C and 34.6°C in the Far North for the dry and rainy seasons respectively. In the Northern region the seasonal average temperature recorded during the dry season was 36.7°C. while the seasonal average temperature during the rainy season recorded 33.4°C. (See table 11 below). The Sudano-Sahelian zone was thus less warmer from North-South in the dry season and increasingly warmer from North-South in the rainy season.

Compared to historical temperatures recorded over the period from 1979 to 2015, the year 2020 was observed to be warmer. An average temperature difference of 0.5°C was observed in the Far-North and a difference of 0.6°C in the North region during the dry season; while the average temperature difference in the rainy season recorded 1.3°C and 1.7°C respectively during the rainy season as seen in figure 37 below.

Table 13: Characteristics of seasonal maximum temperatures in the Sudano-Sahelian zone

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
Far-North Region						
BOGO	35.7	36.0	0.0	35.0	35.5	2.2
KAELE	36.1	36.7	0.7	32.5	34.2	0.9
MAROUA	36.1	36.7	0.7	32.5	34.2	0.9
MINDIF	36.1	36.7	0.7	32.5	34.2	0.9
MOKOLO	36.1	36.7	0.7	32.5	34.2	0.9
MORA	35.7	36.0	0.0	35.0	35.5	2.2
Average	**36.0**	**36.5**	**0.5**	**33.3**	**34.6**	**1.3**

North Region						
GAROUA	36.1	36.7	0.6	32.5	34.2	2.5
GUIDER	36.1	36.7	0.6	28.0	29.4	-2.4
LAGDO	36.1	36.7	0.6	32.5	34.2	2.5
PITOA	36.1	36.7	0.6	32.5	34.2	2.5
REY BOUBA	36.1	36.7	0.6	32.5	34.2	2.5
TCHOLLIRE	36.1	36.7	0.6	32.5	34.2	2.5
Average	**36.1**	**36.7**	**0.6**	**31.8**	**33.4**	**1.7**

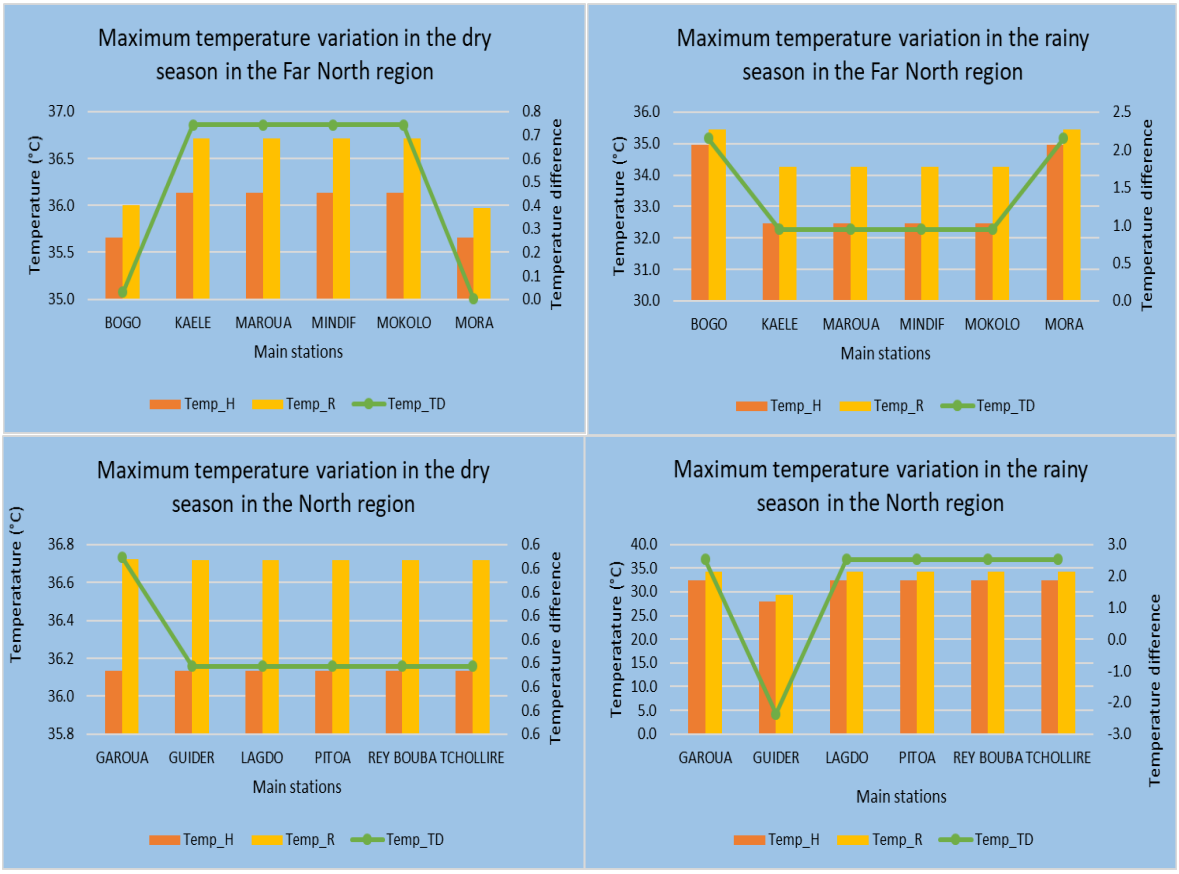


Figure 44: Characteristics of seasonal maximum temperatures relative to historical values in the Sudano-Sahelian zone in 2020

b-Evolution of minimum temperatures

Seasonal minimum average temperatures in the Far-North Region recorded 21.3°C and 24.4°C for the dry and rainy seasons respectively, compared to the minimum average temperatures of 21.9°C and 24.5°C in the North Region for the dry and rainy seasons respectively. (See table 14 below)

As compared to the seasonal minimum temperatures recorded for this agro-ecological zone over the period from 1979 to 2015, the year 2020 was observed to have a globally higher seasonal minimum temperature. Thus, in the dry season, average temperature differences of 0.2°C and 0.1°C were observed in both regions respectively in the Far North and the North.

while the average differences in the rainy season were 0.6°C and 1.0°C respectively as seen below in figure 45.

Table 14: Characteristics of seasonal minimum temperatures in the Sudano-Sahelian zone

	Dry Season			*Rainy Season*		
Localities	***Max_His_T (DS)***	***Max_Real_T (DS)***	***TD_ (DS)***	***Max_His_T (RS)***	***Max_Real_T (RS)***	***TD_ (RS)***
Far-North Region						
BOGO	19.8	20.0	-1.1	24.5	24.2	0.4
KAELE	21.8	21.9	0.8	23.5	24.5	0.6
MAROUA	21.8	21.9	0.8	23.5	24.5	0.6
MINDIF	21.8	21.9	0.8	23.5	24.5	0.6
MOKOLO	21.8	21.9	0.8	23.5	24.5	0.6
MORA	19.8	20.0	-1.1	24.5	24.2	0.4
Average	**21.1**	**21.3**	**0.2**	**23.8**	**24.4**	**0.6**
North Region						
GAROUA	21.8	21.9	0.1	23.5	24.5	1.0
GUIDER	21.8	21.9	0.1	23.5	24.5	1.0
LAGDO	21.8	21.9	0.1	23.5	24.5	1.0
PITOA	21.8	21.9	0.1	23.5	24.5	1.0
REY BOUBA	21.8	21.9	0.1	23.5	24.5	1.0
TCHOLLIRE	21.8	21.9	0.1	23.5	24.5	1.0
Average	**21.8**	**21.9**	**0.1**	**23.5**	**24.5**	**1.0**

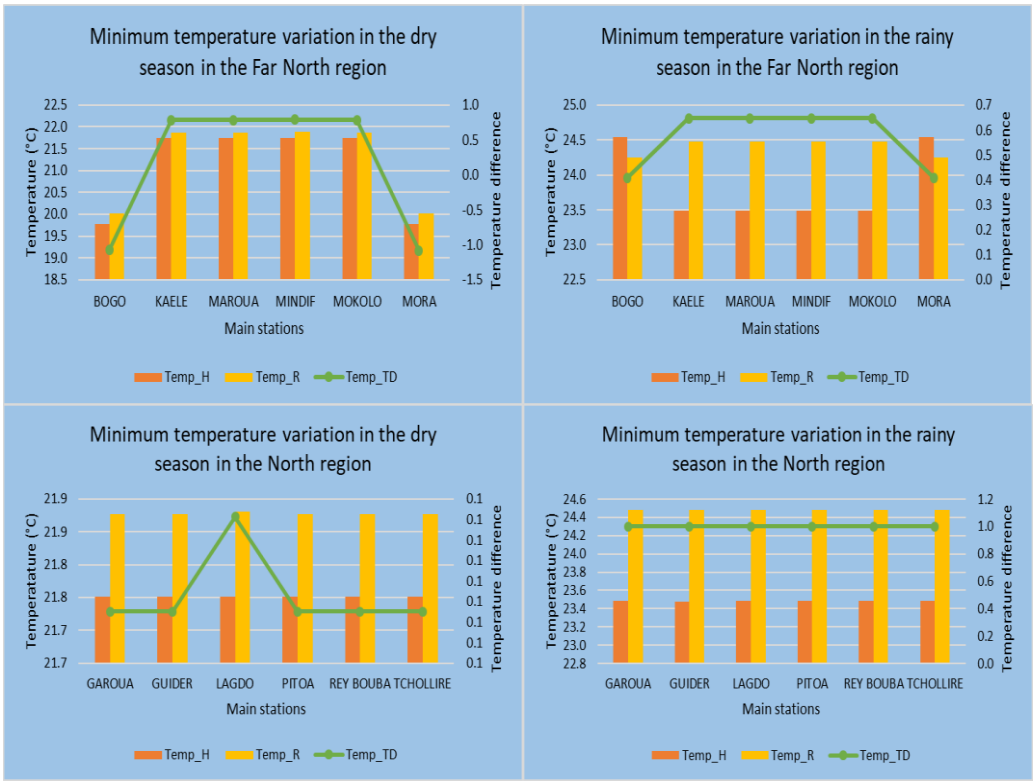


Figure 45: Characteristics of seasonal minimum temperatures relative to historical seasonal minimum temperatures in the Sudano-Sahelian zone in 2020

c-Evolution of average temperatures

Seasonal average temperatures were 28.9°C and 29.5°C in the Far-North Region for the dry and rainy seasons. compared to average temperatures of 29.3°C and 29.4°C in the North Region for the dry and rainy seasons respectively (See table **15** below).

Compared to the seasonal average temperatures recorded for this agro-ecological zone over the period from 1978 to 2015. It was eminent that the year 2019 was observed to have an overall increase in average temperature. Thus, in the dry season, average differences in temperature of 0.3°C and 0.4°C were observed in both regions respectively in the Far North and the North, while the average differences in temperature in the rainy season were 1.0°C and 1.4°C, respectively as seen below in figure **46** below.

Table 15: Characteristics of seasonal average temperatures in the Sudano-Sahelian zone

	Dry Season			***Rainy Season***		
Localities	***Max_His_T (DS)***	***Max_Real_T (DS)***	***TD_ (DS)***	***Max_His_T (RS)***	***Max_Real_T (RS)***	***TD_ (RS)***
Far-North Region						
BOGO	27.7	28.0	-0.5	29.7	29.8	1.3
KAELE	28.9	29.3	0.8	28.0	29.4	0.8
MAROUA	28.9	29.3	0.8	28.0	29.4	0.8
MINDIF	28.9	29.3	0.8	28.0	29.4	0.8
MOKOLO	28.9	29.3	0.8	28.0	29.4	0.8
MORA	27.7	28.0	-0.5	29.7	29.8	1.3
Average	**28.5**	**28.9**	**0.3**	**28.6**	**29.5**	**1.0**
North Region						
GAROUA	28.9	29.3	0.4	28.0	29.4	1.4
GUIDER	28.9	29.3	0.4	28.0	29.4	1.4
LAGDO	28.9	29.3	0.4	28.0	29.4	1.4
PITOA	28.9	29.3	0.4	28.0	29.4	1.4
REY BOUBA	28.9	29.3	0.4	28.0	29.4	1.4
TCHOLLIRE	28.9	29.3	0.4	28.0	29.4	1.4
Average	**28.9**	**29.3**	**0.4**	**28.0**	**29.4**	**1.4**

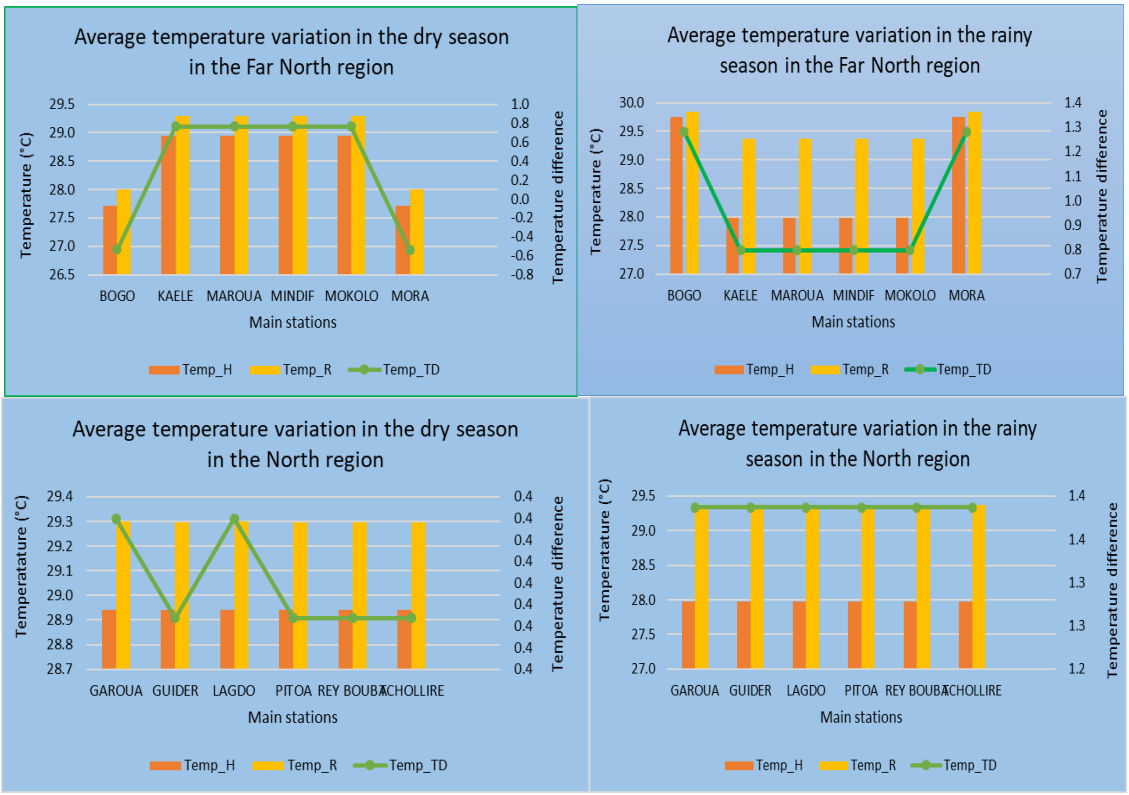


Figure 46: Characteristics of seasonal average temperatures relative to historical seasonal average temperatures in the Sudano-Sahelian zone in 2020

3.1.2 Monthly evolution of maximum, minimum and average temperatures

a- Maximum temperature in the Sudano-Sahelian zone

From table **16** below, the monthly maximum real temperature variations in the Sudano-Sahelian zone ranged from 32.1°C (August) to 42.3°C (April) in the Far-North Region, while in the North region, maximum regional average temperatures ranged from 32.4°C (July) to 41.3°C (April). Real monthly maximum temperature for the Far-North region varied from one month to the other with April being the hottest month and August the coldest. During the hottest month, most localities in the Far-North region recorded the highest real monthly maximum temperature at 43.0°C (Bogo. Kousseri. Maga. Mora. Waza and Yagoua) and the lowest at 41.3°C (Kaele, Maroua, Mindif, and Mokolo), whereas during the coldest month, Bogo, Kousseri, Maga, Mora, Waza, and Yagoua recorded the least real monthly maximum temperature at 31.5°C and, Kousseri, Maga, Maroua, Mindiff and Mokolo, recorded the highest real monthly maximum temperature at 33.1°C. The months of March, May and January, September were equally noted to have a constant real monthly maximum average temperature of 40.3°C and 32.4°C in the Far-North region respectively as seen in table 16 below.

The month of April was the hottest month in the North region, while July was recorded as the coldest month. During the hottest month, all localities recorded the same monthly real

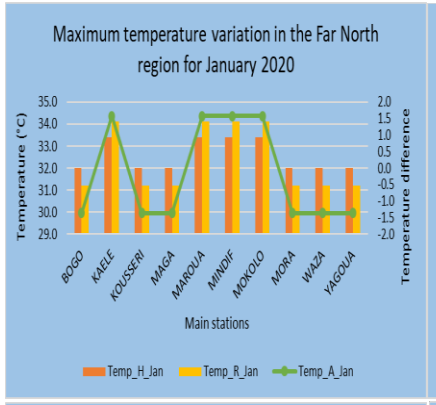
maximum temperature of 41.3^{o}C, while during the coldest months; all localities in July recorded the same real monthly maximum temperature of 32.4°C. Figure 42 above describes the trend of the maximum temperature difference in the Sudano-Sahelian zone. The monthly regional average temperature difference in the Far-North region recorded its highest temperature at 3.3°C in December and its lowest in the month of February and September by 0.7°C.

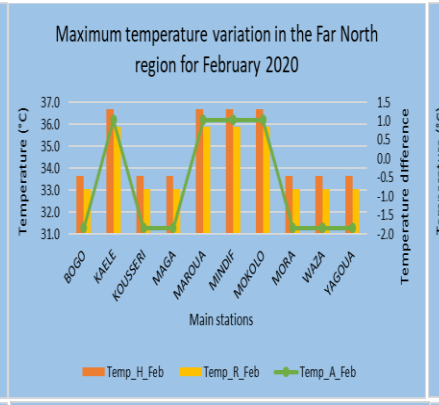
The monthly regional average temperature difference in the North region recorded its highest temperature in December (4.1°C) and lowest in the month of February by 0.8°C, hence constant temperature difference of 0.8°C in all stations. All stations recorded a constant temperature difference of (1.4°C) in March; April (1.5°C), May (2.3°C), June (2.1°C), July (1.2°C), August (2.5°C), September (0.9°C), October (1.3°C), November (2.4°C) and December (4.1°C). However, when the monthly real maximum average temperatures recorded over the period from 1979 to 2018 are compared to the monthly real maximum average temperatures recorded in 2019 during the same period, we observed that the year 2020 was generally warmer than normal in the two constituent regions of the Sudano-Sahelian zone.

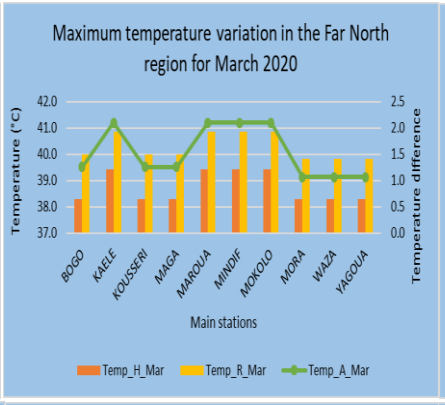
Table 16: Characteristics of monthly maximum temperature in the Sudano-Sahelian zone of Cameroon in 2020.

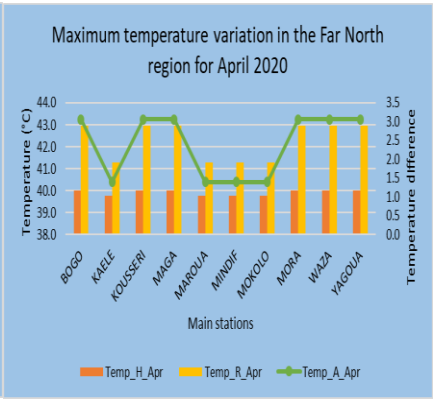
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Far-North region	BOGO	32.0	31.2	-1.4	33.7	33.0	-1.8	38.3	40.0	1.3	40.0	43.0	3.1	39.4	41.6	3.5	37.0	38.8	3.5
	KAELE	33.4	34.1	1.6	36.7	35.9	1.0	39.4	40.8	2.1	39.8	41.3	1.4	36.0	38.3	0.3	32.8	34.8	-0.5
	KOUSSERI	32.0	31.2	-1.4	33.7	33.0	-1.8	38.3	40.0	1.3	40.0	43.0	3.1	39.4	41.6	3.5	37.1	38.8	3.5
	MAGA	32.0	31.2	-1.4	33.7	33.0	-1.8	38.3	40.0	1.3	40.0	43.0	3.1	39.4	41.6	3.5	37.1	38.8	3.5
	MAROUA	33.4	34.1	1.6	36.7	35.9	1.0	39.4	40.8	2.1	39.8	41.3	1.4	36.0	38.3	0.3	32.8	34.8	-0.5
	MINDIF	33.4	34.1	1.6	36.7	35.9	1.0	39.4	40.8	2.1	39.8	41.3	1.4	36.0	38.3	0.3	32.8	34.8	-0.5
	MOKOLO	33.4	34.1	1.6	36.7	35.9	1.0	39.4	40.8	2.1	39.8	41.3	1.4	36.0	38.3	0.3	32.8	34.8	-0.5
	MORA	32.0	31.2	-1.4	33.7	33.0	-1.8	38.3	39.8	1.1	40.0	43.0	3.1	39.4	41.6	3.5	37.1	38.8	3.5
	WAZA	32.0	31.2	-1.4	33.7	33.0	-1.8	38.3	39.8	1.1	40.0	43.0	3.1	39.4	41.6	3.5	37.1	38.8	3.5
	YAGOUA	32.0	31.2	-1.4	33.7	33.0	-1.8	38.3	39.8	1.1	40.0	43.0	3.1	39.4	41.6	3.5	37.1	38.8	3.5
Monthly regional average		**32.6**	**32.4**	**-0.2**	**34.9**	**34.2**	**-0.7**	**38.7**	**40.3**	**1.6**	**39.9**	**42.3**	**2.4**	**38.0**	**40.3**	**2.2**	**35.4**	**37.2**	**1.9**
North region	GAROUA	33.4	34.2	0.8	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	DEMBO	33.4	34.2	0.8	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.4	2.3	32.8	34.8	2.1
	GUIDER	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	LAGDO	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	PITOA	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	POLI	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	REY BOUBA	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	TCHOLLIRE	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
	TOUBORO	33.4	34.1	0.7	36.7	35.9	-0.8	39.4	40.8	1.4	39.8	41.3	1.5	36.0	38.3	2.3	32.8	34.8	2.1
Monthly regional average		**33.4**	**34.1**	**0.7**	**36.7**	**35.9**	**-0.8**	**39.4**	**40.8**	**1.4**	**39.8**	**41.3**	**1.5**	**36.0**	**38.3**	**2.3**	**32.8**	**34.8**	**2.1**

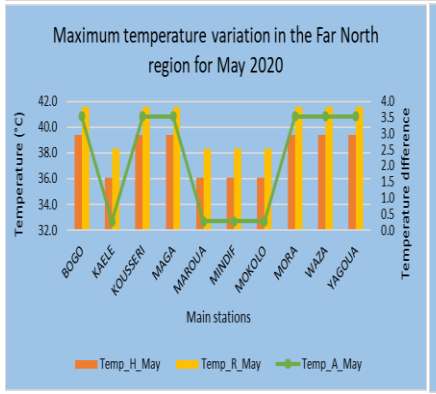
	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Far-North region	BOGO	33.3	33.1	0.7	31.2	31.5	0.5	33.9	32.2	-0.8	37.5	36.4	0.3	35.8	36.0	0.3	32.4	35.5	2.5
	KAELE	31.2	32.4	-0.1	30.7	33.1	2.2	31.7	32.6	-0.5	34.0	35.4	-0.8	35.7	38.2	2.4	33.9	37.4	4.4
	KOUSSERI	33.3	33.1	0.7	31.2	31.5	0.5	33.9	32.2	-0.8	37.5	36.4	0.3	35.8	36.0	0.3	32.4	35.5	2.5
	MAGA	33.3	33.1	0.7	31.2	31.5	0.5	33.9	32.2	-0.8	37.5	36.4	0.3	35.8	36.0	0.3	32.4	35.5	2.5
	MAROUA	31.2	32.4	-0.1	30.7	33.1	2.2	31.7	32.6	-0.5	34.0	35.4	-0.8	35.7	38.2	2.4	33.9	37.4	4.4
	MINDIF	31.2	32.4	-0.1	30.7	33.1	2.2	31.7	32.6	-0.5	34.0	35.4	-0.8	35.7	38.2	2.4	33.9	37.4	4.4
	MOKOLO	31.2	32.4	-0.1	30.7	33.1	2.2	31.7	32.6	-0.5	34.0	35.4	-0.8	35.7	38.2	2.4	33.9	37.4	4.4
	MORA	33.3	33.1	0.7	31.2	31.5	0.5	33.9	32.2	-0.8	37.5	36.4	0.3	35.8	36.0	0.3	32.4	35.5	2.5
	WAZA	33.3	33.1	0.7	31.2	31.5	0.5	33.9	32.2	-0.8	37.5	36.4	0.3	35.8	36.0	0.3	32.4	35.5	2.5
	YAGOUA	33.3	33.1	0.7	31.2	31.5	0.5	33.9	32.2	-0.8	37.5	36.4	0.3	35.8	36.0	0.3	32.4	35.5	2.5
Monthly regional average		**32.5**	**32.8**	**0.4**	**31.0**	**32.1**	**1.2**	**33.0**	**32.4**	**-0.7**	**36.1**	**36.0**	**-0.1**	**35.8**	**36.9**	**1.1**	**33.0**	**36.3**	**3.3**
North region	GAROUA	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	DEMBO	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	GUIDER	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	LAGDO	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	PITOA	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	POLI	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	REY BOUBA	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	TCHOLLIRE	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	33.9	37.4	4.1
	TOUBORO	31.2	32.4	1.2	30.7	33.1	2.5	31.7	32.6	0.9	34.0	35.4	1.3	35.7	38.2	2.4	28.8	37.4	4.1
Monthly regional average		**31.2**	**32.4**	**1.2**	**30.7**	**33.1**	**2.5**	**31.7**	**32.6**	**0.9**	**34.0**	**35.4**	**1.3**	**35.7**	**38.2**	**2.4**	**33.3**	**37.4**	**4.1**

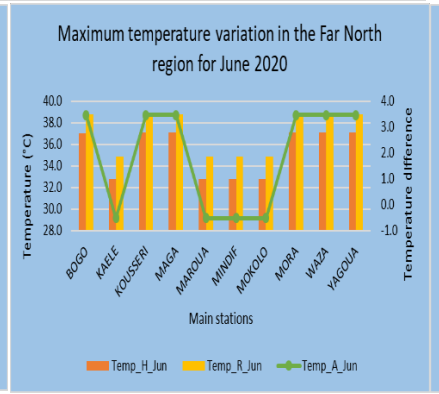

Maximum temperature variation in the Far North region for January 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

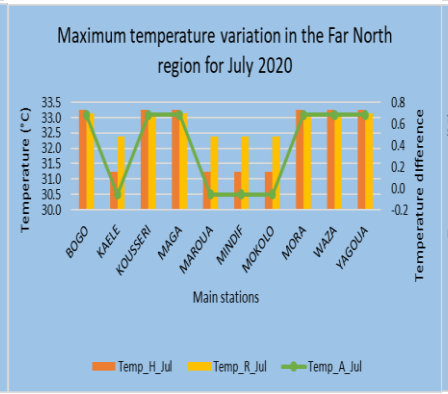

Maximum temperature variation in the Far North region for February 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

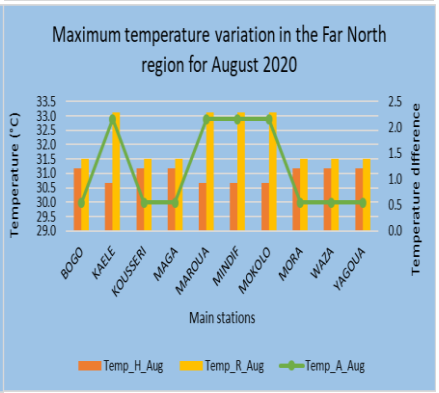

Maximum temperature variation in the Far North region for March 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

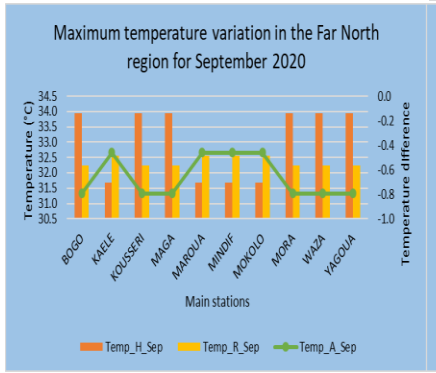

Maximum temperature variation in the Far North region for April 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

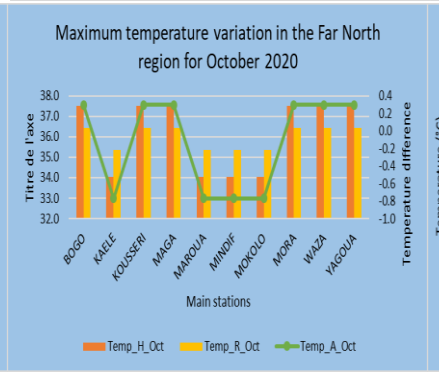

Maximum temperature variation in the Far North region for May 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

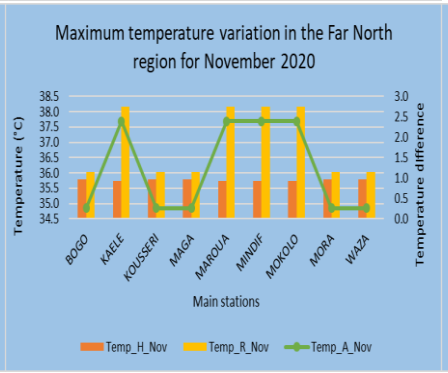

Maximum temperature variation in the Far North region for June 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

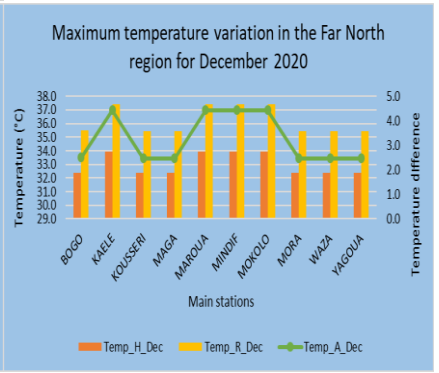

Maximum temperature variation in the Far North region for July 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul


Maximum temperature variation in the Far North region for August 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Maximum temperature variation in the Far North region for September 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Maximum temperature variation in the Far North region for October 2020
Titre de l'axe
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Maximum temperature variation in the Far North region for November 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Maximum temperature variation in the Far North region for December 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

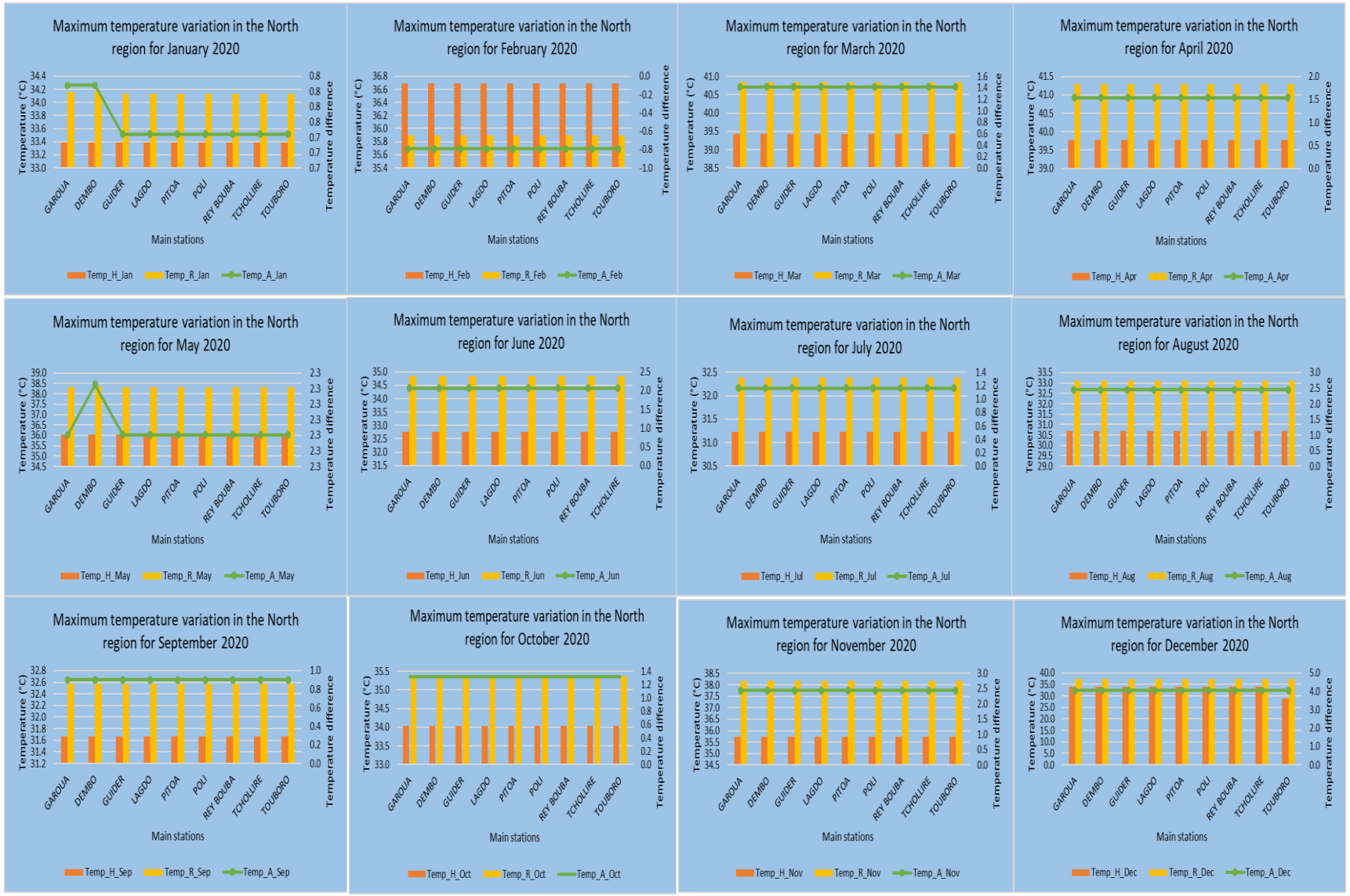


Figure 47: Characteristics of 2020 monthly maximum temperatures relative to historical values in the Sudano-Sahelian zone

b- Minimum temperature in the Sudano-Sahelian zone

The lowest real monthly minimum temperature in the Sudano-Sahelian zone was recorded in Bogo, Kousseri, Maga, Mora, Waza and Yagoua at 14.2°C in December in the Far-North region where as the highest real monthly minimum temperature was recorded in all stations in April at 28.7°C in all stations in the North Region; besides in Kaele, Maroua, Mindiff and Mokolo in the Far-North Region. Table **17** below illustrates that during the hottest month in the Sudano-Sahelian zone, the stations at Kaele, Maroua, Mindiff and Mokolo recorded the highest monthly minimum temperature at 28.7°C and the lowest monthly minimum temperature in Bogo, Kousseri, Maga, Mora, Waza and Yagoua at 14.2°C. Whereas, the coldest month recorded Dembo as the coldest station with a monthly minimum temperature of 14.7°C; with the rest of the stations recording 14.8°C, hence the warmest stations.

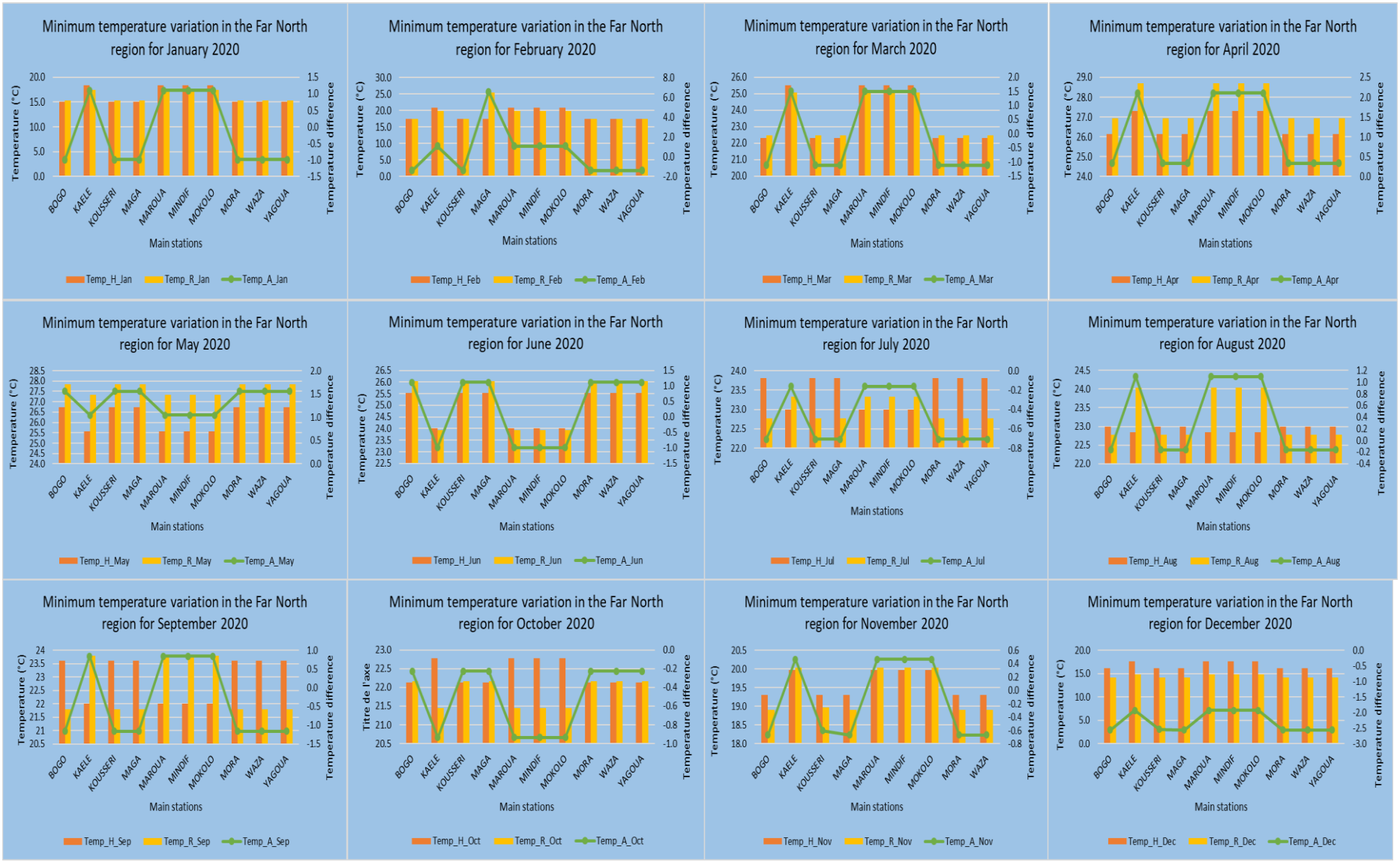
Table **15** below shows that in the Far-North region, the months of April and May were observed to have the highest monthly minimum average temperature of 27.6°C, whereas December was recorded to have the lowest monthly minimum average temperature of 14.4°C. In the North region, April recorded the hottest temperatures (28.7°C). Whereas, December recorded the coldest temperatures (14.8°C).

Figure 48 below shows the trend of the minimum temperature difference in the Far-North and North regions. In the Far-North, the highest monthly regional average temperature differences were recorded in May (1.4°C) and in the North region, the highest monthly regional average temperature difference was recorded in May and September (1.7°C). The lowest monthly regional average temperature difference decreased in December by (2.3°C), and was constant in the North region in January and November at -0.2°C. July and October at -0.5°C. However, by comparing the monthly real minimum average temperatures recorded over the period from 1979 to 2018 with the monthly real minimum average temperatures recorded in 2020 during the same period. We observed that the year 2020 was generally colder in both the Far-North and North regions than normal in the two constituent regions of the Sudano-Sahelian zone.

Table 17: Characteristics of monthly minimum temperature in the Sudano-Sahelian zone of Cameroon in 2020.

	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Far-North region	BOGO	15.0	15.4	-1.0	17.5	17.4	-1.4	22.3	22.5	-1.1	26.1	26.9	0.3	26.7	27.8	1.6	25.5	26.0	1.1
	KAELE	18.4	17.5	1.1	20.9	19.9	1.1	25.5	25.1	1.5	27.3	28.7	2.1	25.6	27.3	1.0	24.0	23.9	-1.0
	KOUSSERI	15.1	15.4	-1.0	17.5	17.4	-1.4	22.3	22.5	-1.1	26.1	26.9	0.3	26.7	27.8	1.6	25.5	26.0	1.1
	MAGA	15.1	15.4	-1.0	17.5	25.4	6.5	22.3	22.5	-1.1	26.1	26.9	0.3	26.7	27.8	1.6	25.5	26.0	1.1
	MAROUA	18.4	17.5	1.1	20.9	19.9	1.1	25.5	25.1	1.5	27.3	28.7	2.1	25.6	27.3	1.0	24.0	23.9	-1.0
	MINDIF	18.4	17.5	1.1	20.9	19.9	1.1	25.5	25.1	1.5	27.3	28.7	2.1	25.6	27.3	1.0	24.0	23.9	-1.0
	MOKOLO	18.4	17.5	1.1	20.9	19.9	1.1	25.5	25.1	1.5	27.3	28.7	2.1	25.6	27.3	1.0	24.0	23.9	-1.0
	MORA	15.1	15.4	-1.0	17.4	17.4	-1.4	22.3	22.5	-1.1	26.1	26.9	0.3	26.7	27.8	1.6	25.5	26.0	1.1
	WAZA	15.1	15.4	-1.0	17.5	17.4	-1.4	22.3	22.5	-1.1	26.1	26.9	0.3	26.7	27.8	1.6	25.5	26.0	1.1
	YAGOUA	15.1	15.4	-1.0	17.5	17.4	-1.4	22.3	22.5	-1.1	26.1	26.9	0.3	26.7	27.8	1.6	25.5	26.0	1.1
Monthly regional average		**16.4**	**16.2**	**-0.2**	**18.9**	**19.2**	**0.4**	**23.6**	**23.6**	**-0.1**	**26.6**	**27.6**	**1.0**	**26.3**	**27.6**	**1.4**	**24.9**	**25.2**	**0.3**
North region	GAROUA	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	DEMBO	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	GUIDER	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	LAGDO	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	PITOA	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	POLI	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	REY BOUBA	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	TCHOLLIRE	18.4	17.5	-0.9	20.9	19.9	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
	TOUBORO	18.4	17.5	-0.9	20.9	19.8	-1.0	25.5	25.1	-0.4	27.3	28.7	1.4	25.6	27.3	1.7	24.0	23.9	-0.1
Monthly regional average		**18.4**	**17.5**	**-0.9**	**20.9**	**19.9**	**-1.0**	**25.5**	**25.1**	**-0.4**	**27.3**	**28.7**	**1.4**	**25.6**	**27.3**	**1.7**	**24.0**	**23.9**	**-0.1**

	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Far-North region	BOGO	23.8	22.8	-0.7	23.0	22.8	-0.2	23.6	21.8	-1.2	22.1	22.2	-0.2	19.3	18.9	-0.7	16.2	14.2	-2.6
	KAELE	23.0	23.3	-0.2	22.8	24.0	1.1	22	23.8	0.8	22.8	21.5	-0.9	20.0	20.0	0.5	17.6	14.8	-1.9
	KOUSSERI	23.8	22.8	-0.7	23.0	22.8	-0.2	23.6	21.8	-1.2	22.1	22.2	-0.2	19.3	19.0	-0.6	16.2	14.2	-2.5
	MAGA	23.8	22.8	-0.7	23.0	22.8	-0.2	23.6	21.8	-1.2	22.1	22.2	-0.2	19.3	18.9	-0.7	16.2	14.2	-2.6
	MAROUA	23.0	23.3	-0.2	22.8	24.0	1.1	22	23.8	0.8	22.8	21.5	-0.9	20.0	20.0	0.5	17.6	14.8	-1.9
	MINDIF	23.0	23.3	-0.2	22.8	24.0	1.1	22	23.8	0.8	22.8	21.5	-0.9	20.0	20.0	0.5	17.6	14.8	-1.9
	MOKOLO	23.0	23.3	-0.2	22.8	24.0	1.1	22	23.8	0.8	22.8	21.5	-0.9	20.0	20.0	0.5	17.6	14.8	-1.9
	MORA	23.8	22.8	-0.7	23.0	22.8	-0.2	23.6	21.8	-1.2	22.1	22.2	-0.2	19.3	18.9	-0.7	16.2	14.2	-2.6
	WAZA	23.8	22.8	-0.7	23.0	22.8	-0.2	23.6	21.8	-1.2	22.1	22.2	-0.2	19.3	18.9	-0.7	16.2	14.2	-2.6
	YAGOUA	23.8	22.8	-0.7	23.0	22.8	-0.2	23.6	21.8	-1.2	22.1	22.2	-0.2	19.3	18.9	-0.7	16.2	14.2	-2.6
Monthly regional average		**23.5**	**23.0**	**-0.5**	**22.9**	**23.3**	**0.3**	**23.0**	**22.6**	**-0.4**	**22.4**	**21.9**	**-0.5**	**19.6**	**19.4**	**-0.2**	**16.8**	**14.4**	**-2.3**
North region	GAROUA	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	DEMBO	23.0	23.3	0.3	22.8	24.0	1.2	22	23.1	1.1	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.7	-2.9
	GUIDER	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	LAGDO	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	PITOA	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	POLI	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	REY BOUBA	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	TCHOLLIRE	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
	TOUBORO	23.0	23.3	0.3	22.8	24.0	1.2	22	23.8	1.8	22.8	21.5	-1.3	20.0	20.0	0.1	17.6	14.8	-2.8
Monthly regional average		**23.0**	**23.3**	**0.3**	**22.8**	**24.0**	**1.2**	**22.0**	**23.7**	**1.7**	**22.8**	**21.5**	**-1.3**	**20.0**	**20.0**	**0.1**	**17.6**	**14.8**	**-2.8**


Minimum temperature variation in the Far North region for January 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jan Temp_R_Jan Temp_A_Jan
Minimum temperature variation in the Far North region for February 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Feb Temp_R_Feb Temp_A_Feb
Minimum temperature variation in the Far North region for March 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Mar Temp_R_Mar Temp_A_Mar
Minimum temperature variation in the Far North region for April 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Apr Temp_R_Apr Temp_A_Apr
Minimum temperature variation in the Far North region for May 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_May Temp_R_May Temp_A_May
Minimum temperature variation in the Far North region for June 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jun Temp_R_Jun Temp_A_Jun
Minimum temperature variation in the Far North region for July 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jul Temp_R_Jul Temp_A_Jul
Minimum temperature variation in the Far North region for August 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Aug Temp_R_Aug Temp_A_Aug
Minimum temperature variation in the Far North region for September 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Sep Temp_R_Sep Temp_A_Sep
Minimum temperature variation in the Far North region for October 2020
Titre de l'axe
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Oct Temp_R_Oct Temp_A_Oct
Minimum temperature variation in the Far North region for November 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA
Main stations
Temp_H_Nov Temp_R_Nov Temp_A_Nov
Minimum temperature variation in the Far North region for December 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Dec Temp_R_Dec Temp_A_Dec

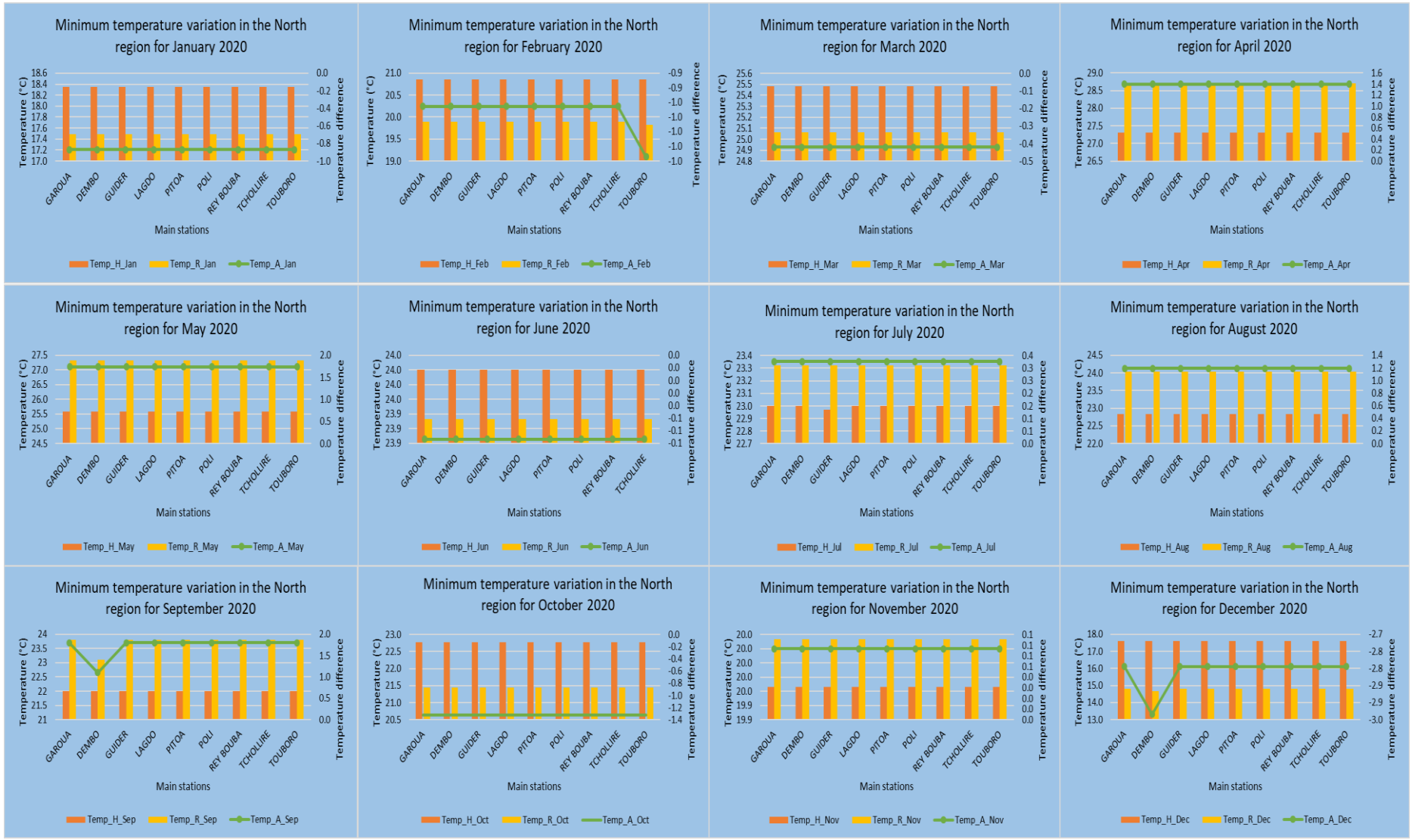


Figure 48: Characteristics of 2020 monthly minimum temperatures relative to historical values in the Sudano-Sahelian zone

c- Average temperature in the Sudano-Sahelian zone

Real monthly average temperatures in the Sudano-Sahelian zone ranged from 24.3°C in January in the Far-North Region to 35.0°C in April in both the Far-North and North Regions. Figure 49 below shows the trend of the monthly average temperature difference in the Far-North and North regions. Thus, the real average temperature deviations in this zone respectively increased by 3.0°C (in December) in the North Region and decreased by 0.9°C (in February) in the North region.

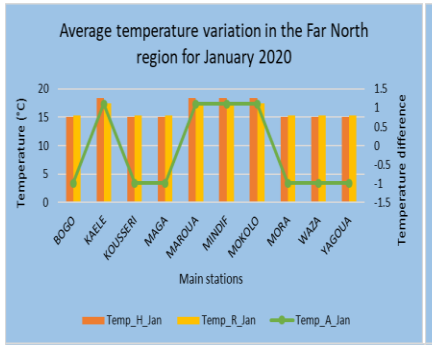
The lowest real monthly average temperature in the Sudano-Sahelian zone was recorded in Bogo, Kousseri, Maga, Mora, Waza and Yagoua at 23.3°C in January in the Far-North region whereas the highest real monthly average temperature was recorded in all stations in both the North and Far-North regions 35.0°C in April 2020. In the Far-North region, we observed that April was the hottest month with an average temperature (35.0°C) while January was the coldest month with an average temperature (24.3°C) as seen in table 18 below. During the hottest month in the Far-North region, all the stations recorded the equal real monthly average temperatures of 35.0°C, whereas the coldest month recorded Bogo, Kousseri, Maga, Mora, Waza and Yagoua as the coldest station with a real monthly average temperature of 23.3°C and Kaele, Maroua, Minfif, and Mokolo (25.8°C) as the warmest station. In the North region, Table 18 illustrates that April was recorded as the hottest month with an average temperature (35.0°C) whereas, January was recorded as the coldest month (25.8°C). During the hottest and coldest months, all stations recorded similar real monthly average temperatures of 35.0°C and 25.9°C respectively.

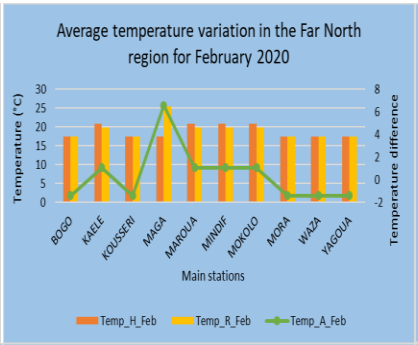
However, by comparing the monthly average temperatures recorded over the period from 1979 to 2018, with the monthly average temperatures recorded in 2019 during the same period, we observed that the year 2020 was generally warmer than normal in the two constituent regions of the Sudano-Sahelian zone.

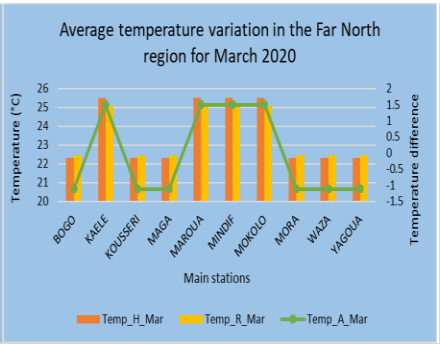
Table 18: Characteristics of monthly average temperature in the Sudano-Sahelian zone of Cameroon in 2020.

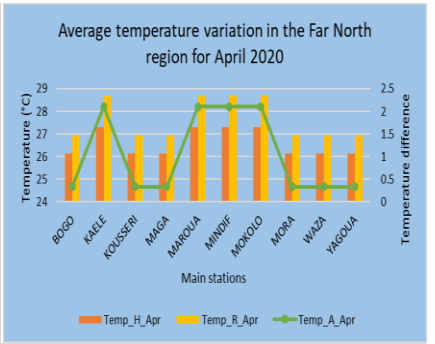
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Far-North region	BOGO	23.5	23.3	-1.2	25.6	25.2	-1.6	30.3	31.2	0.1	33.1	35.0	1.7	33.1	34.7	2.5	31.3	32.4	2.3
	KAELE	25.9	25.8	1.3	28.8	27.9	1.0	32.5	33.0	1.8	33.5	35.0	1.7	30.8	32.8	0.7	28.4	29.4	-0.7
	KOUSSERI	23.5	23.3	-1.2	25.6	25.2	-1.6	30.3	31.2	0.1	33.1	35.0	1.7	33.1	34.7	2.5	31.3	32.4	2.3
	MAGA	23.5	23.3	-1.2	25.6	29.2	2.4	30.3	31.2	0.1	33.1	35.0	1.7	33.1	34.7	2.5	31.3	32.4	2.3
	MAROUA	25.9	25.8	1.3	28.8	27.9	1.0	32.5	33.0	1.8	33.5	35.0	1.7	30.8	32.8	0.7	28.4	29.4	-0.7
	MINDIF	25.9	25.8	1.3	28.8	27.9	1.0	32.5	33.0	1.8	33.5	35.0	1.7	30.8	32.8	0.7	28.4	29.4	-0.7
	MOKOLO	25.9	25.8	1.3	28.8	27.9	1.0	32.5	33.0	1.8	33.5	35.0	1.7	30.8	32.8	0.7	28.4	29.4	-0.7
	MORA	23.5	23.3	-1.2	25.6	25.2	-1.6	30.3	31.1	0.0	33.1	35.0	1.7	33.1	34.7	2.5	31.3	32.4	2.3
	WAZA	23.5	23.3	-1.2	25.6	25.2	-1.6	30.3	31.1	0.0	33.1	35.0	1.7	33.1	34.7	2.5	31.3	32.4	2.3
	YAGOUA	23.5	23.3	-1.2	25.6	25.2	-1.6	30.3	31.1	0.0	33.1	35.0	1.7	33.1	34.7	2.5	31.3	32.4	2.3
Monthly regional average		**24.5**	**24.3**	**-0.2**	**26.9**	**26.7**	**-0.2**	**31.2**	**31.9**	**0.8**	**33.3**	**35.0**	**1.7**	**32.2**	**33.9**	**1.8**	**30.1**	**31.2**	**1.1**
North region	GAROUA	25.9	25.8	0.0	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	DEMBO	25.9	25.8	0.0	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	GUIDER	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	LAGDO	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	PITOA	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	POLI	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	REY BOUBA	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	TCHOLLIRE	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
	TOUBORO	25.9	25.8	-0.1	28.8	27.9	-0.9	32.5	33.0	0.5	33.5	35.0	1.5	30.8	32.8	2.0	28.4	29.4	1.0
Monthly regional average		**25.9**	**25.8**	**-0.1**	**28.8**	**27.9**	**-0.9**	**32.5**	**33.0**	**0.5**	**33.5**	**35.0**	**1.5**	**30.8**	**32.8**	**2.0**	**28.4**	**29.4**	**1.0**

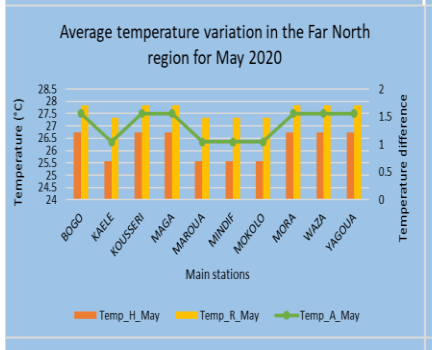
	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Far-North region	BOGO	28.5	28.0	0.0	27.1	27.1	0.2	28.8	27.0	-1.0	29.8	29.3	0.0	27.6	27.5	-0.2	24.3	27.3	2.4
	KAELE	27.1	27.9	-0.1	26.8	28.6	1.6	26.8	28.2	0.2	28.4	28.4	-0.9	27.9	29.1	1.4	25.8	28.5	3.6
	KOUSSERI	28.5	28.0	0.0	27.1	27.1	0.2	28.8	27.0	-1.0	29.8	29.3	0.0	27.6	27.5	-0.2	24.3	27.2	2.4
	MAGA	28.5	28.0	0.0	27.1	27.1	0.2	28.8	27.0	-1.0	29.8	29.3	0.0	27.6	27.5	-0.2	24.3	27.2	2.4
	MAROUA	27.1	27.9	-0.1	26.8	28.6	1.6	26.8	28.2	0.2	28.4	28.4	-0.9	27.9	29.1	1.4	25.8	28.5	3.6
	MINDIF	27.1	27.9	-0.1	26.8	28.6	1.6	26.8	28.2	0.2	28.4	28.4	-0.9	27.9	29.1	1.4	25.8	28.5	3.6
	MOKOLO	27.1	27.9	-0.1	26.8	28.6	1.6	26.8	28.2	0.2	28.4	28.4	-0.9	27.9	29.1	1.4	25.8	28.5	3.6
	MORA	28.5	28.0	0.0	27.1	27.1	0.2	28.8	27.0	-1.0	29.8	29.3	0.0	27.6	27.5	-0.2	24.3	27.2	2.4
	WAZA	28.5	28.0	0.0	27.1	27.1	0.2	28.8	27.0	-1.0	29.8	29.3	0.0	27.6	27.5	-0.2	24.3	27.2	2.4
	YAGOUA	28.5	28.0	0.0	27.1	27.1	0.2	28.8	27.0	-1.0	29.8	29.3	0.0	27.6	27.5	-0.2	24.3	27.2	2.4
Monthly regional average		**27.9**	**28.0**	**0.0**	**27.0**	**27.7**	**0.8**	**28.0**	**27.5**	**-0.5**	**29.2**	**28.9**	**-0.4**	**27.7**	**28.1**	**0.4**	**24.9**	**27.7**	**2.9**
North region	GAROUA	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	DEMBO	27.1	27.9	0.7	26.8	28.6	1.8	26.8	27.8	1.0	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	GUIDER	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	LAGDO	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	PITOA	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	POLI	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	REY BOUBA	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	TCHOLLIRE	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	25.8	28.5	3.0
	TOUBORO	27.1	27.9	0.7	26.8	28.6	1.8	26.8	28.2	1.4	28.4	28.4	0.0	27.9	29.1	1.3	23.2	28.5	3.0
Monthly regional average		**27.1**	**27.9**	**0.7**	**26.8**	**28.6**	**1.8**	**26.8**	**28.2**	**1.4**	**28.4**	**28.4**	**0.0**	**27.9**	**29.1**	**1.3**	**25.5**	**28.5**	**3.0**

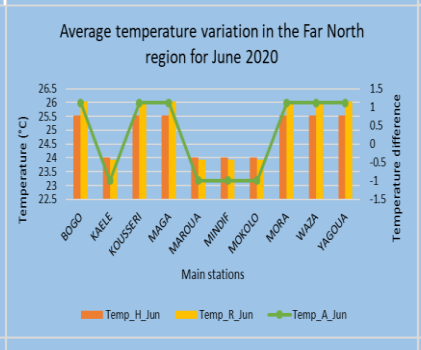

Average temperature variation in the Far North region for January 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

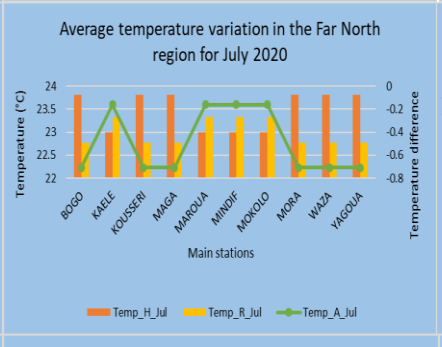

Average temperature variation in the Far North region for February 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

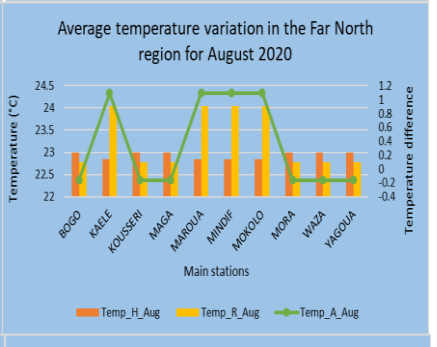

Average temperature variation in the Far North region for March 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

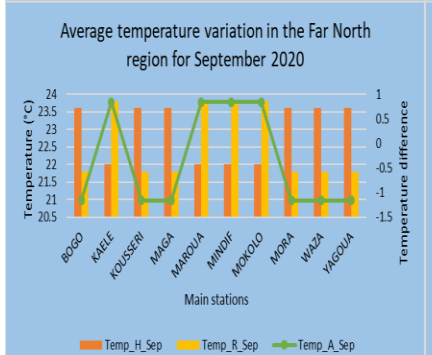

Average temperature variation in the Far North region for April 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

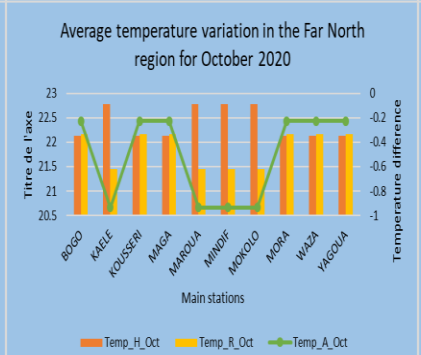

Average temperature variation in the Far North region for May 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

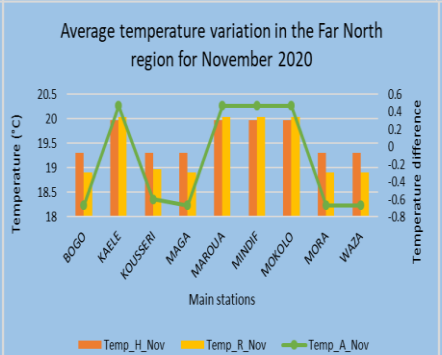

Average temperature variation in the Far North region for June 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

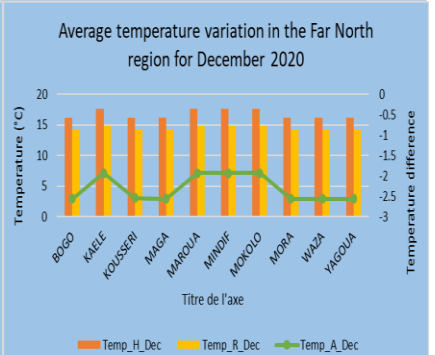

Average temperature variation in the Far North region for July 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul


Average temperature variation in the Far North region for August 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Average temperature variation in the Far North region for September 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Average temperature variation in the Far North region for October 2020
Titre de l'axe
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Average temperature variation in the Far North region for November 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Average temperature variation in the Far North region for December 2020
Temperature (°C)
Temperature difference
BOGO KAELE KOUSSERI MAGA MAROUA MINDIF MOKOLO MORA WAZA YAGOUA
Titre de l'axe
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

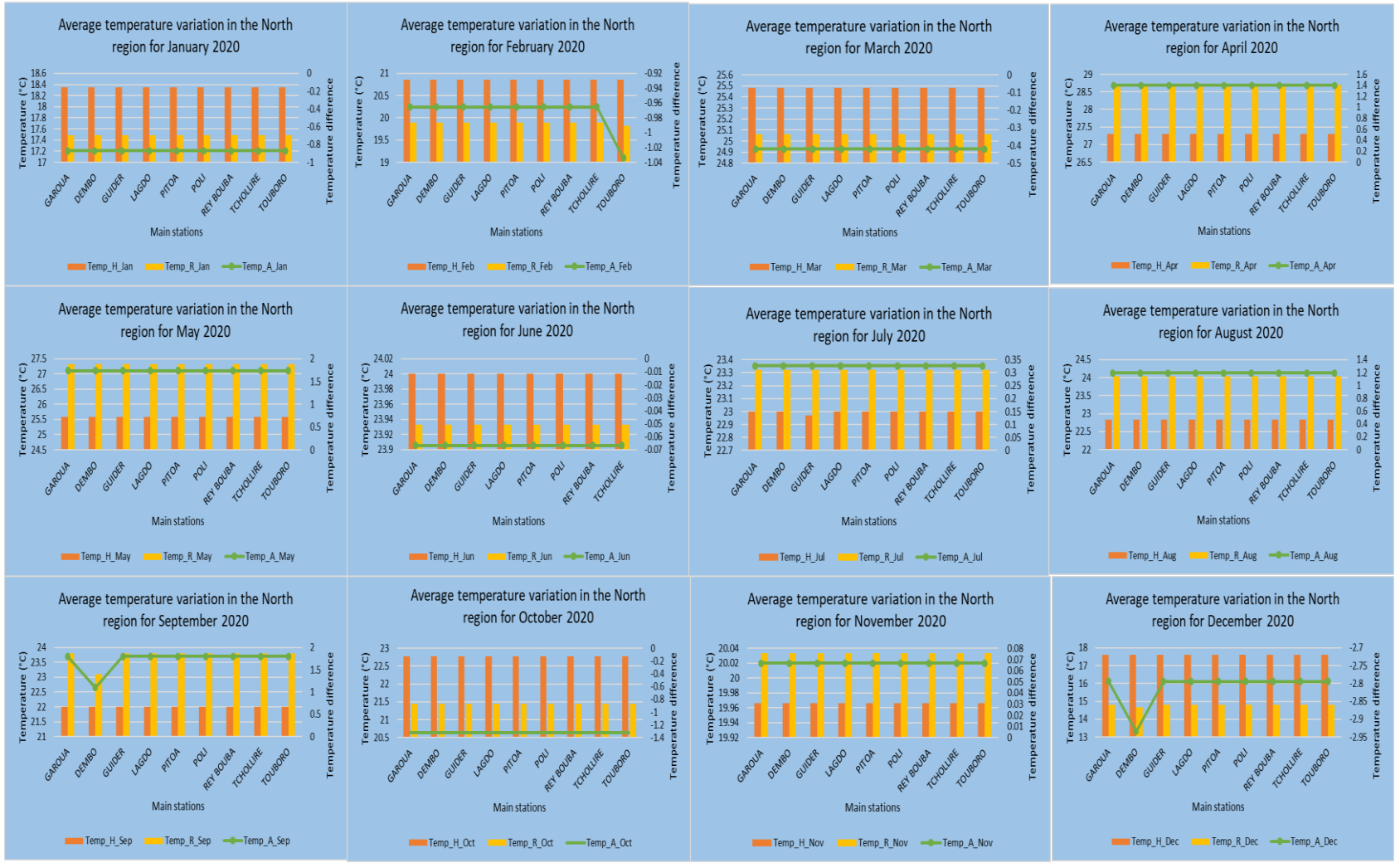


Figure 49: Characteristics of 2020 monthly average temperatures relative to historical values in the Sudano-Sahelian zone

3.2. THE GUINEAN SAVANNAH HIGHLAND ZONE

3.2.1 Changes in seasonal temperatures in the Guinean Savannah Highland zone

The general maximum, minimum and average temperature values for the year 2020 in the Guinean Savannah Highland zone varied in different ways. We observe that by comparing the overall maximum, minimum and average historic temperatures recorded over the period from 1979 to 2018 with the maximum, minimum and average real temperatures recorded in 2020 during the same period, the year 2020 was generally warmer than normal in the Guinean Savannah Highland zone.

a- Evolution of maximum temperatures

Figure 50 below illustrates the trend in temperature difference in the Guinean Savannah Highland zone. From the seasonal maximum temperature analysis in this zone. the Adamawa region registered an increase in the average real maximum temperatures in the dry season at 34.6 ^{o}C. as compared to the average maximum historic temperatures (32.6 ^{o}C) as recorded over the period from 1979 to 2018. hence by comparing the difference in temperature between the historic and real values in the Guinean Savannah Highland zone. we observed a generally warmer temperature by 1.9°C in the Adamawa region during the dry season.

The seasonal maximum temperature analysis in this zone shows that the Adamawa region registered an increase in the average real maximum temperatures in the rainy season at 31.2^{o}C. as compared to the average maximum historic temperatures (29.7 ^{o}C) recorded over the period from 1979 to 2018. hence by comparing the difference in temperature between the historic and real values in the Guinean Savannah Highland zone. we observed a generally warmer temperature of 1.5°C in the Adamawa region during the rainy season.

During this period. we observed that the overall mean maximum temperature difference registered in the Adamawa region increased during the dry season in Meiganga and Ngaoundere by 3.9°C (highest) and dropped by 0.6°C in Tibati (lowest) and during the rainy season. the overall mean maximum temperature difference was similarly highest in Meiganga and Ngaoundere at 5.7°C and lowest in Banyo and Tibati at 2.8°C. Nevertheless. by comparing the maximum historic temperatures recorded over the period from 1978 to 2018 with the maximum real temperatures recorded in 2020 during the same period. we observed that the year 2020 was generally warmer than normal in the high Guinean Savannah zone.

Table 19: Characteristics of seasonal maximum temperatures in the Guinean Savannah Highland zone

	Dry Season			*Rainy Season*		
Localities	***Max_His_T (DS)***	***Max_Real_T (DS)***	***TD_ (DS)***	***Max_His_T (RS)***	***Max_Real_T (RS)***	***TD_ (RS)***
Adamawa Region						
BANYO	30.2	32.9	0.3	25.6	26.9	-2.8
MEIGANGA	35.8	36.6	3.9	33.7	35.4	5.7
NGAOUNDERE	35.8	36.6	3.9	33.7	35.4	5.7
TIBATI	28.7	32.1	-0.6	25.6	26.9	-2.8
Average	**32.6**	**34.6**	**1.9**	**29.7**	**31.2**	**1.5**

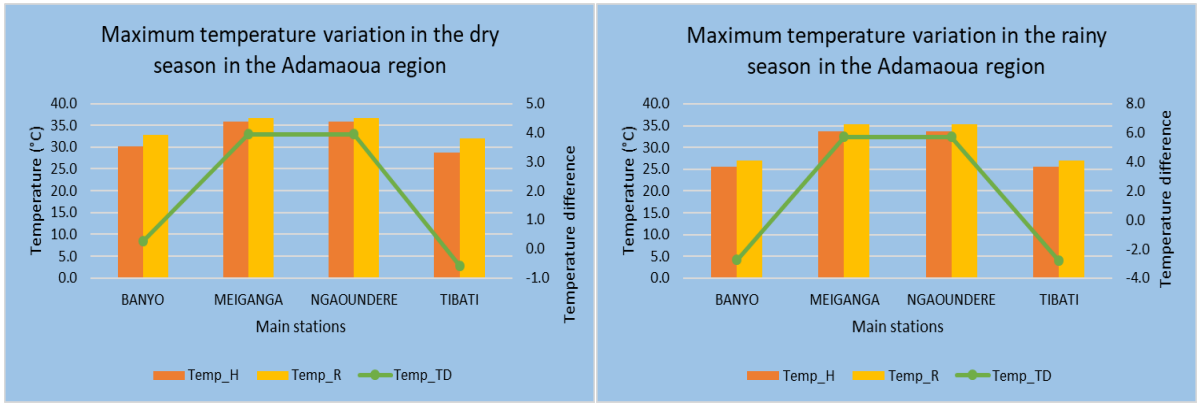


Figure 50: Characteristics of seasonal maximum temperatures relative to historical values in the Guinean Savannah Highland zone in 2020

b- Evolution of minimum temperatures

Figure 51 below illustrates the trend in temperature difference in the Guinean Savannah Highland zone. From the seasonal minimum temperature analysis in this zone, the Adamawa region registered a decrease in the real average minimum temperatures in the dry season being 17.6^{o}C, as compared to the average minimum historic temperatures (18.1^{o}C) as recorded over the period from 1979 to 2018, hence by comparing the difference in temperature between the historic and real values in the Guinean Savannah Highland zone, we observed a generally warmer temperature of 0.5 °C in the Adamawa region during the dry season.

From the seasonal minimum temperature analysis in this zone, the Adamawa region registered an increase in the real average minimum temperatures in the rainy season (21.0^{o}C), as compared to the average minimum historic temperatures (20.1^{o}C) as recorded over the period from 1979 to 2018, hence by comparing the difference in temperature between the historic and real values in the Guinean Savannah Highland zone. we observed a generally warmer temperature at 0.9°C in the Adamawa region during the rainy season.

During this period, we observed that the overall mean minimum temperature difference registered in the Adamawa region increased during the dry season in Banyo and Tibati by 3.2°C (highest) and dropped at 2.2°C (lowest) in Meiganga and Ngaoundere. During the rainy season,

the overall mean minimum temperature difference increases at 4.6°C both in Meiganga and Ngaoundere and dropped by 2.9°C in Banyo and Tibati. Nevertheless, when comparing the minimum historic temperatures recorded over the period from 1979 to 2018 with the real minimum temperatures recorded in 2020 during the same period, we observed that the year 2020 was generally warmer than normal in the Guinean Savannah Highlandzone.

Table 20: Characteristics of seasonal minimum temperatures in the Guinean Savannah Highland zone

	Dry Season			***Rainy Season***		
Localities	***Max_His_T (DS)***	***Max_Real_T (DS)***	***TD_ (DS)***	***Max_His_T (RS)***	***Max_Real_T (RS)***	***TD_ (RS)***
Adamawa Region						
BANYO	15.7	14.9	-3.2	16.3	17.2	-2.9
MEIGANGA	20.4	20.3	2.2	23.9	24.7	4.6
NGAOUNDERE	20.4	20.3	2.2	23.9	24.7	4.6
TIBATI	15.7	14.9	-3.2	16.3	17.2	-2.9
Average	**18.1**	**17.6**	**-0.5**	**20.1**	**21.0**	**0.9**

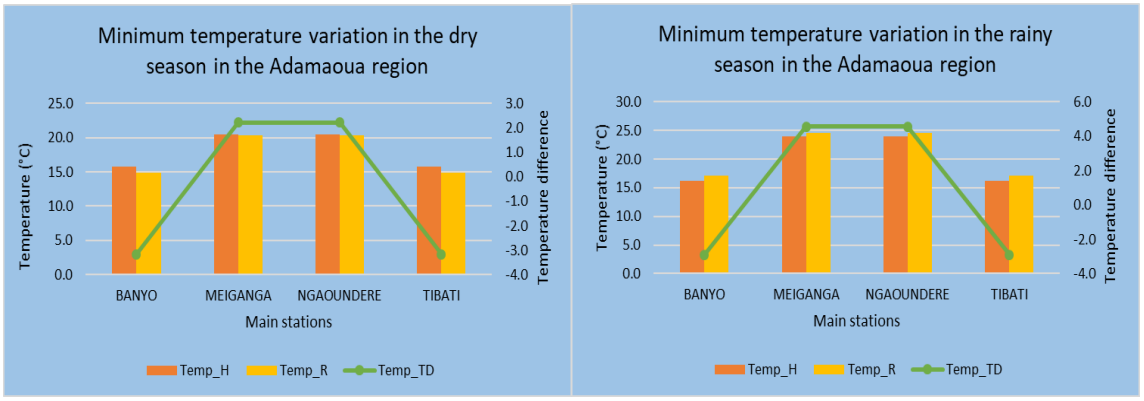


Figure 51: Characteristics of seasonal minimum temperatures relative to historical values in the Guinean Savannah Highland zone in 2020

b- Evolution of average temperatures

Figure 52 below illustrates the trend in temperature difference in the Guinean Savannah Highland zone. From the seasonal average temperature analysis in this zone, the Adamawa region registered an increase in the real average temperatures in the dry season (26.0°C) as compared to the average historic temperatures (25.2°C) as recorded over the period from 1979 to 2018, hence by comparing the difference in temperature between the historic and real values in the Guinean Savannah Highland zone, we observed a generally warmer temperature of 0.8 °C in the Adamawa region during the dry season.

From the seasonal average temperature analysis in this zone, the Adamawa region registered an increase in the real average temperatures in the rainy season of 26.1°C as compared to the historic average temperatures (24.9°C) as recorded over the period from 1979 to 2018, hence by comparing the difference in temperature between the historic and real values in the Guinean

Savannah Highland zone, we observed a generally warmer temperature at 0.8°C in the Adamawa region during the rainy season.

During this period, we observed that the overall mean minimum temperature difference registered in the Adamawa region increased during the dry season in Banyo and Tibati by 3.2°C (highest) and dropped to 2.2°C (lowest) in Meiganga and Ngaoundere. During the rainy season, the overall mean minimum temperature difference increases to 4.6°C both in Meiganga and Ngaoundere and dropped by 2.9°C in Banyo and Tibati. Nevertheless, when comparing the minimum historic temperatures recorded over the period from 1979 to 2018 with the real minimum temperatures recorded in 2020 during the same period, we observed that the year 2020 was generally warmer than normal in the Guinean Savannah Highland

zone**Table 21: Characteristics of seasonal average temperatures in the Guinean Savannah Highland zone**

	Dry Season			***Rainy Season***		
Localities	***Max_His_T (DS)***	***Max_Real_T (DS)***	***TD_ (DS)***	***Max_His_T (RS)***	***Max_Real_T (RS)***	***TD_ (RS)***
Adamawa Region						
BANYO	22.2	23.5	-1.7	21.0	22.1	-2.8
MEIGANGA	28.1	28.4	3.3	28.8	30.0	5.1
NGAOUNDERE	28.1	28.4	3.3	28.8	30.0	5.1
TIBATI	22.2	23.5	-1.7	21.0	22.1	-2.8
Average	**25.2**	**26.0**	**0.8**	**24.9**	**26.1**	**1.2**

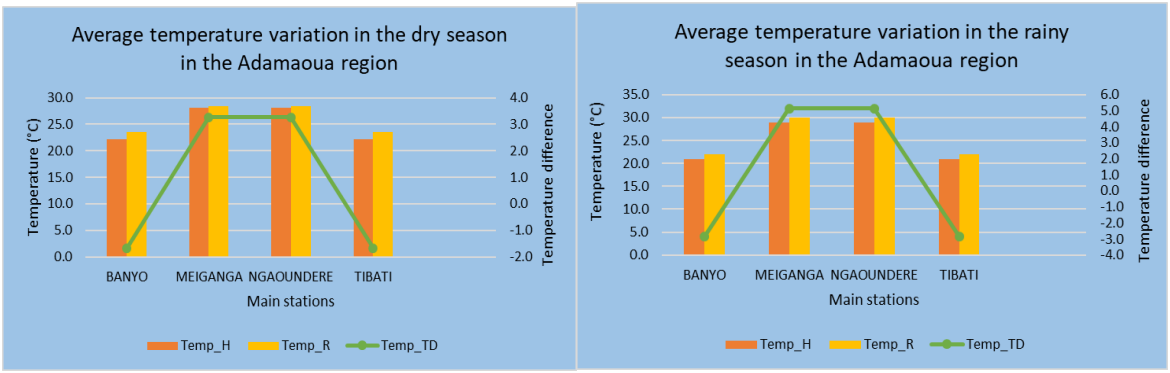


Figure 52: Characteristics of seasonal average temperatures relative to historical values in the Guinean Savannah highland zone in 2020

3.2.2. Monthly evolution of maximum, minimum and average temperatures in the Guinean Savannah Highland zone.

c- Maximum temperatures

Monthly real maximum temperature variations in the Guinean Savannah Highland zone ranged from 25.5°C in Banyo, Makam and Tibati in July in the Adamawa region to 41.3°C in Mbe, Meiganga, Ngoundere and Tignere in April as seen in table **22** above.

The monthly maximum temperature for the Adamawa region varied from one month to the other with March being the hottest month and the coldest being July. During the hottest month, Mbe, Meiganga, Ngoundere and Tignere registered the highest monthly maximum temperature of 40.8^{o}C and lowest monthly maximum temperature in Banyo, Makam and Tibati at 32.4°C, whereas during the coldest month, Banyo, Makam and Tibati recorded least monthly maximum temperatures of 25.5°C and highest monthly maximum temperature in Mbe, Meiganga. Ngoundere and Tignere at 32.4°C. The highest real monthly maximum average temperature in the Adamawa region was recorded in March at 37.2°C whereas the lowest real monthly maximum average temperature was constant in July at 29.4°C as seen in table 22.

The monthly regional average temperature difference was recorded to be the highest in the Adamawa region in December (3.3°C) and lowest in July (0.8°C) (figure 49 below). However, by comparing the monthly real maximum average temperatures recorded over the period from 1979 to 2018 with the monthly real maximum average temperatures recorded in 2020 during the same period, we observed that the year 2020 was generally warmer than normal in the Guinean Savannah Highland zone.

Table 22: Characteristics of 2020 monthly maximum temperatures relative to historical values in the Guinean Savannah Highland zone.

	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Adamawa region	BANYO	29.5	33.1	1.4	29.4	34.4	0.8	28.3	32.4	-2.2	27.9	29.0	-5.6	26.5	27.8	-4.2	25.1	26.5	-3.0
	MAKAM	29.5	33.1	1.4	29.4	34.4	0.8	28.3	32.4	-2.2	27.9	29.0	-5.6	26.5	27.8	-4.2	25.1	26.5	-3.0
	MBE	33.4	34.1	2.4	36.7	35.9	2.3	39.4	40.8	6.2	39.8	41.3	6.6	36.0	38.3	6.4	32.8	34.8	5.3
	MEIGANGA	33.4	34.1	2.4	36.7	35.9	2.3	39.4	40.8	6.2	39.8	41.3	6.6	36.0	38.3	6.4	32.8	34.8	5.3
	NGAOUNDERE	33.4	34.1	2.4	36.7	35.9	2.3	39.4	40.8	6.2	39.8	41.3	6.6	36.0	38.3	6.4	32.8	34.8	5.3
	TIBATI	29.5	33.1	1.4	29.4	34.4	0.8	28.3	32.4	-2.2	27.9	29.0	-5.6	26.5	27.8	-4.2	25.1	26.5	-3.0
	TIGNERE	33.4	34.1	2.4	36.7	35.9	2.3	39.4	40.8	6.2	39.8	41.3	6.6	36.0	38.3	6.4	32.8	34.8	5.3
Monthly regional average		**31.7**	**33.7**	**2.0**	**33.6**	**35.3**	**1.7**	**34.6**	**37.2**	**2.6**	**34.7**	**36.0**	**1.4**	**31.9**	**33.8**	**1.9**	**29.5**	**31.2**	**1.7**

	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Adamawa region	BANYO	25.0	25.5	-3.1	24.4	26.5	-1.5	25.0	26.1	-2.7	25.6	27.2	-3.2	27.4	29.3	-2.8	28.8	31.9	0.1
	MAKAM	25.0	25.5	-3.1	24.4	26.5	-1.5	25.0	26.1	-2.7	25.6	27.1	-3.3	27.4	29.3	-2.8	28.8	31.9	0.1
	MBE	31.2	32.4	3.8	30.7	33.1	5.2	31.7	32.6	3.8	34.0	35.4	4.9	35.7	38.2	6.0	33.9	37.4	5.7
	MEIGANGA	31.2	32.4	3.8	30.7	33.1	5.2	31.7	32.6	3.8	34.0	35.4	4.9	35.7	38.2	6.0	33.9	37.4	5.7
	NGAOUNDERE	31.2	32.4	3.8	30.7	33.1	5.2	31.7	32.6	3.8	34.0	35.4	4.9	35.7	38.2	6.0	33.9	37.4	5.7
	TIBATI	25.0	25.5	-3.1	24.4	26.5	-1.5	25.0	26.1	-2.7	25.6	27.1	-3.3	27.4	29.3	-2.8	28.8	31.9	0.1
	TIGNERE	31.2	32.4	3.8	30.7	33.1	5.2	31.7	32.6	3.8	34.0	35.4	4.9	35.7	38.2	6.0	33.9	37.4	5.7
Monthly regional average		**28.5**	**29.4**	**0.8**	**28.0**	**30.3**	**2.3**	**28.8**	**29.8**	**1.0**	**30.4**	**31.9**	**1.4**	**32.1**	**34.4**	**2.2**	**31.7**	**35.0**	**3.3**

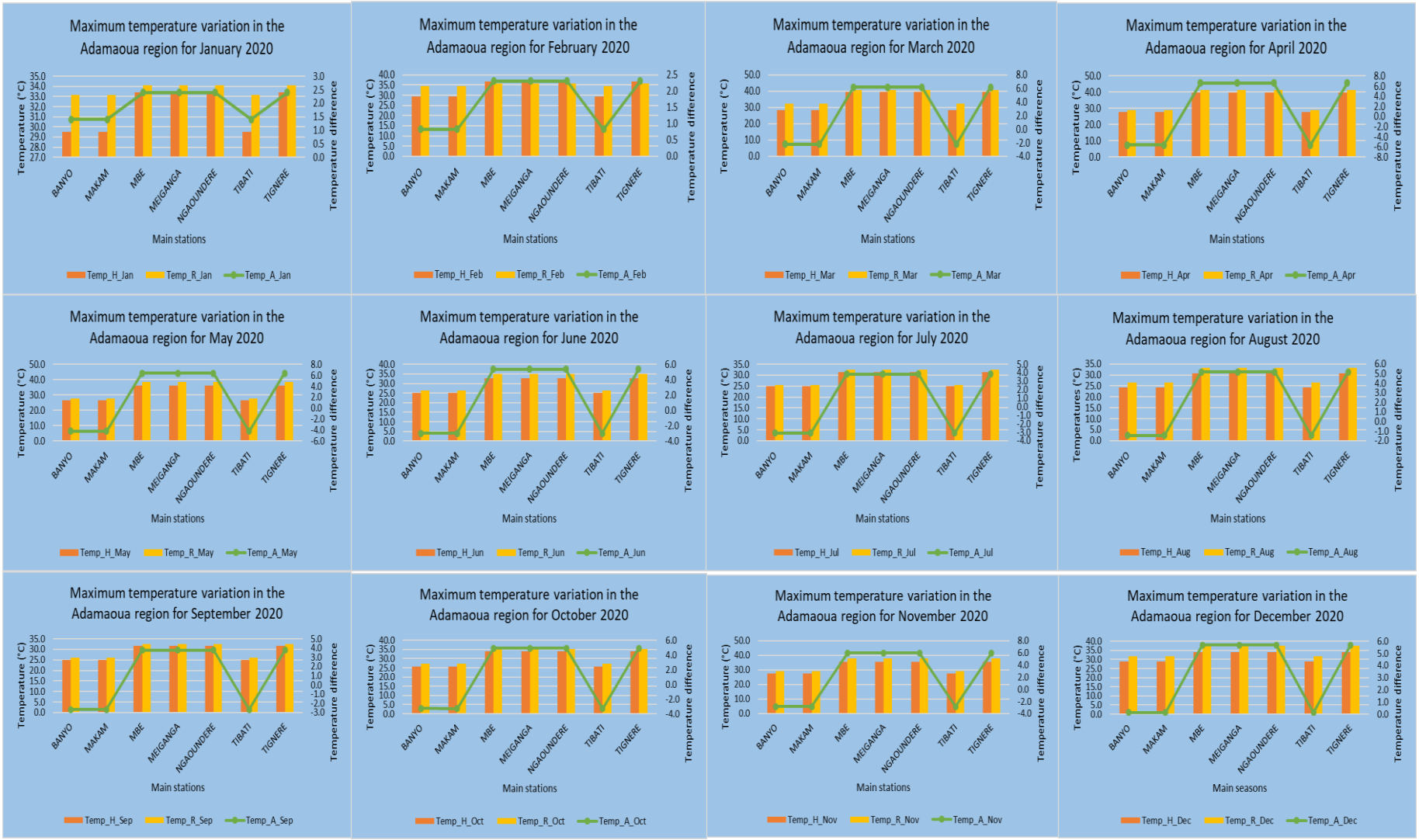


Figure 53: Characteristics of 2020 monthly maximum temperatures relative to historical values in the Guinean Savannah Highland zone

d- Minimum temperatures

In the Adamawa region, real monthly minimum temperatures in the Guinean Savannah Highland zone ranged from 11.4°C in Banyo, Makam and Tibati in December to 28.7°C in Mbe, Meiganga, Ngaoundere and Tignere in April 2020 (table 20).

The month of April was the hottest (24.1°C) in the Adamawa region while December was the coldest (13.3°C). During the hottest month, the towns of Mbe, Meiganga, Ngaoundere and Tignere recorded the highest monthly minimum temperature of 28.7°C and the lowest in Banyo, Makam and Tibati (17.9°C) whereas during the coldest month Banyo, Makam and Tibati recorded 11.4°C as the lowest monthly minimum temperature and the highest was recorded in Mbe, Meiganga, Ngaoundere and Tignere (14.8°C) as seen in table 20 below.

The highest monthly regional average temperature difference was recorded in the Adamawa region in May and September (1.4°C) and lowest in the month of December at 3.2°C (figure 49 above). However, by comparing the real monthly minimum average temperatures recorded over the period from 1979 to 2018 with the real monthly minimum average temperatures recorded in 2020 during the same period, we observed that the year 2020 was generally warmer than normal in the Guinean Savannah Highland zone.

Table 23: Characteristics of 2020 monthly minimum temperatures relative to historical values in the Guinean Savannah Highland zone.

	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Adamawa region	BANYO	15.1	13.2	-3.8	16.0	14.3	-4.4	16.9	17.0	-4.9	17.0	17.9	-5.0	16.8	17.7	-4.1	16.0	17.0	-3.6
	MAKAM	15.1	13.2	-3.8	16.0	14.3	-4.4	16.9	17.0	-4.9	17.0	17.9	-5.0	16.8	17.7	-4.1	16.0	17.0	-3.6
	MBE	18.4	17.5	0.5	20.9	19.9	1.1	25.5	25.1	3.2	27.3	28.7	5.8	25.6	27.3	5.5	24.0	23.9	3.4
	MEIGANGA	18.4	17.5	0.5	20.9	19.9	1.1	25.5	25.1	3.2	27.3	28.7	5.8	25.6	27.3	5.5	24.0	23.9	3.4
	NGAOUNDERE	18.4	17.5	0.5	20.9	19.9	1.1	25.5	25.1	3.2	27.3	28.7	5.8	25.6	27.3	5.5	24.0	23.9	3.4
	TIBATI	15.1	13.2	-3.8	16.0	14.3	-4.4	16.9	17.0	-4.9	17.0	17.9	-5.0	16.8	17.7	-4.1	16.0	17.0	-3.6
	TIGNERE	18.4	17.5	0.5	20.9	19.9	1.1	25.5	25.1	3.2	27.3	28.7	5.8	25.6	27.3	5.5	24.0	23.9	3.4
Monthly regional average		**17.0**	**15.7**	**-1.3**	**18.8**	**17.5**	**-1.3**	**21.8**	**21.6**	**-0.3**	**22.9**	**24.1**	**1.2**	**21.8**	**23.2**	**1.4**	**20.6**	**20.9**	**0.4**

	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Adamawa region	BANYO	16.0	17.0	-3.0	16.0	16.9	-3.0	16	16.9	-2.6	16.0	16.9	-3.0	15.7	15.7	-2.5	15.0	11.4	-5.1
	MAKAM	16.0	17.0	-3.0	16.0	16.9	-3.0	16	16.9	-2.6	16.0	16.9	-3.0	15.7	15.7	-2.5	15.0	11.4	-5.1
	MBE	23.0	23.3	3.3	22.8	24.0	4.1	22	23.8	4.4	22.8	21.5	1.6	20.0	20.0	1.9	17.6	14.8	-1.7
	MEIGANGA	23.0	23.3	3.3	22.8	24.0	4.1	22	23.8	4.4	22.8	21.5	1.6	20.0	20.0	1.9	17.6	14.8	-1.7
	NGAOUNDERE	23.0	23.3	3.3	22.8	24.0	4.1	22	23.8	4.4	22.8	21.5	1.6	20.0	20.0	1.9	17.6	14.8	-1.7
	TIBATI	16.0	17.0	-3.0	16.0	16.9	-3.0	16	16.9	-2.6	16.0	16.9	-3.0	15.7	15.7	-2.5	15.0	11.4	-5.1
	TIGNERE	23.0	23.3	3.3	22.8	24.0	4.1	22	23.8	4.4	22.8	21.5	1.6	20.0	20.0	1.9	17.6	14.8	-1.7
Monthly regional average		**20.0**	**20.6**	**0.6**	**19.9**	**21.0**	**1.1**	**19.4**	**20.8**	**1.4**	**19.9**	**19.5**	**-0.4**	**18.2**	**18.2**	**0.0**	**16.5**	**13.3**	**-3.2**

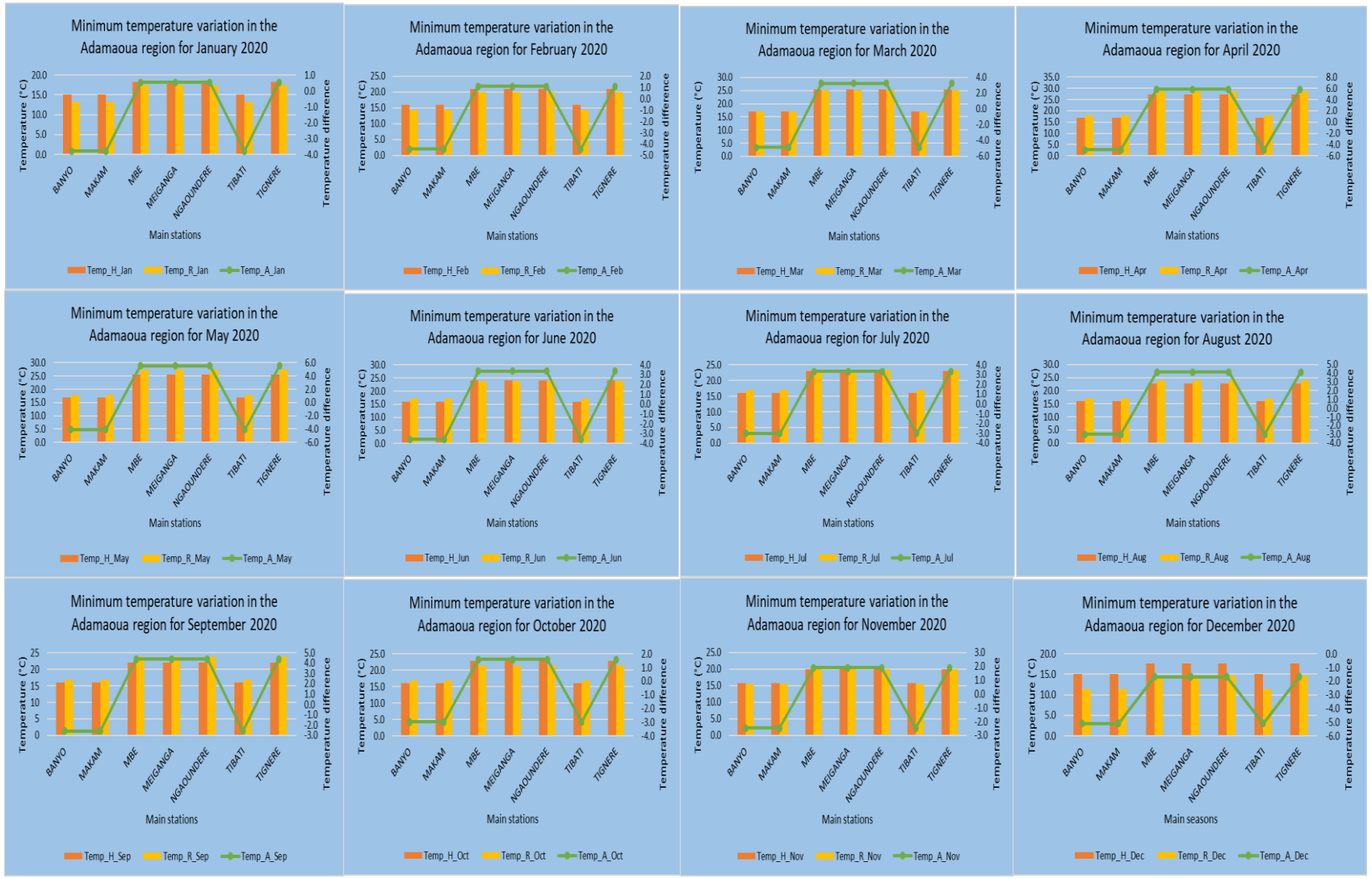


Figure 54: Characteristics of 2020 monthly minimum temperatures relative to historical values in the Guinean Savannah Highland zone

e- Average temperatures

Table 24 above shows that real monthly average temperature analysis in the Guinean Savannah Highland zone ranged from 24.6°C in January to 30.1°C in April with constant real average temperatures at 26.4°C in February and December. Table 24 above illustrates that during the hottest month (April), the stations at Mbei, Meiganga, Ngaoundere and Tigner recorded the highest monthly average temperature of 35.0°C and the lowest monthly average temperature in Banyo, Makam and Tibati (23.5°C) whereas, the coldest month (January) recorded Bayo, Makam and Tibati as the coldest station with a monthly average temperature of 23.1°C and Mbei, Meiganga, Ngaoundere and Tignere as the hottest station with a monthly average temperature of 25.8°C.

Figure 55 below shows the trend of the minimum temperature difference in the Guinean Savannah Highland zone. The maximum and minimum temperature differences for the Guinean Savannah Highland zone were respectively 2.3°C (in December) and 0.2°C (in February) in the Adamawa region, compared to the real monthly average temperatures recorded over the period from 1979 to 2018, it was noticed that the year 2020 was generally warmer than normal in the Guinean Savannah Highland zone.

Table 24: Characteristics of 2020 monthly average temperatures relative to historical values in the Guinean Savannah Highland zone.

	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Adamawa region	BANYO	22.3	23.1	-1.2	22.7	24.4	-1.8	22.6	24.7	-3.5	22.5	23.5	-5.3	21.7	22.7	-4.1	20.6	21.7	-3.3
	MAKAM	22.3	23.1	-1.2	22.7	24.4	-1.8	22.6	24.7	-3.5	22.5	23.5	-5.3	21.7	22.7	-4.1	20.6	21.7	-3.3
	MBE	25.9	25.8	1.5	28.8	27.9	1.7	32.5	33.0	4.7	33.5	35.0	6.2	30.8	32.8	5.9	28.4	29.4	4.4
	MEIGANGA	25.9	25.8	1.5	28.8	27.9	1.7	32.5	33.0	4.7	33.5	35.0	6.2	30.8	32.8	5.9	28.4	29.4	4.4
	NGAOUNDERE	25.9	25.8	1.5	28.8	27.9	1.7	32.5	33.0	4.7	33.5	35.0	6.2	30.8	32.8	5.9	28.4	29.4	4.4
	TIBATI	22.3	23.1	-1.2	22.7	24.4	-1.8	22.6	24.7	-3.5	22.5	23.5	-5.3	21.7	22.7	-4.1	20.6	21.7	-3.3
	TIGNERE	25.9	25.8	1.5	28.8	27.9	1.7	32.5	33.0	4.7	33.5	35.0	6.2	30.8	32.8	5.9	28.4	29.4	4.4
Monthly regional average		**24.4**	**24.6**	**0.3**	**26.2**	**26.4**	**0.2**	**28.3**	**29.4**	**1.2**	**28.8**	**30.1**	**1.3**	**26.9**	**28.5**	**1.6**	**25.1**	**26.1**	**1.1**

	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
Adamawa region	BANYO	20.5	21.2	-3.0	20.2	21.7	-2.2	20.5	21.5	-2.6	20.8	22.0	-3.1	21.5	22.5	-2.6	21.9	23.6	-0.5
	MAKAM	20.5	21.2	-3.0	20.2	21.7	-2.2	20.5	21.5	-2.6	20.8	22.0	-3.1	21.5	22.5	-2.6	21.9	23.6	-0.5
	MBE	27.1	27.9	3.6	26.8	28.6	4.6	26.8	28.2	4.1	28.4	28.4	3.2	27.9	29.1	4.0	25.8	28.5	4.4
	MEIGANGA	27.1	27.9	3.6	26.8	28.6	4.6	26.8	28.2	4.1	28.4	28.4	3.2	27.9	29.1	4.0	25.8	28.5	4.4
	NGAOUNDERE	27.1	27.9	3.6	26.8	28.6	4.6	26.8	28.2	4.1	28.4	28.4	3.2	27.9	29.1	4.0	25.8	28.5	4.4
	TIBATI	20.5	21.2	-3.0	20.2	21.7	-2.2	20.5	21.5	-2.6	20.8	22.0	-3.1	21.5	22.5	-2.6	21.9	23.6	-0.5
	TIGNERE	27.1	27.9	3.6	26.8	28.6	4.6	26.8	28.2	4.1	28.4	28.4	3.2	27.9	29.1	4.0	25.8	28.5	4.4
Monthly regional average		**24.3**	**25.0**	**0.8**	**24.0**	**25.6**	**1.7**	**24.1**	**25.3**	**1.2**	**25.1**	**25.7**	**0.5**	**25.2**	**26.3**	**1.2**	**24.1**	**26.4**	**2.3**

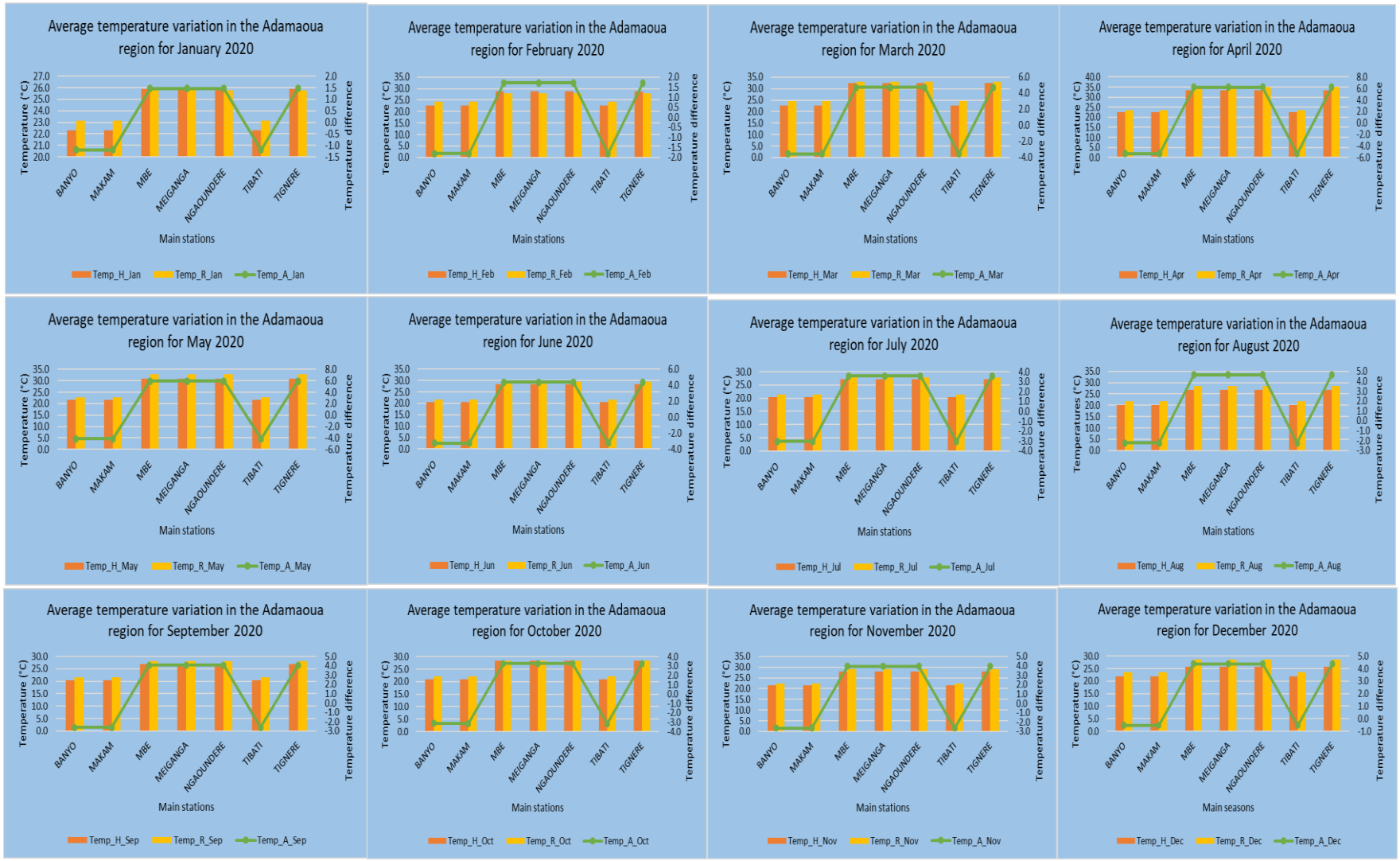


Figure 55: Characteristics of 2020 monthly average temperatures relative to historical values in the Guinean Savannah Highland zone

3.3. BIMODAL RAINFOREST ZONE

3.3.1 Changes in seasonal temperatures in the bimodal rainforest zone

a- Evolution of maximum temperatures

Seasonal maximum average temperatures were 27.4°C and 31.6°C for the long and short dry season being 29.5°C and 31.5°C for the long and short rainy season in the East Region, compared to maximum average temperatures of 26.5°C and 26.5°C for the long and short dry season; and 28.7°C and 30.2°C for the long and short rainy season in the Centre Region respectively. The maximum average temperatures for the South Region registered 22.1°C and 25.1°C for the long and short dry season and 22.2°C and 22.9°C for the long and short rainy season respectively (See table 25 below).

Compared to the seasonal maximum temperatures recorded for this agro-ecological zone over the period from 1978 to 2015, it was noted that the year 2020 was observed to have an overall increase in maximum average temperatures. Thus, in the long dry season, maximum differences with temperatures of -0.5°C, -0.9°C and 1.7°C were observed in the East, Centre and South Regions; in the short dry season, average differences with temperatures of 1.9°C, 2.1°C and 1.4°C were observed in the East, Centre and South Regions; in the long rainy season, average differences with temperatures of 1.3°C, 1.3°C and 1.9°C were observed in the East, Centre and South Regions and lastly in the short rainy season, average differences with temperatures of 1.2°C, 1.1°C and 1.8°C were observed in the East, Centre and South Regions respectively (figure **56** below).

Table 25: Characteristics of seasonal maximum temperatures in the bimodal rainforest zone.

	Long Dry Season			*Short Dry Season*			*Long Rainy Season*			*Short Rainy Season*		
Localities	***Max_His_T (LDS)***	***Max_Real_ T (LDS)***	***TD_ (LDS)***	***Max_His_ T (SDS)***	***Max_Real_ T (SDS)***	***TD_ (RS)***	***Max_His _T (LRS)***	***Max_Real_ T (LRS)***	***TD_ (LRS)***	***Max_His_ T (SRS)***	***Max_Real_ T (SRS)***	***TD_ (SRS)***
East Region												
ABONG MBANG	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
BATOURI	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
BELABO	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
BERTOUA	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
BETARE OYA	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
GAROUA BOULAI	31.6	33.4	5.5	34.7	34.9	5.2	33.8	35.4	7.1	38.4	40.2	9.9
MINDOUROU	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
YOKADOUMA	27.4	26.5	-1.4	29.0	31.1	1.4	27.4	28.7	0.5	29.1	30.2	-0.1
Average	**27.9**	**27.4**	**-0.5**	**29.7**	**31.6**	**1.9**	**28.2**	**29.5**	**1.3**	**30.3**	**31.5**	**1.2**
Centre Region												
AKONOLINGA	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
BAFIA	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
ESEKA	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
MBALMAYO	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
MBANDJOK	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
NANGA EBOKO	27.3	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
NKOTENG	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
OBALA	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
YAOUNDE	27.4	26.5	-0.9	29.0	31.1	2.1	27.4	28.7	1.3	29.1	30.2	1.1
Average	**27.4**	**26.5**	**-0.9**	**29.0**	**26.5**	**2.1**	**27.4**	**28.7**	**1.3**	**29.1**	**30.2**	**1.1**
South Region												
EBOLOWA	18.7	20.4	0.0	22.4	23.6	-0.1	18.4	20.4	0.1	19.3	21.1	0.0
KRIBI	22.0	23.8	3.4	25.0	26.6	2.8	22.2	23.9	3.6	22.8	24.7	3.6
LOLODORF	22.0	23.8	3.4	25.0	26.6	2.8	22.2	23.9	3.6	22.8	24.7	3.6
SANGMELIMA	18.7	20.4	0.0	22.4	23.6	-0.1	18.4	20.4	0.1	19.3	21.1	0.0
Average	**20.4**	**22.1**	**1.7**	**23.7**	**25.1**	**1.4**	**20.3**	**22.2**	**1.9**	**21.1**	**22.9**	**1.8**

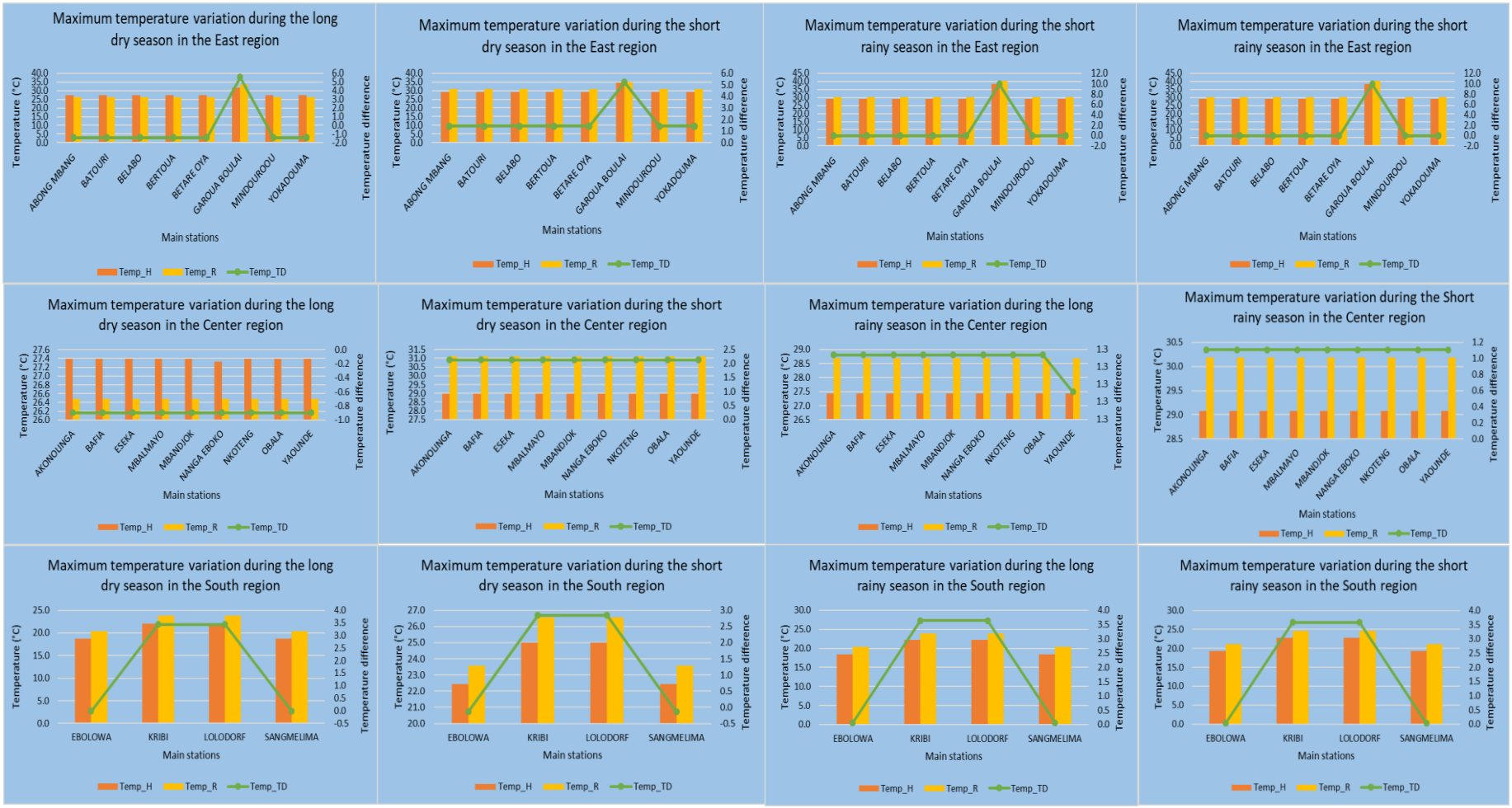


Figure 56: Characteristics of seasonal maximum temperatures relative to historical values in the bimodal rainforest zone in 2020

b- Evolution of minimum temperatures

Seasonal minimum average temperatures were 20.8°C and 20.1°C for the long and short dry season; 20.6°C and 21.8°C for the long and short rainy season in the East Region, compared to minimum average temperatures of 20.4°C and 20.4°C for the long and short dry season; and 20.4°C and 21.1°C for the long and short rainy season in the Centre Region respectively. The minimum average temperatures for the South Region registered 24.7°C and 22.6°C for the long and short dry season and 22.2°C and 22.9°C for the long and short rainy season respectively (table 26 below)

Compared to the seasonal minimum temperatures recorded for this agro-ecological zone over the period from 1978 to 2015, it was noted that the year 2020 was observed to have an overall increase in minimum average temperatures. Thus, in the long dry season, minimum differences with temperatures of 1.4°C, 1.6°C and 1.7°C were observed in the East, Centre and South Regions; in the short dry season, average differences with temperatures of 0.7°C, 0.9°C and 1.4°C were observed in the East. Centre and South Regions; in the long rainy season. average differences with temperatures of 1.7°C, 1.9°C and 1.9°C were observed in the East, Centre and South Regions and lastly in the short rainy season, average differences with temperatures of 1.7°C, 1.8°C and 1.8°C were observed in the East, Centre and South Regions respectively (figure 57 below).

Table 26: Characteristics of seasonal minimum temperatures in the bimodal rainforest zone.

	Long Dry Season			*Short Dry Season*			*Long Rainy Season*			*Short Rainy Season*		
Localities	***Max_His_T (LDS)***	***Max_Real_ T (LDS)***	***TD_ (LDS)***	***Max_His_ T (SDS)***	***Max_Real_ T (SDS)***	***TD_ (RS)***	***Max_His _T (LRS)***	***Max_Real_ T (LRS)***	***TD_ (LRS)***	***Max_His_ T (SRS)***	***Max_Real_ T (SRS)***	***TD_ (SRS)***
East Region												
ABONG MBANG	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
BATOURI	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
BELABO	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
BERTOUA	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
BETARE OYA	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
GAROUA BOULAI	23.3	23.8	4.5	18.9	18.3	-1.1	21.6	21.8	2.9	26.1	27.0	6.9
MINDOUROU	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
YOKADOUMA	18.7	20.4	1.0	19.4	20.3	1.0	18.4	20.4	1.5	19.3	21.1	0.9
Average	**19.3**	**20.8**	**1.4**	**19.3**	**20.1**	**0.7**	**18.8**	**20.6**	**1.7**	**20.2**	**21.8**	**1.7**
Centre Region												
AKONOLINGA	18.7	20.6	1.8	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
BAFIA	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
ESEKA	18.7	20.6	1.8	20.8	21.6	2.0	18.4	20.4	1.9	19.3	21.1	1.8
MBALMAYO	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
MBANDJOK	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
NANGA EBOKO	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
NKOTENG	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
OBALA	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
YAOUNDE	18.7	20.4	1.6	19.4	20.3	0.8	18.4	20.4	1.9	19.3	21.1	1.8
Average	**18.7**	**20.4**	**1.6**	**19.6**	**20.4**	**0.9**	**18.4**	**20.4**	**1.9**	**19.3**	**21.1**	**1.8**
South Region												
EBOLOWA	18.7	20.4	0.0	19.4	20.3	-0.9	18.4	20.4	0.1	19.3	21.1	0.0
KRIBI	22.0	23.8	3.4	23.0	24.8	3.6	22.2	23.9	3.6	22.8	24.7	3.6
LOLODORF	22.0	23.8	3.4	23.0	24.8	3.6	22.2	23.9	3.6	22.8	24.7	3.6
SANGMELIMA	18.7	20.4	0.0	19.4	20.3	-0.9	18.4	20.4	0.1	19.3	21.1	0.0
Average	**20.4**	**22.1**	**1.7**	**21.2**	**22.6**	**1.4**	**20.3**	**22.2**	**1.9**	**21.1**	**22.9**	**1.8**

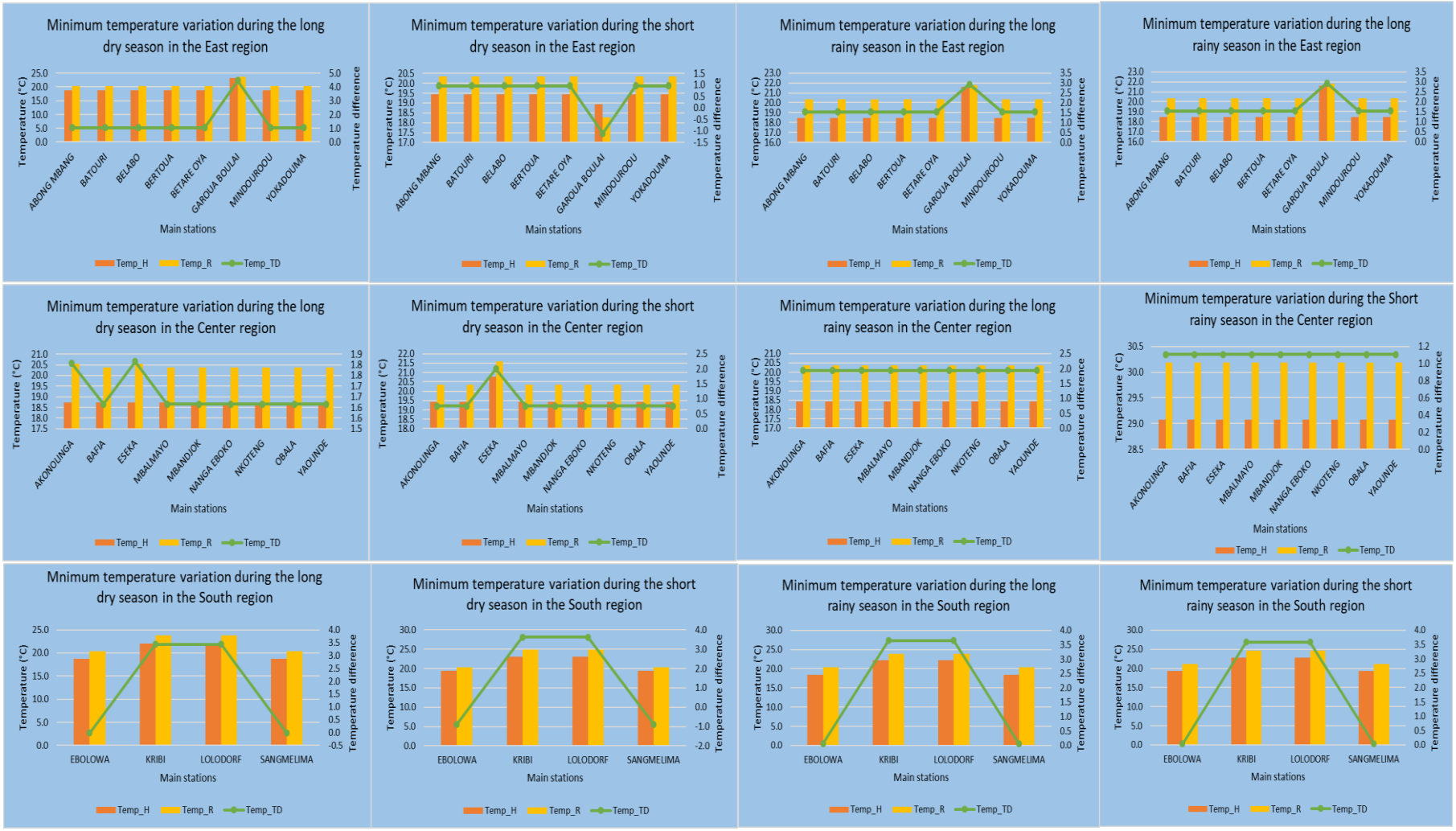


Figure 57: Characteristics of seasonal minimum temperatures relative to historical values in the bimodal rainforest zone in 2020

c- Evolution of average temperatures

Seasonal average temperatures were 24.1°C and 25.8°C for the long and short dry season. and 25.0°C and 26.6°C for the long and short rainy season in the East Region. compared to average temperatures of 23.4°C and 25.7°C for the long and short dry season; 24.5°C and 25.6°C for the long and short rainy season in the Centre Region respectively. The average temperatures for the South Region registered 24.7°C and 26.5°C for the long and short dry season; 25.6°C and 25.9°C for the long and short rainy season respectively as shown in table 26 below.

Compared to the seasonal average temperatures recorded for this agro-ecological zone over the period from 1978 to 2015, it was noticed that the year 2020 was observed to have an overall increase in average temperatures. Thus, in the long dry season average differences with temperatures of 0.5°C. 0.4°C and 0.9°C were observed in the East, Centre and South Regions; in the short dry season, average differences with temperatures of 1.3°C. 1.5°C and 1.3°C were observed in the East, Centre and South Regions; in the long rainy season, average differences with temperatures of 1.5°C. 1.6°C and 1.7°C were observed in the East, Centre and South Regions and lastly in the short rainy season, average differences with temperatures of 1.4°C. 1.4°C and 1.6°C were observed in the East, Centre and South Regions respectively as shown in table 24 below.

Table 27: Characteristics of seasonal average temperatures in the bimodal rainforest zone.

	Long Dry Season			Short Dry Season			Long Rainy Season			Short Rainy Season		
Localities	***Max_His_T (LDS)***	***Max_Real_ T (LDS)***	***TD_ (LDS)***	***Max_His_ T (SDS)***	***Max_Real_ T (SDS)***	***TD_ (RS)***	***Max_His _T (LRS)***	***Max_Real_ T (LRS)***	***TD_ (LRS)***	***Max_His_ T (SRS)***	***Max_Real_ T (SRS)***	***TD_ (SRS)***
East Region												
ABONG MBANG	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
BATOURI	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
BELABO	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
BERTOUA	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
BETARE OYA	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
GAROUA BOULAI	27.4	28.6	5.0	26.8	26.6	2.1	27.7	28.6	5.0	32.3	33.6	8.4
MINDOUROU	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
YOKADOUMA	23.1	23.4	-0.2	24.2	25.7	1.2	22.9	24.5	1.0	24.2	25.6	0.4
Average	**23.6**	**24.1**	**0.5**	**24.5**	**25.8**	**1.3**	**23.5**	**25.0**	**1.5**	**25.2**	**26.6**	**1.4**
Centre Region												
AKONOLINGA	23.1	23.5	0.5	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.7	1.5
BAFIA	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
ESEKA	23.1	23.5	0.5	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
MBALMAYO	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
MBANDJOK	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
NANGA EBOKO	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
NKOTENG	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
OBALA	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
YAOUNDE	23.1	23.4	0.4	24.2	25.7	1.5	22.9	24.5	1.6	24.2	25.6	1.4
Average	**23.1**	**23.4**	**0.4**	**24.2**	**25.7**	**1.5**	**22.9**	**24.5**	**1.6**	**24.2**	**25.6**	**1.4**
South Region												
EBOLOWA	23.1	23.4	-0.4	24.2	25.7	0.5	22.9	24.5	0.6	22.9	24.5	0.3
KRIBI	24.7	26.0	2.2	26.3	27.2	2.0	24.9	26.6	2.7	26.3	27.8	3.5
LOLODORF	24.7	26.0	2.2	26.3	27.2	2.0	24.9	26.6	2.7	24.9	26.6	2.4
SANGMELIMA	23.1	23.4	-0.4	24.2	25.7	0.5	22.9	24.5	0.6	22.9	24.5	0.3
Average	**23.9**	**24.7**	**0.9**	**25.3**	**26.5**	**1.3**	**23.9**	**25.6**	**1.7**	**24.3**	**25.9**	**1.6**

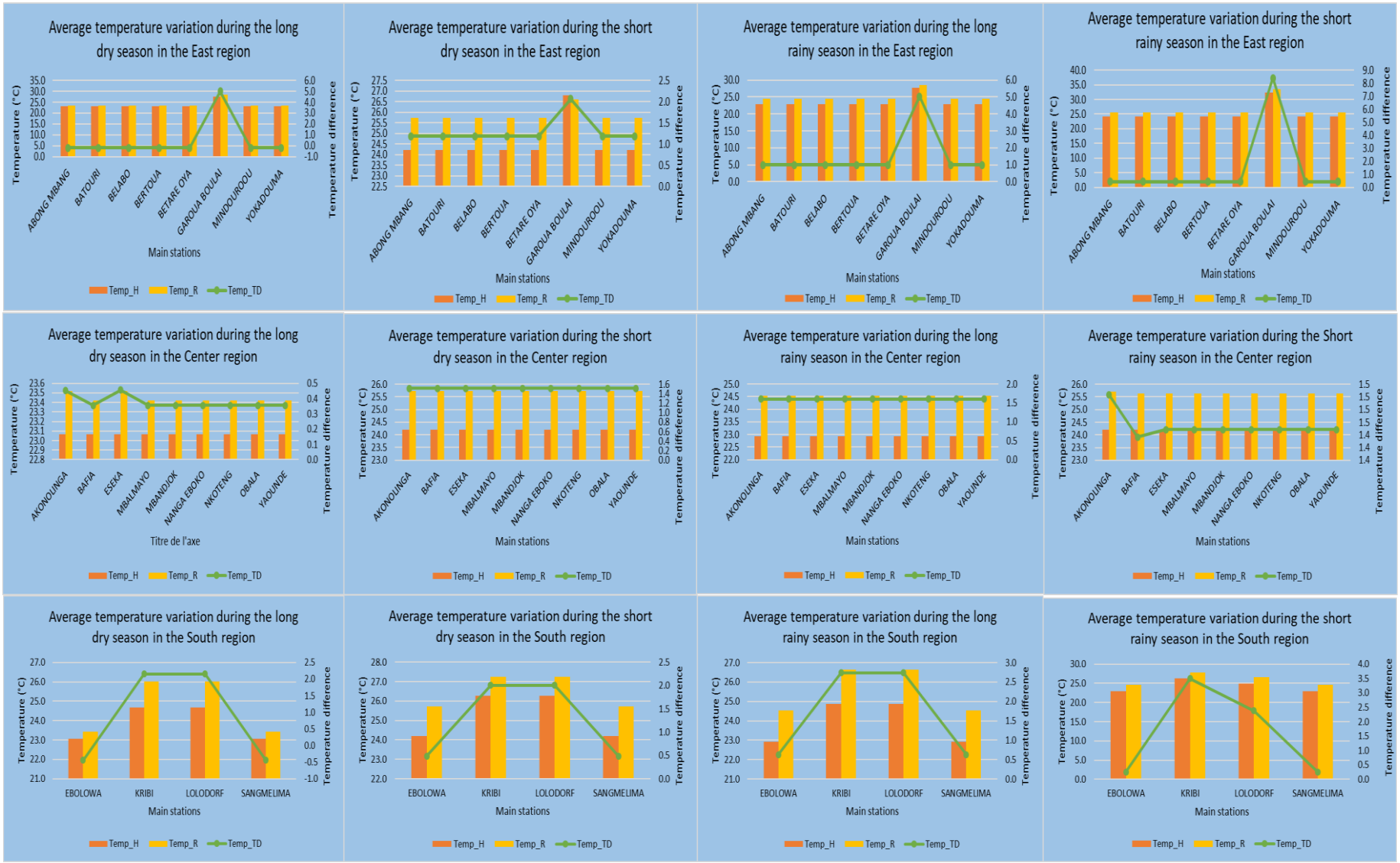


Figure 58: Characteristics of seasonal average temperatures relative to historical values in the bimodal rainforest zone in 2020

3.3.2 Evolution of maximum, minimum and average temperatures on a monthly scale in the bimodal rainforest zone

a- Maximum temperature

the monthly maximum average temperatures in the Bimodal Rainforest zone ranged from 26.5°C in July to 33.0°C in February in the East region. In the Centre region, the average maximum temperatures ranged from 25.5°C in July to 32.5°C in February and in the South region, the average maximum temperatures ranged from 26.8°C in July to 31.0°C in February as shown in table 28 below.

By comparing the average maximum temperatures recorded over the period from 1979 to 2018 with the average maximum real temperatures for the same period, it was observed that the year 2020 was generally warmer than the historical averages in the three constituent regions of the Bimodal Rainforest zone. Thus, the average maximum and minimum temperature deviations were 2.7 °C (in December) and -1.2°C (in July) in the East Region, and the average maximum and minimum temperature deviations were 3.1°C in February) and -1.3°C (in July) in the Centre Region; and the South-West Region registered average maximum and minimum temperature deviations of 1.5°C (in October) and hence reduced by -0.4°C as (in July).

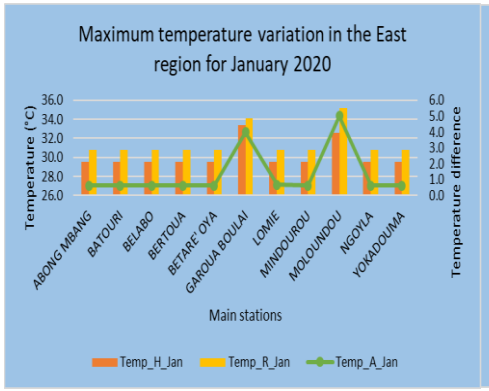
Table 28: Characteristics of monthly maximum temperatures in the Bimodal Rainforest zone of Cameroon in 2020.

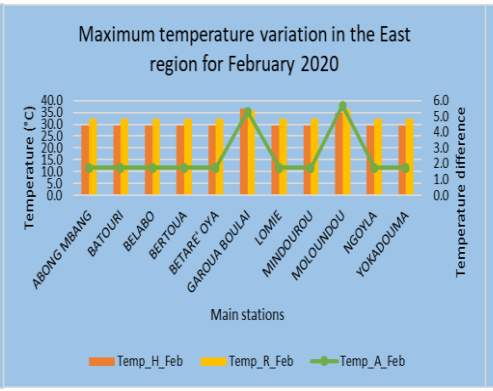
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
East	ABONG MBANG	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	BATOURI	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	BELABO	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	BERTOUA	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	BETARE OYA	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	GAROUA BOULAI	33.4	34.1	4.0	36.7	35.9	5.3	39.4	40.8	10.0	39.8	41.3	10.6	36.0	38.3	9.0	32.8	34.8	6.2
	LOMIE	29.5	30.8	0.7	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	MINDOUROU	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	MOLOUNDOU	32.6	35.2	5.0	34.9	36.3	5.7	33.9	35.6	4.8	32.7	32.7	2.0	31.7	31.9	2.6	30.7	31.1	2.4
	NGOYLA	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
	YOKADOUMA	29.5	30.8	0.6	29.4	32.3	1.7	29.5	31.4	0.6	29.4	30.3	-0.4	28.3	28.9	-0.4	28.0	28.0	-0.7
Monthly regional average		**30.1**	**31.5**	**1.3**	**30.6**	**33.0**	**2.4**	**30.8**	**32.6**	**1.8**	**30.6**	**31.5**	**0.8**	**29.3**	**30.0**	**0.7**	**28.7**	**28.9**	**0.2**
Center	AKONOLINGA	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	BAFIA	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	ESEKA	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	MBALMAYO	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	MBANDJOK	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	MONATELE	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	NANGA EBOKO	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	27.8	28.0	0.3
	NGORO	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	NKOTENG	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	OBALA	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	YAOUNDE	29.5	30.8	1.3	29.4	32.3	2.9	29.5	31.4	2.0	29.4	30.3	1.0	28.3	28.9	0.7	28.0	28.0	0.3
	YOKO	29.5	33.3	3.7	29.4	34.4	5.0	28.3	32.4	3.0	27.9	29.0	-0.3	26.5	27.8	-0.4	25.1	26.5	-1.3
Monthly regional average		**29.5**	**31.0**	**1.5**	**29.4**	**32.5**	**3.1**	**29.4**	**31.5**	**2.1**	**29.3**	**30.2**	**0.9**	**28.2**	**28.8**	**0.6**	**27.7**	**27.9**	**0.2**
South	AKOM II	29.5	29.5	-0.3	30.0	30.0	0.1	30.0	30.5	0.6	30.0	30.8	1.0	29.5	30.2	1.1	28.0	28.3	0.2
	AMBAM	29.5	29.5	-0.3	30.0	30.0	0.1	30.0	30.5	0.6	30.0	30.8	1.0	29.5	30.2	1.1	28.0	28.3	0.2
	CAMPO	31.7	29.6	-0.1	31.2	30.4	0.5	31.0	30.9	1.0	31.0	29.8	-0.1	30.5	30.1	1.0	29.5	28.8	0.7
	DJOUM	29.5	30.8	1.0	29.4	32.3	2.4	29.5	31.4	1.5	29.4	30.3	0.4	28.3	28.9	-0.3	28.0	28.0	-0.1
	EBOLOWA	29.5	30.8	1.0	29.4	32.3	2.4	29.5	31.4	1.5	29.4	30.3	0.4	28.3	28.9	-0.3	28.0	28.0	-0.1
	KRIBI	29.5	29.5	-0.3	30.0	30.0	0.1	30.0	30.5	0.6	30.0	30.8	1.0	29.5	30.2	1.1	28.0	28.3	0.2

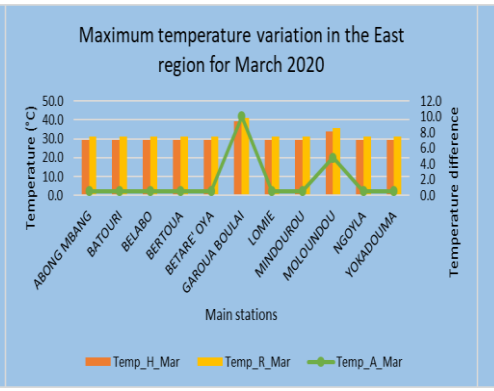
	LOLODORF	29.5	29.5	-0.3	30.0	30.0	0.1	30.0	30.5	0.6	30.0	30.8	1.0	29.5	30.2	1.1	28.0	28.3	0.2
	SANGMELIMA	29.5	30.8	1.0	29.4	32.3	2.4	29.5	31.4	1.5	29.4	30.3	0.4	28.3	28.9	-0.3	28.0	28.0	-0.1
	NYABESSAN	29.5	29.5	-0.3	30.0	30.0	0.1	30.0	30.5	0.6	30.0	30.8	1.0	29.5	30.2	1.1	28.0	28.3	0.2
	ZOETELE	29.5	30.8	1.0	29.4	32.3	2.4	29.5	31.4	1.5	29.4	30.3	0.4	28.3	28.9	-0.3	28.0	28.0	-0.1
Monthly regional average		**29.7**	**30.0**	**0.2**	**29.9**	**31.0**	**1.1**	**29.9**	**30.9**	**1.0**	**29.9**	**30.5**	**0.7**	**29.1**	**29.7**	**0.5**	**28.2**	**28.2**	**0.1**

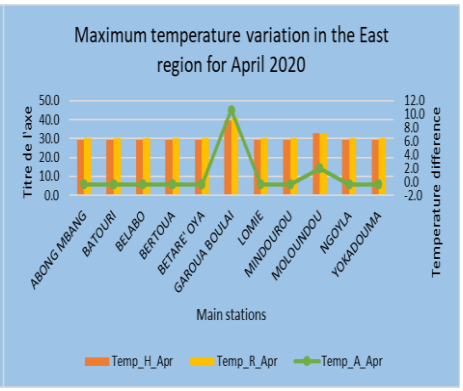
	LOCALITIES	**JUL**			**AUG**			**SEPT**			**OCT**			**NOV**			**DEC**		
		H_T	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**
East	ABONG MBANG	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	BATOURI	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	BELABO	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	BERTOUA	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	BETARE OYA	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	GAROUA BOULAI	31.2	32.4	4.7	30.7	33.1	5.5	31.7	32.6	4.9	34.0	35.4	7.2	35.7	38.2	9.2	33.9	37.4	8.6
	LOMIE	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	MINDOUROU	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	MOLOUNDOU	29.3	29.9	2.2	30.0	31.9	4.3	30.0	33.1	5.4	30.0	32.9	4.8	30.7	34.1	5.2	30.7	35.5	6.7
	NGOYLA	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
	YOKADOUMA	27.2	25.5	-2.2	27.0	25.9	-1.7	27.0	27.6	-0.1	27.3	28.4	0.3	28.0	30.0	1.1	28.0	30.4	1.6
Monthly regional average		**27.8**	**26.5**	**-1.2**	**27.6**	**27.1**	**-0.5**	**27.7**	**28.6**	**0.9**	**28.2**	**29.4**	**1.3**	**28.9**	**31.1**	**2.2**	**28.8**	**31.5**	**2.7**
Center	AKONOLINGA	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	BAFIA	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	ESEKA	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	MBALMAYO	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	MBANDJOK	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	MONATELE	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	NANGA EBOKO	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	NGORO	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	NKOTENG	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	OBALA	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	YAOUNDE	27.2	25.5	-1.3	27.0	25.9	-0.7	27.0	27.6	0.8	27.3	28.4	1.3	28.0	30.0	2.1	28.0	30.4	2.3
	YOKO	25.0	25.5	-1.3	24.4	26.5	-0.1	25.0	26.1	-0.7	25.6	27.1	0.0	27.4	29.3	1.4	28.8	31.9	3.8
Monthly regional average		**27.0**	**25.5**	**-1.3**	**26.8**	**26.0**	**-0.7**	**26.8**	**27.5**	**0.7**	**27.2**	**28.3**	**1.2**	**28.0**	**29.9**	**2.0**	**28.1**	**30.5**	**2.4**
S	AKOM II	27.0	27.6	0.4	27.0	28.8	1.6	27.0	29.1	1.9	27.2	29.5	2.0	28.5	29.5	1.1	29.0	29.2	0.6

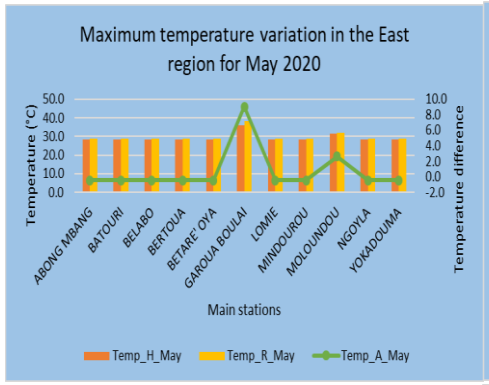
	AMBAM	27.0	27.6	0.4	27.0	28.8	1.6	27.0	29.1	1.9	27.2	29.5	2.0	28.5	29.5	1.1	29.0	29.2	0.6
	CAMPO	28.0	27.7	0.5	29.0	27.7	0.5	29.0	28.3	1.1	29.5	28.6	1.2	29.0	29.7	1.4	29.0	30.3	1.7
	DJOUM	27.2	25.5	-1.7	27.0	25.9	-1.3	27.0	27.6	0.4	27.3	28.4	1.0	28.0	30.0	1.7	28.0	30.4	1.8
	EBOLOWA	27.2	25.5	-1.7	27.0	25.9	-1.3	27.0	27.6	0.4	27.3	28.4	1.0	28.0	30.0	1.7	28.0	30.4	1.8
	KRIBI	27.0	27.6	0.4	27.0	28.8	1.6	27.0	29.1	1.9	27.2	29.5	2.0	28.5	29.5	1.1	29.0	29.2	0.6
	LOLODORF	27.0	27.6	0.4	27.0	28.8	1.6	27.0	29.1	1.9	27.2	29.5	2.0	28.5	29.5	1.1	29.0	29.2	0.6
	SANGMELIMA	27.2	25.5	-1.7	27.0	25.9	-1.3	27.0	27.6	0.4	27.3	28.4	1.0	28.0	30.0	1.7	28.0	30.4	1.8
	NYABESSAN	27.0	27.6	0.4	27.0	28.8	1.6	27.0	29.1	1.9	27.2	29.5	2.0	28.5	29.5	1.1	29.0	29.2	0.6
	ZOETELE	27.2	25.5	-1.7	27.0	25.9	-1.3	27.0	27.6	0.4	27.3	28.4	1.0	28.0	30.0	1.7	28.0	30.4	1.8
Monthly regional average		**27.2**	**26.8**	**-0.4**	**27.2**	**27.5**	**0.3**	**27.2**	**28.4**	**1.2**	**27.5**	**29.0**	**1.5**	**28.4**	**29.7**	**1.4**	**28.6**	**29.8**	**1.2**

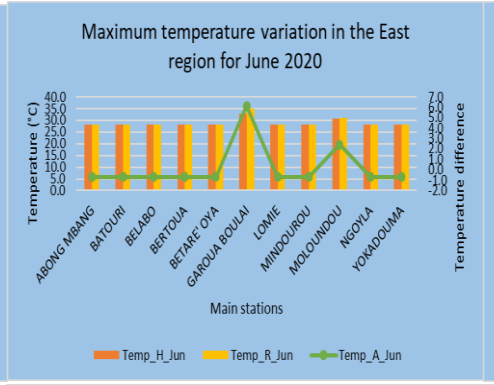

Maximum temperature variation in the East region for January 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

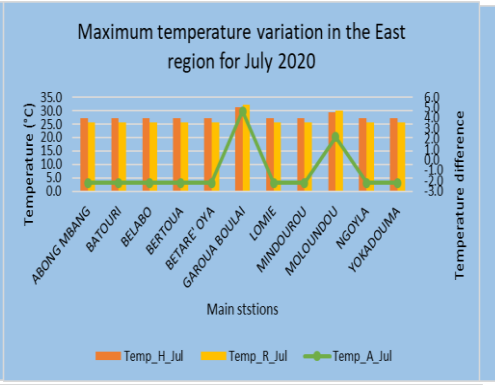

Maximum temperature variation in the East region for February 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

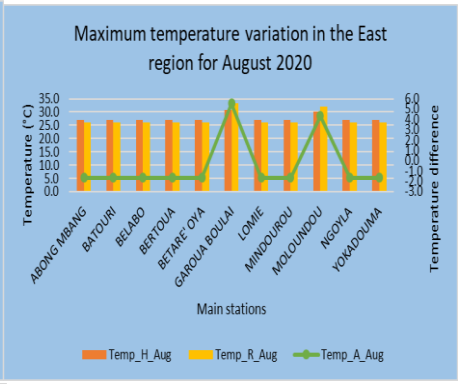

Maximum temperature variation in the East region for March 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

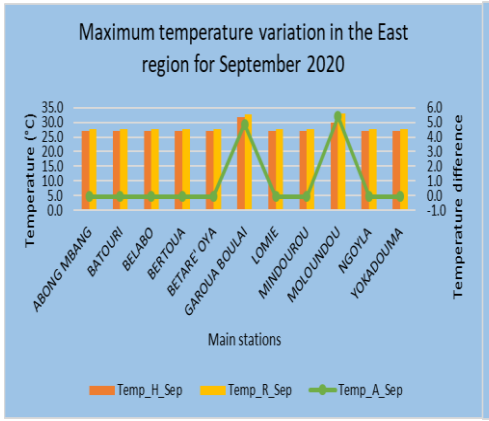

Maximum temperature variation in the East region for April 2020
Titre de l'axe
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

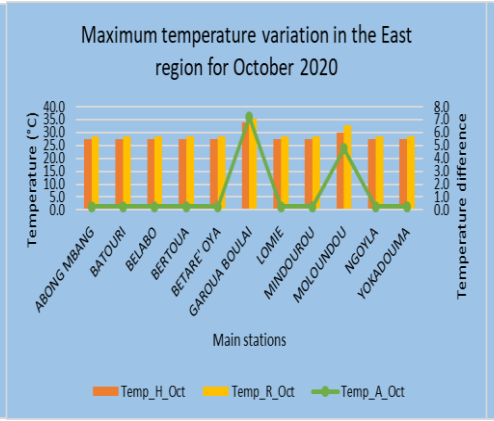

Maximum temperature variation in the East region for May 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

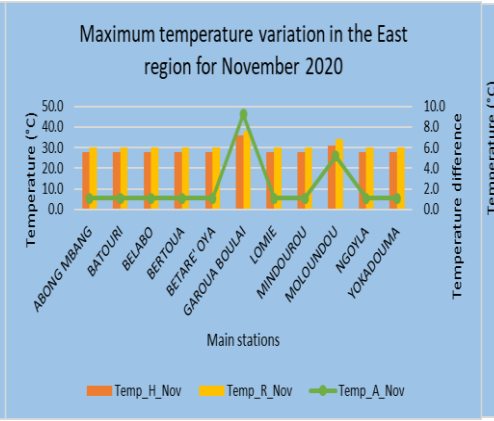

Maximum temperature variation in the East region for June 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

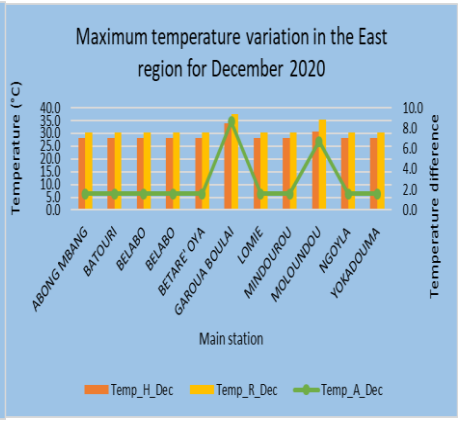

Maximum temperature variation in the East region for July 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main ststions
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul

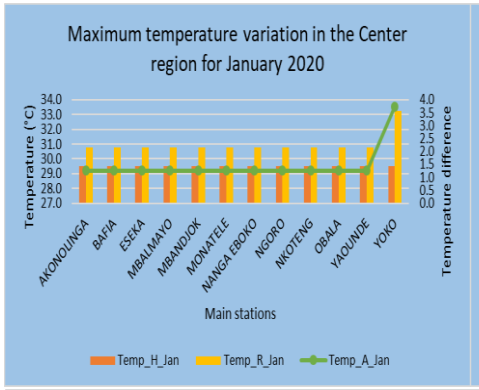

Maximum temperature variation in the East region for August 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug

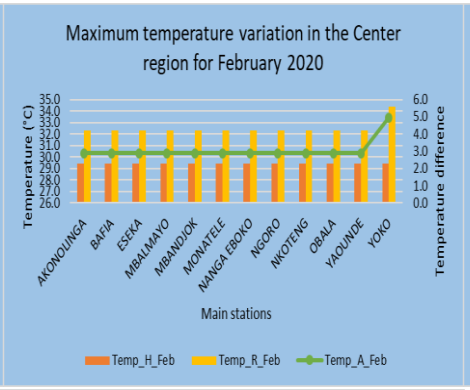

Maximum temperature variation in the East region for September 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep

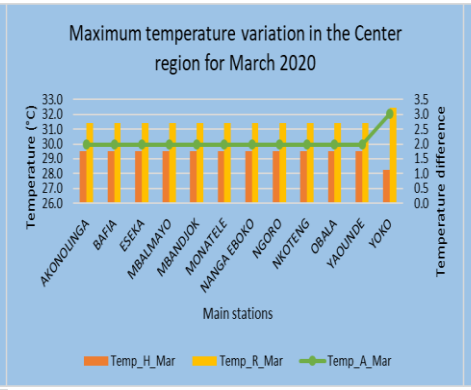

Maximum temperature variation in the East region for October 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct

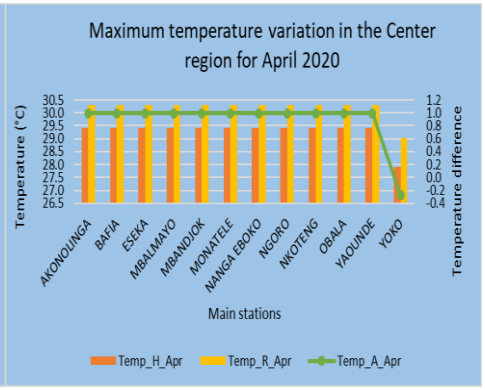

Maximum temperature variation in the East region for November 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov

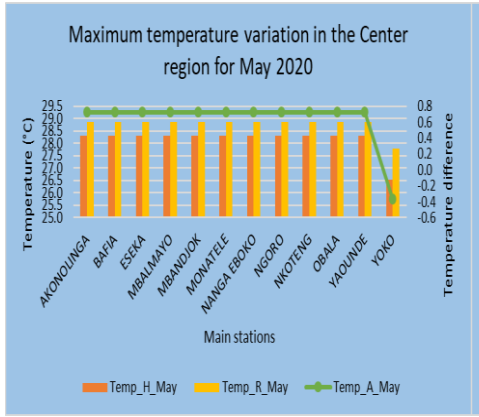

Maximum temperature variation in the East region for December 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BELABO
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main station
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

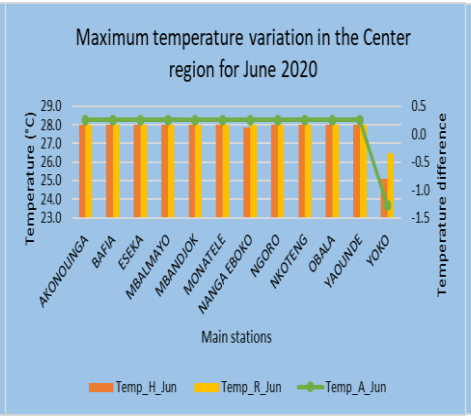

Maximum temperature variation in the Center region for January 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Jan Temp_R_Jan Temp_A_Jan

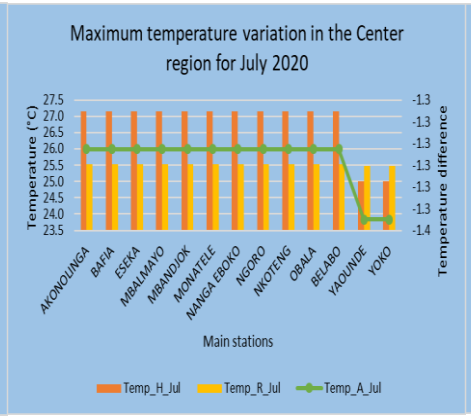

Maximum temperature variation in the Center region for February 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Feb Temp_R_Feb Temp_A_Feb

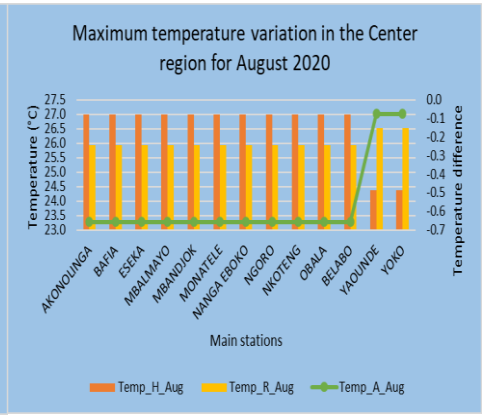

Maximum temperature variation in the Center region for March 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Mar Temp_R_Mar Temp_A_Mar

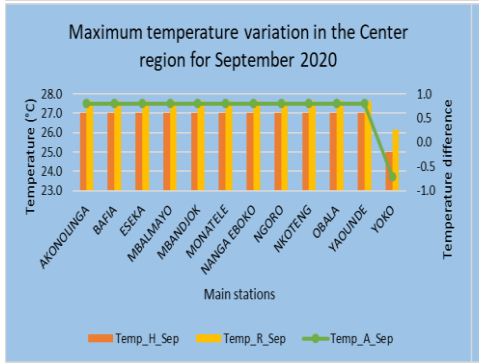

Maximum temperature variation in the Center region for April 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Apr Temp_R_Apr Temp_A_Apr

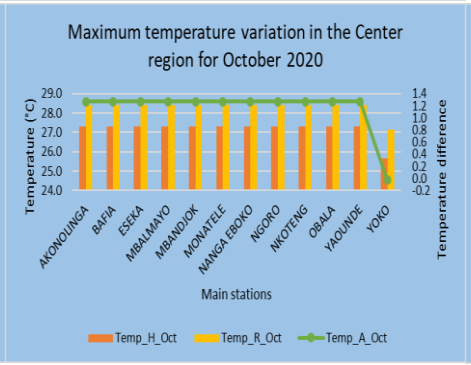

Maximum temperature variation in the Center region for May 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_May Temp_R_May Temp_A_May

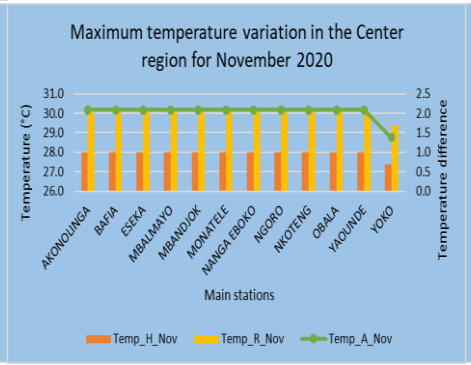

Maximum temperature variation in the Center region for June 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Jun Temp_R_Jun Temp_A_Jun

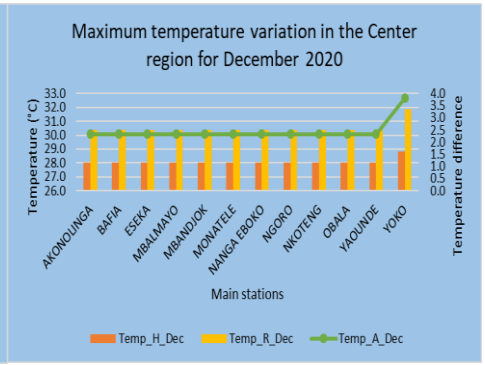

Maximum temperature variation in the Center region for July 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA BELABO YAOUNDE YOKO
Main stations
Temp_H_Jul Temp_R_Jul Temp_A_Jul


Maximum temperature variation in the Center region for August 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA BELABO YAOUNDE YOKO
Main stations
Temp_H_Aug Temp_R_Aug Temp_A_Aug


Maximum temperature variation in the Center region for September 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Sep Temp_R_Sep Temp_A_Sep


Maximum temperature variation in the Center region for October 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Oct Temp_R_Oct Temp_A_Oct


Maximum temperature variation in the Center region for November 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Nov Temp_R_Nov Temp_A_Nov


Maximum temperature variation in the Center region for December 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Dec Temp_R_Dec Temp_A_Dec

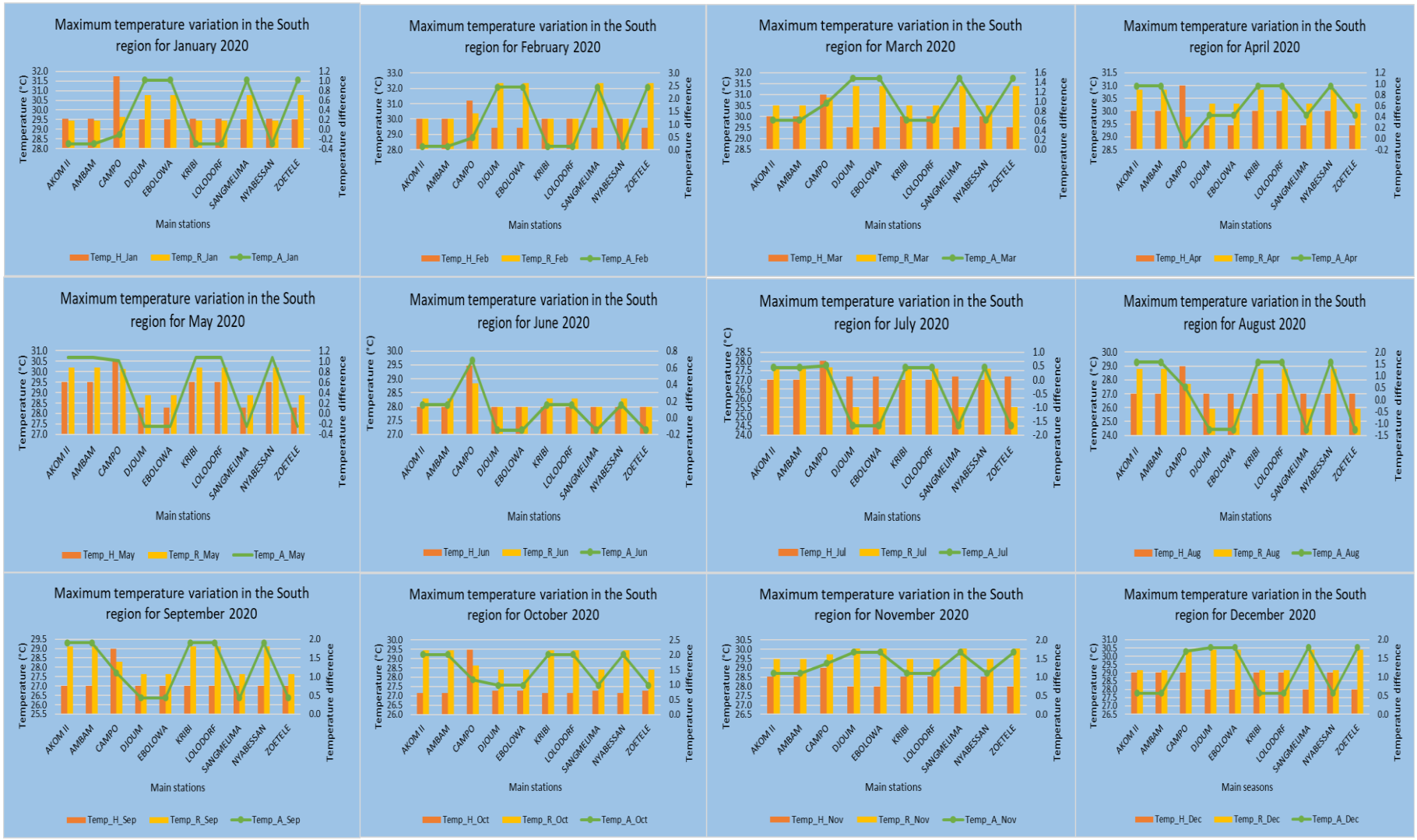


Figure 59: Characteristics of 2020 monthly maximum temperatures relative to historical values in the bimodal rainforest zone.

b- Minimum temperature

Table 29 below shows the minimum temperature variations for the East, Center and South regions in the bimodal rainforest zone. The least monthly minimum real average temperature recorded for all these regions varied per month with 23.9°C as the least hot temperature in June, in the Centre region and the hottest temperature in the month of March at 27.5°C in the East Region.

In the East region, monthly minimum real temperatures ranged from 22.9°C in all localities in July except in Garoua Boulai (27.9°C) and Moloundou (25.9°C) to 35.0°C in Garoua Boulai in April, while in the Center region, the monthly minimum real temperatures were recorded ranging from 21.2°C in Yoko in July to 26.6°C in all stations in March but Yoko which registered 24.7°C.

Monthly minimum average temperatures in the East region were highest in March, 27.5°C and lowest in July,23.6°C, while in the Center region, the highest monthly minimum average temperature was recorded in February (26.5°C) but on the contrary the lowest monthly minimum average temperature was recorded in July at 22.8°C. In the South region, monthly minimum real temperatures alternated from 23.7°C (least hot) in December to 27.4°C (hottest) in March 2020 with constant average temperatures of 26.4°C in January and May as shown in table 26; figure 56 below.

However, the actual minimum temperature values recorded in 2020 were observed to be generally higher than the historic values recorded over the period from 1979 to 2018 in all three regions of the bimodal rainforest zone in the year 2020.

Figure 56 below shows the trend of minimum temperature difference in the East, Center and South regions. In the East region, the lowest monthly regional average temperature difference recorded was in July (0.0°C); the highest in March (1.9°C) and were constant in January, June and December (1.6°C). In the Center region, the monthly regional average temperature difference was noticed to have decreased (lowest) in July (0.2°C); highest in February and March (2.1°C); constant in February/ March (2.1°C) and September, October at 1.5°C and in the South region, the lowest monthly regional average temperature difference was recorded in December by (1.2°C) and highest in September and October at 1.8°C, hence constant. These monthly regional average temperature differences were constant in September and October at 1.8°C, as well as in February and March at 1.7°C.

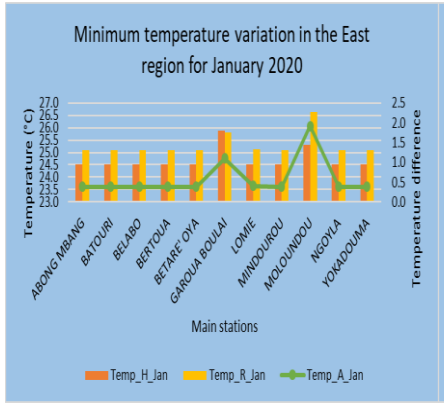
Table 29: Characteristics of monthly minimum temperatures in the Bimodal Rainforest zone of Cameroon in 2020.

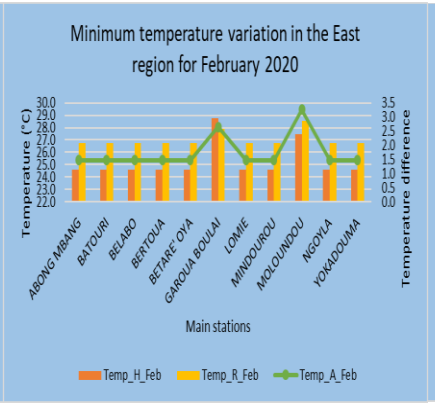
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
East	ABONG MBANG	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BATOURI	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BELABO	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BERTOUA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BETARE OYA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	GAROUA BOULAI	25.9	25.8	1.1	28.8	27.9	2.6	32.5	33.0	7.4	33.5	35.0	9.7	30.8	32.8	8.0	28.4	29.4	5.2
	LOMIE	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	MINDOUROU	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	MOLOUNDOU	25.3	26.6	1.9	27.4	28.5	3.3	28.0	29.6	4.1	27.4	28.3	2.9	26.8	27.8	3.0	26.4	26.8	2.6
	NGOYLA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	YOKADOUMA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
Monthly regional average		**24.7**	**25.3**	**0.6**	**25.2**	**27.0**	**1.8**	**25.5**	**27.5**	**1.9**	**25.3**	**26.6**	**1.2**	**24.8**	**25.9**	**1.1**	**24.2**	**24.8**	**0.6**
Center	AKONOLINGA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	BAFIA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	ESEKA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.4	1.2
	MBALMAYO	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	MBANDJOK	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	MONATELE	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	NANGA EBOKO	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.4	24.1	0.9
	NGORO	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	NKOTENG	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	OBALA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	YAOUNDE	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	YOKO	22.3	23.2	-1.1	22.7	24.4	-0.1	22.6	24.7	0.4	22.5	23.5	-0.6	21.7	22.7	-1.0	20.6	21.7	-1.5
Monthly regional average		**24.3**	**24.9**	**0.6**	**24.4**	**26.5**	**2.1**	**24.3**	**26.4**	**2.1**	**24.1**	**25.3**	**1.2**	**23.7**	**24.7**	**1.0**	**23.3**	**23.9**	**0.7**
South	AKOM II	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	AMBAM	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	CAMPO	26.1	27.4	1.8	25.7	28.0	2.4	25.8	28.1	2.5	26.0	27.4	1.8	25.5	27.6	2.5	24.7	26.8	2.4
	DJOUM	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
	EBOLOWA	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3

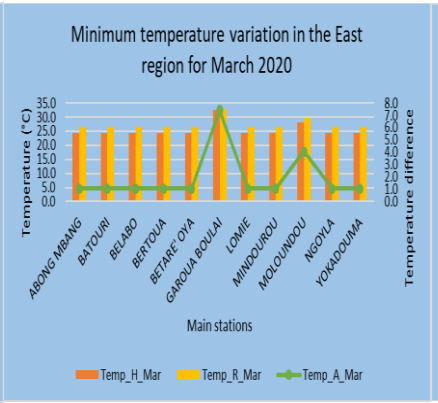
	KRIBI	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	LOLODORF	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	SANGMELIMA	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
	NYABESSAN	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	ZOETELE	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
Monthly regional average		**25.6**	**26.4**	**0.8**	**25.7**	**27.3**	**1.7**	**25.6**	**27.4**	**1.7**	**25.5**	**26.8**	**1.2**	**25.1**	**26.4**	**1.3**	**24.4**	**25.4**	**1.0**

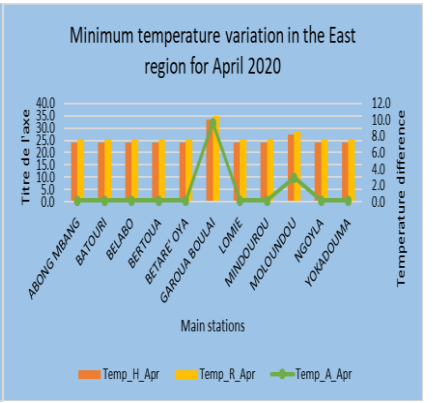
	LOCALITIES	**JUL**			**AUG**			**SEPT**			**OCT**			**NOV**			**DEC**		
		H_T	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**
East	ABONG MBANG	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BATOURI	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BELABO	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BERTOUA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BETARE OYA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	GAROUA BOULAI	27.1	27.9	4.2	26.8	28.6	5.3	26.8	28.2	5.0	28.4	28.4	4.9	27.9	29.1	5.1	25.8	28.5	4.7
	LOMIE	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	MINDOUROU	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	MOLOUNDOU	25.1	25.9	2.3	25.5	27.3	4.0	25.5	27.8	4.6	25.5	27.5	4.0	25.0	27.9	3.8	24.8	27.2	3.4
	NGOYLA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	YOKADOUMA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
Monthly regional average		**23.6**	**23.6**	**0.0**	**23.2**	**24.1**	**0.8**	**23.2**	**24.7**	**1.5**	**23.6**	**25.0**	**1.5**	**24.0**	**25.8**	**1.8**	**23.8**	**24.4**	**0.6**
Center	AKONOLINGA	23.1	23.2	0.2	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	BAFIA	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	ESEKA	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	MBALMAYO	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	MBANDJOK	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	MONATELE	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	NANGA EBOKO	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	NGORO	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	NKOTENG	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	OBALA	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	YAOUNDE	23.1	22.9	-0.1	22.6	23.2	0.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	YOKO	20.5	21.2	-1.8	20.2	21.7	-0.8	20.5	21.5	-0.8	20.8	22.0	-0.6	21.5	22.5	-0.8	21.9	23.6	0.2

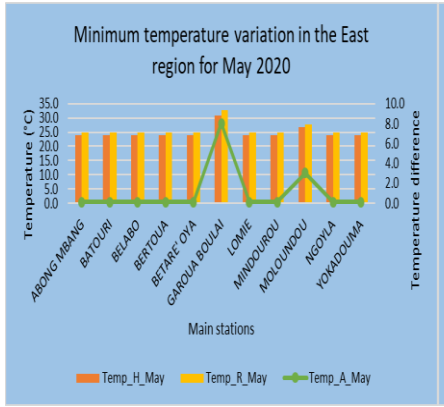
Monthly regional average		**22.9**	**22.8**	**-0.2**	**22.4**	**23.1**	**0.6**	**22.3**	**23.8**	**1.5**	**22.6**	**24.2**	**1.5**	**23.3**	**25.0**	**1.7**	**23.4**	**23.6**	**0.2**
South	AKOM II	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	25.8	23.6	-1.2
	AMBAM	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	25.8	23.6	-1.2
	CAMPO	24.0	26.3	2.4	24.5	26.4	2.6	24.5	26.2	2.5	25.1	26.3	2.4	25.0	27.1	2.5	25.0	24.2	-0.7
	DJOUM	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
	EBOLOWA	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
	KRIBI	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	26.0	23.6	-1.2
	LOLODORF	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	26.0	23.6	-1.2
	SANGMELIMA	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
	NYABESSAN	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	24.2	26.8	2.3	26.0	23.6	-1.2
	ZOETELE	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
Monthly regional average		**23.9**	**24.6**	**0.7**	**23.7**	**25.1**	**1.3**	**23.7**	**25.5**	**1.8**	**23.9**	**25.7**	**1.8**	**24.5**	**26.2**	**1.7**	**24.9**	**23.7**	**-1.2**

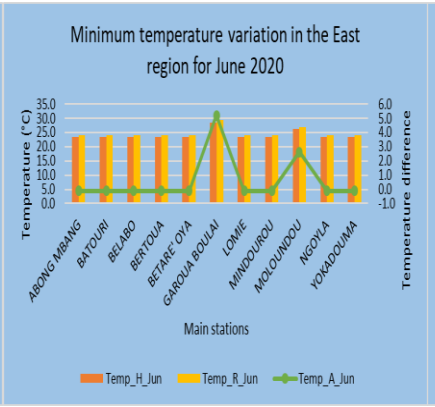

Minimum temperature variation in the East region for January 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

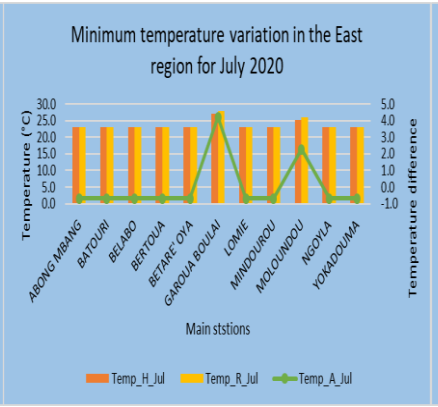

Minimum temperature variation in the East region for February 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

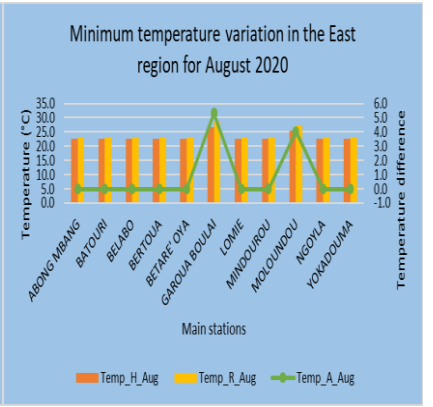

Minimum temperature variation in the East region for March 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

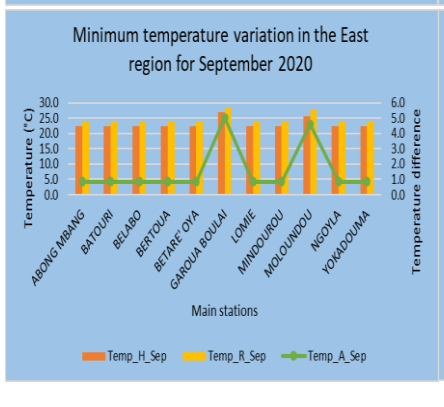

Minimum temperature variation in the East region for April 2020
Titre de l'axe
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

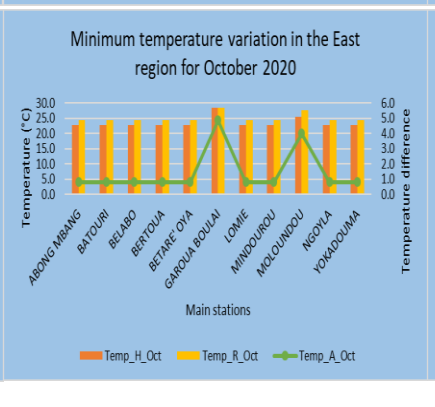

Minimum temperature variation in the East region for May 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

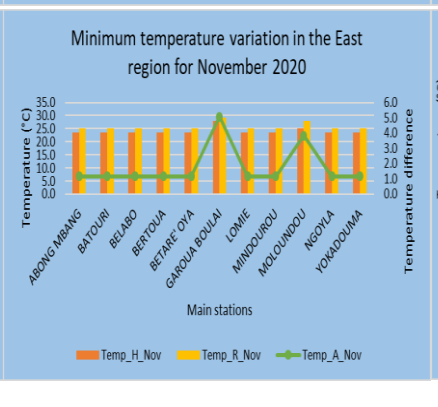

Minimum temperature variation in the East region for June 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

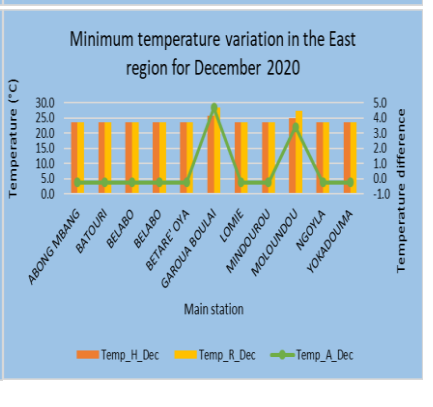

Minimum temperature variation in the East region for July 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main ststions
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul

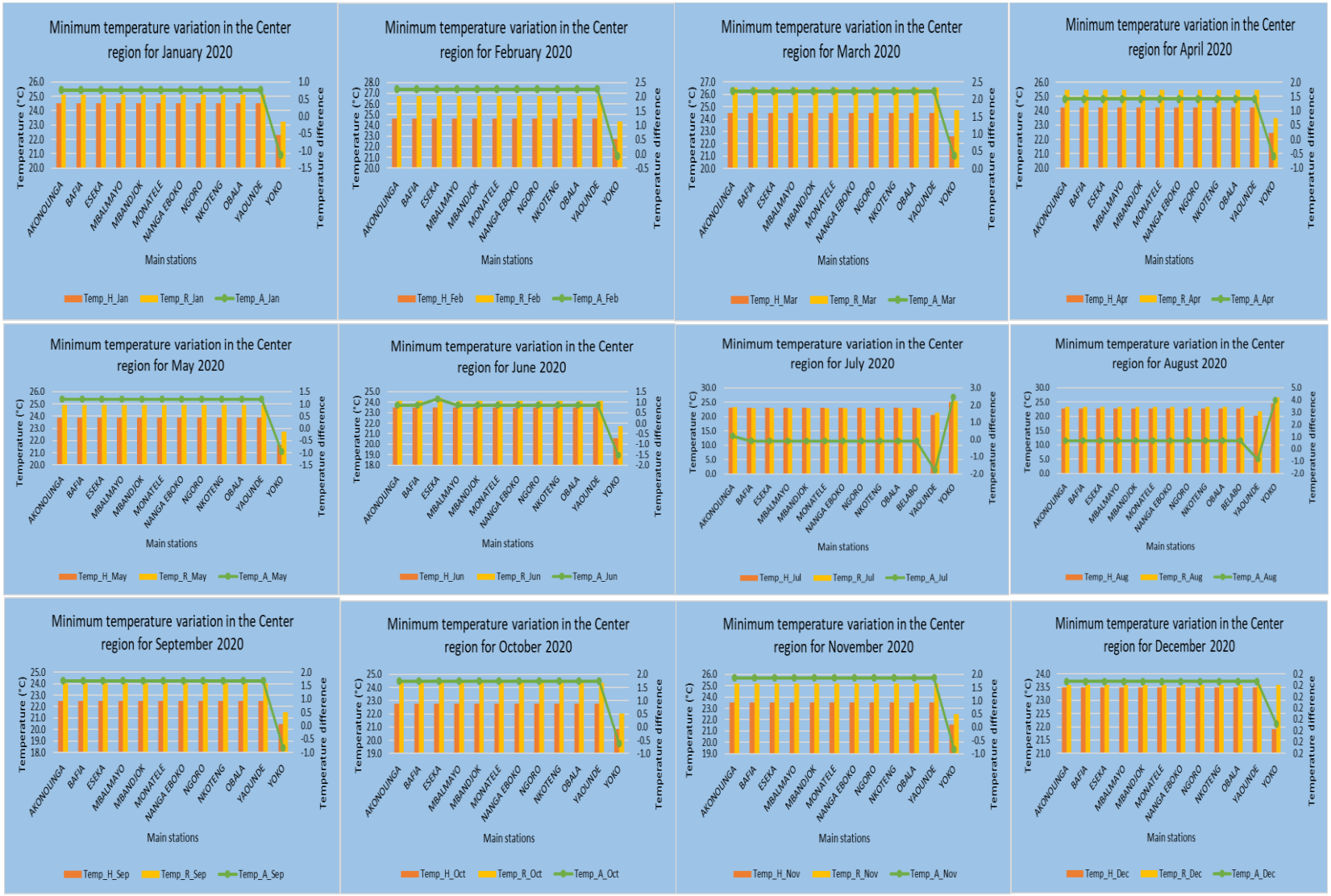

Minimum temperature variation in the East region for August 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Minimum temperature variation in the East region for September 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Minimum temperature variation in the East region for October 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Minimum temperature variation in the East region for November 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Minimum temperature variation in the East region for December 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main station
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec


Minimum temperature variation in the Center region for January 2020
Minimum temperature variation in the Center region for February 2020
Minimum temperature variation in the Center region for March 2020
Minimum temperature variation in the Center region for April 2020
Minimum temperature variation in the Center region for May 2020
Minimum temperature variation in the Center region for June 2020
Minimum temperature variation in the Center region for July 2020
Minimum temperature variation in the Center region for August 2020
Minimum temperature variation in the Center region for September 2020
Minimum temperature variation in the Center region for October 2020
Minimum temperature variation in the Center region for November 2020
Minimum temperature variation in the Center region for December 2020
Temperature (°C)
Temperature difference
Main stations
AKONOLINGA
BAFIA
ESEKA
MBALMAYO
MBANDJOK
MONATELE
NANGA EBOKO
NGORO
NKOTENG
OBALA
BELABO
YAOUNDE
YOKO
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr
Temp_H_May
Temp_R_May
Temp_A_May
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

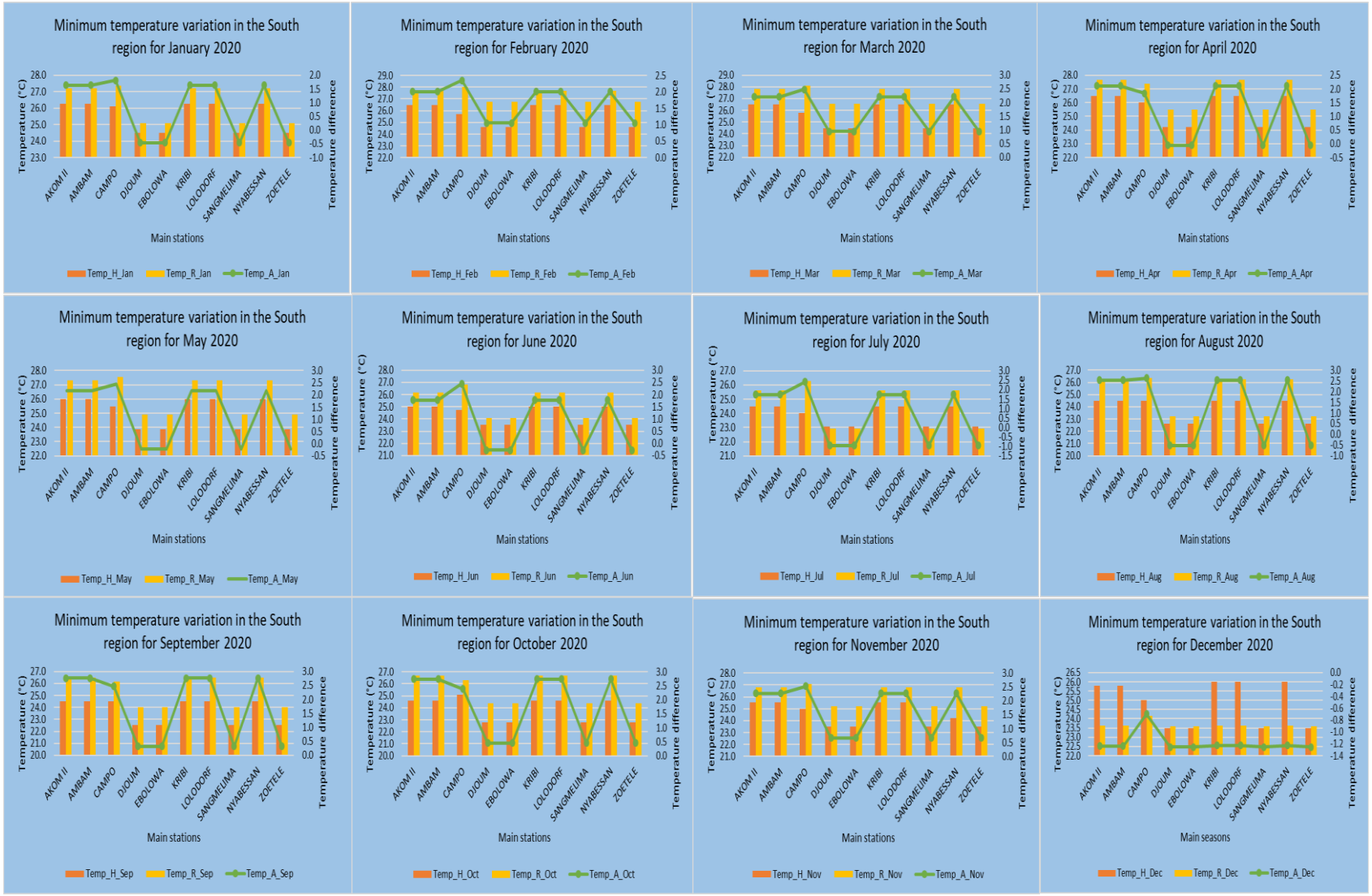


Figure 60: Characteristics of monthly minimum temperatures relative to historical values in the bimodal rainforest zone in 2020.

c- Average temperature

Table 30 below illustrates that in the East region, according to the monthly regional average real temperatures; the month of March was recorded to be the hottest month (27.5°C), and followed by February (27.0°C). The coldest month as compared to the others was in July (23.6°C). During the hottest month, Garoua Boulai recorded the highest average temperature of 33.0°C and the lowest in the rest of the localities being 26.6°C, but for Moloundou, which recorded 29.6°C, while during the coldest month, all localities registered the coldest average temperatures at 22.9°C except for Garoua Boulai and Moloundou which recorded 27.9°C and 25.9° (the lowest).

The monthly average temperature in the Centre region was characterized by February being the hottest month at 26.5°C, with the highest monthly average temperature in all localities (26.7°C) except in Yoko (24.4°C); whereas, the month of July recorded the least hot month at 22.8 °C with constant monthly average temperature values in all stations respectively except in Akonolinga (23.2°C) and Yoko (21.2°C).

The South region was hottest during March at 27.4°C (highest average temperature) and least hot in December (23.7°C) (lowest average temperature). Most of the stations in the hottest month recorded the same monthly real temperatures of 27.8°C (Akom II. Ambam. Kribi. Lolodorf and Nyabessan) as well as 26.6°C (Djoum, Ebolowa, Sangmelima and Zoetele) with an exception in Campo (28.1°C). During the least hot month, all the stations recorded 23.6°C except Campo, which registered 24.2°C (table 27).

Figure 57 below shows the trend of the monthly average temperature difference in the East, Center and South regions. In the East region, the monthly regional average temperature difference was highest at 1.9°C in March and constant in January, June and December (0.6°C). In the Center region, the monthly regional average temperature difference was highest at 2.1°C in both February and March.

Lastly, in the South region, the monthly regional average temperature difference decreased to its lowest by -0.2°C in December and increased to its highest in the month of September and October (1.8°C). Hence, February/ March/November (1.7°C), September/ October (1.8°C) and May/August (1.3°C) recorded constant temperatures. However, the actual monthly average temperature values recorded in 2020 were observed to be generally higher than the historic values recorded over the period from 1979 to 2018 in all three regions of the bimodal rainforest zone in the year 2020.

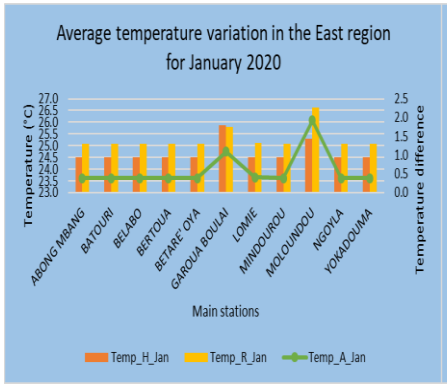
Table 30: Characteristics of monthly average temperatures in the Bimodal Rainforest zone of Cameroon in 2020.

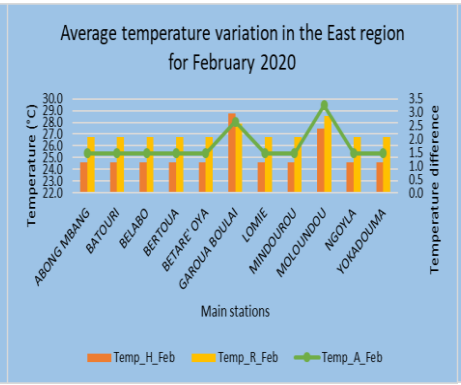
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
East	ABONG MBANG	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BATOURI	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BELABO	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BERTOUA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	BETARE OYA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	GAROUA BOULAI	25.9	25.8	1.1	28.8	27.9	2.6	32.5	33.0	7.4	33.5	35.0	9.7	30.8	32.8	8.0	28.4	29.4	5.2
	LOMIE	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	MINDOUROU	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	MOLOUNDOU	25.3	26.6	1.9	27.4	28.5	3.3	28.0	29.6	4.1	27.4	28.3	2.9	26.8	27.8	3.0	26.4	26.8	2.6
	NGOYLA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
	YOKADOUMA	24.5	25.1	0.4	24.6	26.7	1.5	24.5	26.6	1.0	24.2	25.5	0.1	23.9	24.9	0.1	23.5	24.1	-0.1
Monthly regional average		**24.7**	**25.3**	**0.6**	**25.2**	**27.0**	**1.8**	**25.5**	**27.5**	**1.9**	**25.3**	**26.6**	**1.2**	**24.8**	**25.9**	**1.1**	**24.2**	**24.8**	**0.6**
Centre	AKONOLINGA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	BAFIA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	ESEKA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.4	1.2
	MBALMAYO	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	MBANDJOK	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	MONATELE	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	NANGA EBOKO	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.4	24.1	0.9
	NGORO	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	NKOTENG	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	OBALA	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	YAOUNDE	24.5	25.1	0.8	24.6	26.7	2.3	24.5	26.6	2.2	24.2	25.5	1.4	23.9	24.9	1.2	23.5	24.1	0.9
	YOKO	22.3	23.2	-1.1	22.7	24.4	-0.1	22.6	24.7	0.4	22.5	23.5	-0.6	21.7	22.7	-1.0	20.6	21.7	-1.5
Monthly regional average		**24.3**	**24.9**	**0.6**	**24.4**	**26.5**	**2.1**	**24.3**	**26.4**	**2.1**	**24.1**	**25.3**	**1.2**	**23.7**	**24.7**	**1.0**	**23.3**	**23.9**	**0.7**
South	AKOM II	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	AMBAM	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	CAMPO	26.1	27.4	1.8	25.7	28.0	2.4	25.8	28.1	2.5	26.0	27.4	1.8	25.5	27.6	2.5	24.7	26.8	2.4

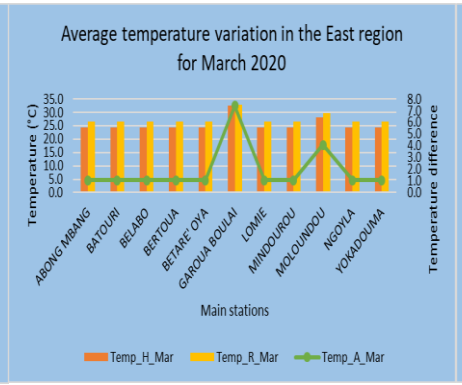
	DJOUM	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
	EBOLOWA	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
	KRIBI	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	LOLODORF	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	SANGMELIMA	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
	NYABESSAN	26.3	27.2	1.6	26.5	27.7	2.0	26.5	27.8	2.2	26.5	27.7	2.1	26.0	27.3	2.2	25.0	26.2	1.8
	ZOETELE	24.5	25.1	-0.5	24.6	26.7	1.1	24.5	26.6	0.9	24.2	25.5	-0.1	23.9	24.9	-0.2	23.5	24.1	-0.3
Monthly regional average		**25.6**	**26.4**	**0.8**	**25.7**	**27.3**	**1.7**	**25.6**	**27.4**	**1.7**	**25.5**	**26.8**	**1.2**	**25.1**	**26.4**	**1.3**	**24.4**	**25.4**	**1.0**

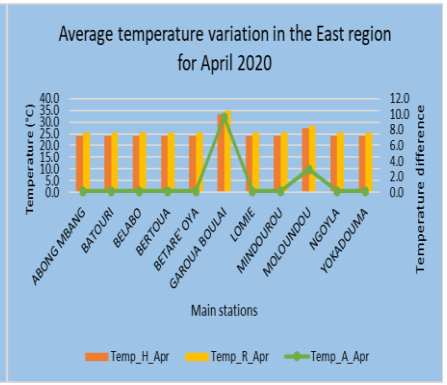
	LOCALITIES	**JUL**			**AUG**			**SEPT**			**OCT**			**NOV**			**DEC**		
		H_T	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**	**H_T**	**R_T**	**TD**
East	ABONG MBANG	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BATOURI	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BELABO	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BERTOUA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	BETARE OYA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	GAROUA BOULAI	27.1	27.9	4.2	26.8	28.6	5.3	26.8	28.2	5.0	28.4	28.4	4.9	27.9	29.1	5.1	25.8	28.5	4.7
	LOMIE	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	MINDOUROU	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	MOLOUNDOU	25.1	25.9	2.3	25.5	27.3	4.0	25.5	27.8	4.6	25.5	27.5	4.0	25.0	27.9	3.8	24.8	27.2	3.4
	NGOYLA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
	YOKADOUMA	23.1	22.9	-0.7	22.6	23.2	0.0	22.5	24.0	0.8	22.8	24.4	0.8	23.5	25.2	1.2	23.5	23.6	-0.2
Monthly regional average		**23.6**	**23.6**	**0.0**	**23.2**	**24.1**	**0.8**	**23.2**	**24.7**	**1.5**	**23.6**	**25.0**	**1.5**	**24.0**	**25.8**	**1.8**	**23.8**	**24.4**	**0.6**
Centre	AKONOLINGA	23.1	23.2	0.4	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	BAFIA	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	ESEKA	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	MBALMAYO	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	MBANDJOK	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	MONATELE	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	NANGA EBOKO	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	NGORO	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2

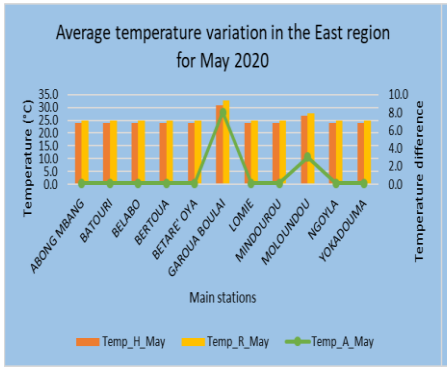
	NKOTENG	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	OBALA	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	YAOUNDE	23.1	22.9	0.1	22.5	24.0	1.7	22.5	24.0	1.7	22.8	24.4	1.7	23.5	25.2	1.9	23.5	23.6	0.2
	YOKO	20.5	21.2	-1.6	20.5	21.5	-0.8	20.5	21.5	-0.8	20.8	22.0	-0.6	21.5	22.5	-0.8	21.9	23.6	0.2
Monthly regional average		**22.9**	**22.8**	**0.0**	**22.3**	**23.8**	**1.5**	**22.3**	**23.8**	**1.5**	**22.6**	**24.2**	**1.5**	**23.3**	**25.0**	**1.7**	**23.4**	**23.6**	**0.2**
South	AKOM II	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	25.8	23.6	-1.2
	AMBAM	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	25.8	23.6	-1.2
	CAMPO	24.0	26.3	2.4	24.5	26.4	2.6	24.5	26.2	2.5	25.1	26.3	2.4	25.0	27.1	2.5	25.0	24.2	-0.7
	DJOUM	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
	EBOLOWA	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
	KRIBI	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	26.0	23.6	-1.2
	LOLODORF	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	25.5	26.8	2.3	26.0	23.6	-1.2
	SANGMELIMA	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
	NYABESSAN	24.5	25.6	1.7	24.5	26.3	2.5	24.5	26.5	2.8	24.6	26.7	2.7	24.2	26.8	2.3	26.0	23.6	-1.2
	ZOETELE	23.1	22.9	-0.9	22.6	23.2	-0.5	22.5	24.0	0.3	22.8	24.4	0.5	23.5	25.2	0.7	23.5	23.6	-1.3
Monthly regional average		**23.9**	**24.6**	**0.7**	**23.7**	**25.1**	**1.3**	**23.7**	**25.5**	**1.8**	**23.9**	**25.7**	**1.8**	**24.5**	**26.2**	**1.7**	**24.9**	**23.7**	**-1.2**

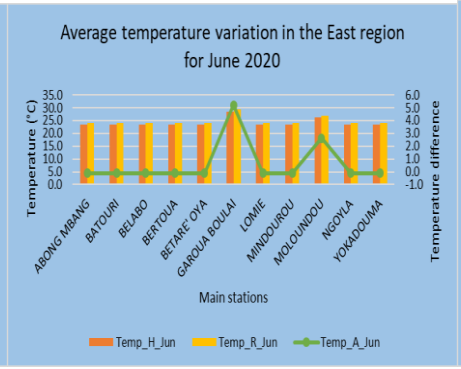

Average temperature variation in the East region for January 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

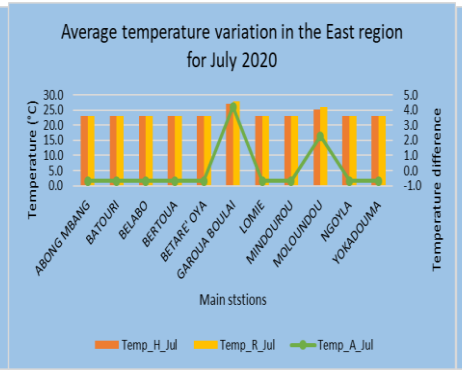

Average temperature variation in the East region for February 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

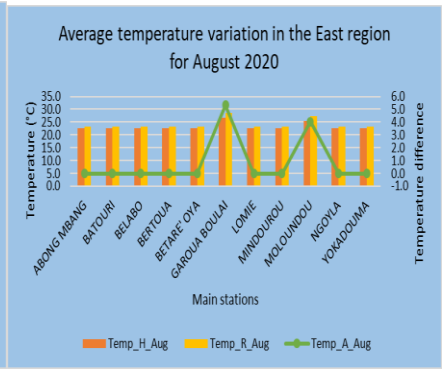

Average temperature variation in the East region for March 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

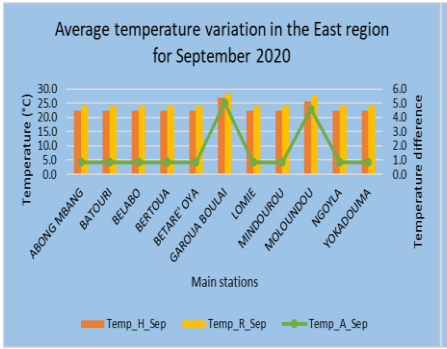

Average temperature variation in the East region for April 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

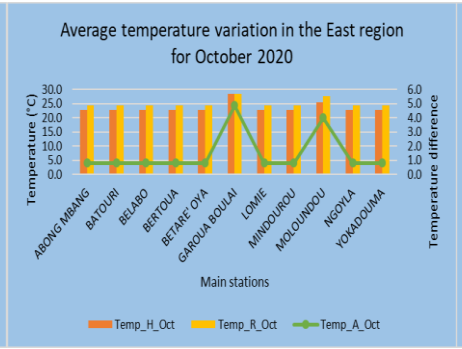

Average temperature variation in the East region for May 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

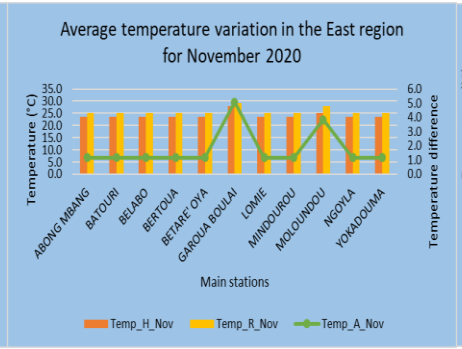

Average temperature variation in the East region for June 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

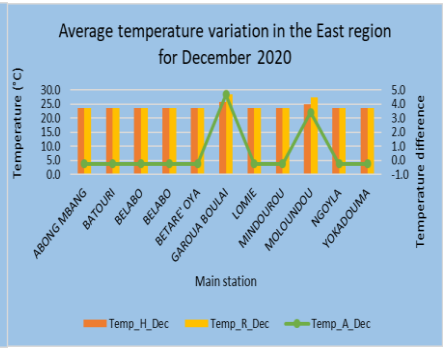

Average temperature variation in the East region for July 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main ststions
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul

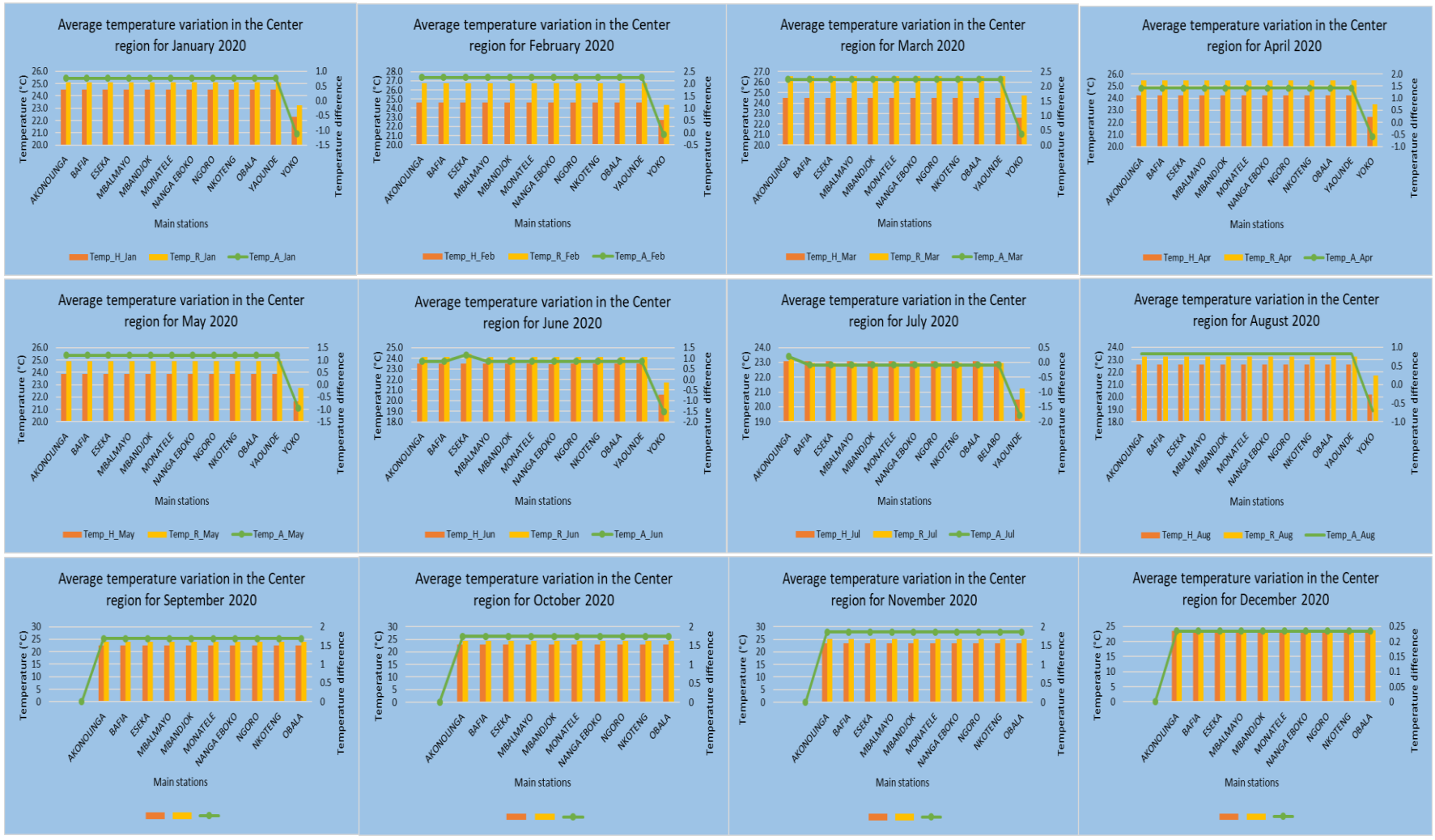

Average temperature variation in the East region for August 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Average temperature variation in the East region for September 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Average temperature variation in the East region for October 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Average temperature variation in the East region for November 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Average temperature variation in the East region for December 2020
Temperature (°C)
Temperature difference
ABONG MBANG
BATOURI
BELABO
BERTOUA
BETARE' OYA
GAROUA BOULAI
LOMIE
MINDOUROU
MOLOUNDOU
NGOYLA
YOKADOUMA
Main station
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec


Average temperature variation in the Center region for January 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Jan Temp_R_Jan Temp_A_Jan
Average temperature variation in the Center region for February 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Feb Temp_R_Feb Temp_A_Feb
Average temperature variation in the Center region for March 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Mar Temp_R_Mar Temp_A_Mar
Average temperature variation in the Center region for April 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Apr Temp_R_Apr Temp_A_Apr
Average temperature variation in the Center region for May 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_May Temp_R_May Temp_A_May
Average temperature variation in the Center region for June 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Jun Temp_R_Jun Temp_A_Jun
Average temperature variation in the Center region for July 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA BELABO YAOUNDE
Main stations
Temp_H_Jul Temp_R_Jul Temp_A_Jul
Average temperature variation in the Center region for August 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA YAOUNDE YOKO
Main stations
Temp_H_Aug Temp_R_Aug Temp_A_Aug
Average temperature variation in the Center region for September 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA
Main stations
Average temperature variation in the Center region for October 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA
Main stations
Average temperature variation in the Center region for November 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA
Main stations
Average temperature variation in the Center region for December 2020
Temperature (°C)
Temperature difference
AKONOLINGA BAFIA ESEKA MBALMAYO MBANDJOK MONATELE NANGA EBOKO NGORO NKOTENG OBALA
Main stations

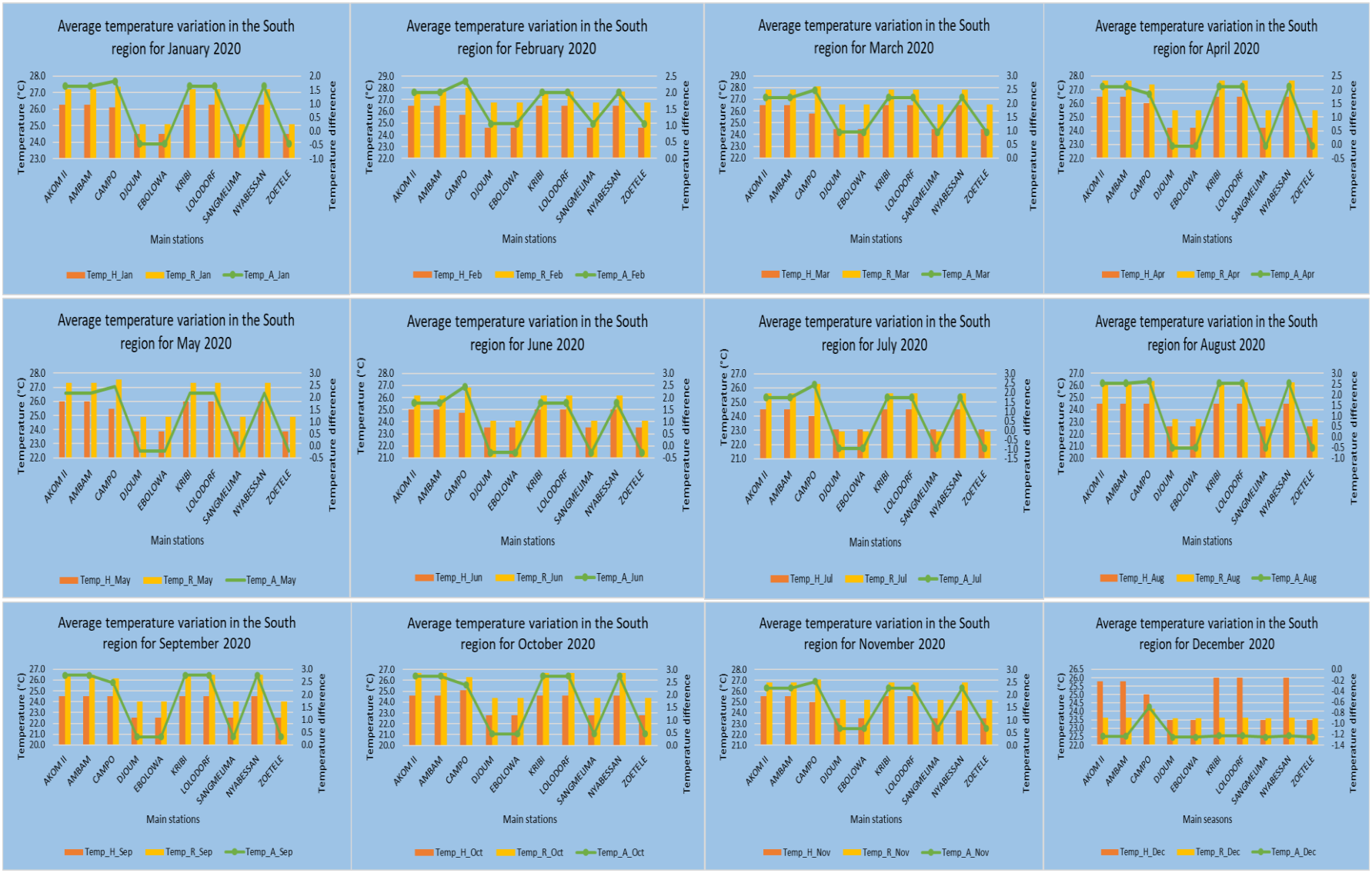


Figure 61: Characteristics monthly average temperatures relative to historical values in the bimodal rainforest zone in 2020.

3.3. MONOMODAL RAINFOREST ZONE

3.4.1 Changes in seasonal temperatures in the monomodal rainforest zone

a- Evolution of maximum temperatures

Maximum temperatures in the Monomodal rainforest zone recorded seasonal average temperatures of 25.2°C and 21.9°C in the South-West region for the dry and rainy seasons respectively. In the Littoral region, the seasonal average temperature during the dry season recorded 24.8°C, while the average temperature during the rainy season recorded 21.4°C as shown in table 28 below. The monomodal rainforest zone was increasingly warm from the South to the North in both the dry and rainy seasons.

Compared to historical temperatures recorded over the period from 1979 to 2015, the year 2020 was observed to be warmer. An average difference in temperature of 1.1°C was certainly observed in the South-West and a difference of 1.6°C in the Littoral Region during the dry season, whereas the average temperature difference in the rainy season was 2.1°C and 2.6°C respectively in both the South-West and Littoral Regions as seen in figure 58 below.

Table 31: Characteristics of seasonal maximum temperatures in the monomodal rainforest zone.

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
South-West Region						
BUEA	21.2	22.4	-1.7	17.7	19.2	-2.0
FONTEM	21.2	22.4	-1.7	17.7	19.2	-2.0
IDENAU	25.0	26.2	2.1	22.3	22.8	1.6
KUMBA	25.0	26.2	2.1	22.3	22.8	1.6
LIMBE	25.0	26.1	2.0	22.3	22.7	1.5
MAMFE	23.6	23.6	-0.5	20.2	21.5	0.3
MUNDEMBA	25.0	26.2	2.1	22.3	22.8	1.6
MUTENGENE	25.0	26.2	2.1	22.3	22.8	1.6
MUYUKA	25.0	26.2	2.1	22.3	22.8	1.6
TIKO	25.0	26.2	2.1	22.3	22.8	1.6
Seasonal average temperatures	**24.1**	**25.2**	**1.1**	**21.2**	**21.9**	**0.7**
Littoral Region						
DIZANGUE	25.0	27.6	4.4	22.3	23.8	3.8
DOUALA	25.0	27.6	4.4	22.3	23.8	3.8
EDEA	25.0	27.6	4.4	22.3	23.8	3.8
LOUM	21.2	22.4	-0.8	17.7	19.2	-0.8
MANJO	21.2	22.3	-0.8	17.7	19.2	-0.8
MBANGA	25.0	26.2	3.0	22.3	22.8	2.7
MELONG	21.2	22.4	-0.8	17.7	19.2	-0.8
NKONGSAMBA	21.2	22.4	-0.8	17.7	19.2	-0.8
Seasonal average temperatures	**23.1**	**24.8**	**1.6**	**20.0**	**21.4**	**1.4**

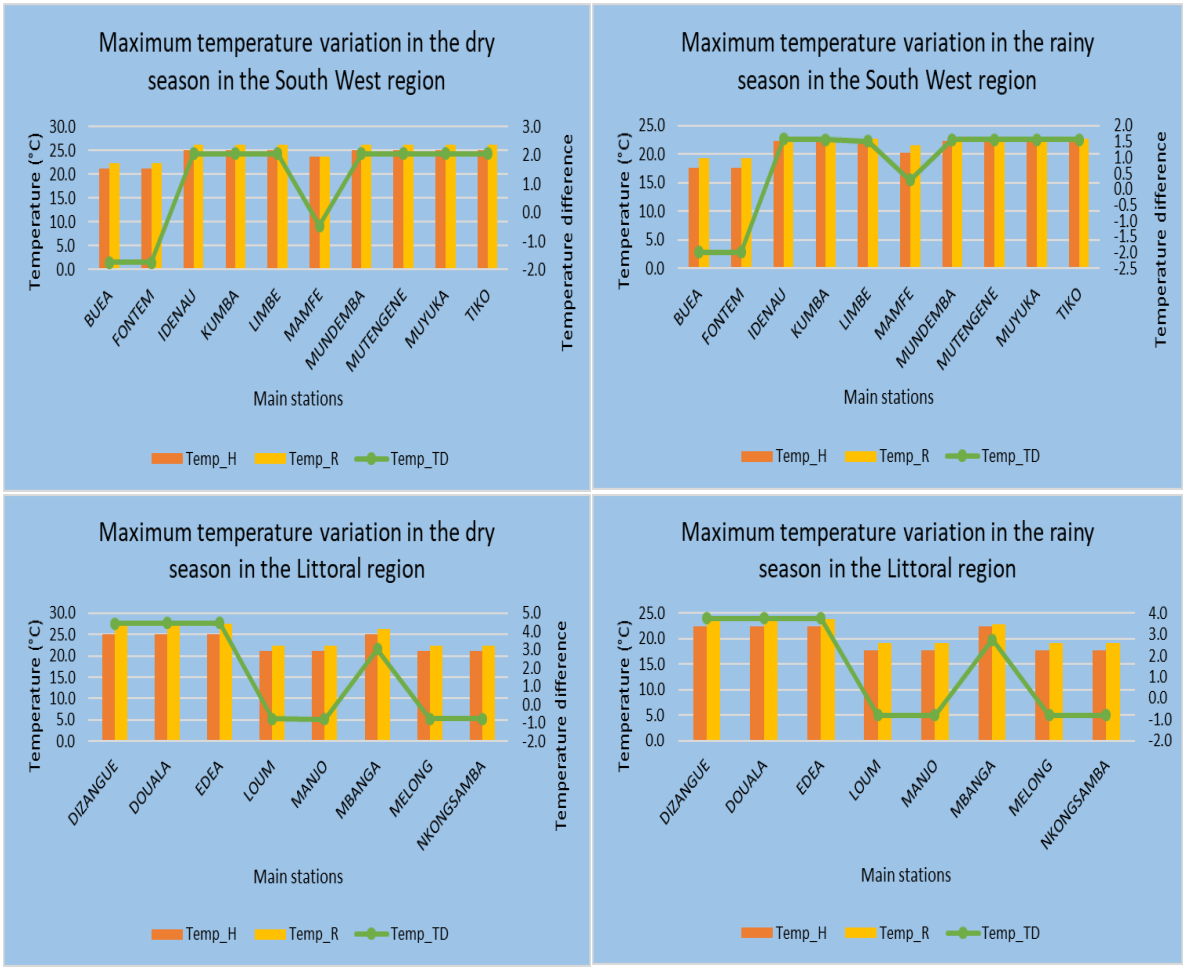


Figure 62: Characteristics of seasonal maximum temperatures relative to historical values in the monomodal rainforest zone

b- Evolution of minimum temperatures

Seasonal minimum average temperatures in the South-West Region recorded 25.2°C and 21.9°C for the dry and rainy seasons respectively, compared to the minimum average temperatures of 24.8°C and 21.4°C in the Littoral Region for the dry and rainy seasons respectively (table 32 below).

As compared to the seasonal minimum temperatures recorded for this agro-ecological zone over the period from 1979 to 2015, the year 2020 was observed to have a globally higher seasonal minimum temperature. Thus, in the dry season, average temperature differences of 1.1°C and 1.6°C were observed in both regions, respectively in the South-West and the Littoral, while the average differences in the rainy season were 0.7°C and 1.4°C respectively as seen below in figure 63.

Table 32: Characteristics of seasonal minimum temperatures in the monomodal rainforest zone.

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
South-West Region						
BUEA	21.2	22.4	-1.7	17.7	19.2	-2.0
FONTEM	21.2	22.4	-1.7	17.7	19.2	-2.0
IDENAU	25.0	26.2	2.1	22.3	22.8	1.6
KUMBA	25.0	26.2	2.1	22.3	22.8	1.6
LIMBE	25.0	26.1	2.0	22.3	22.7	1.5
MAMFE	23.6	23.6	-0.5	20.2	21.5	0.3
MUNDEMBA	25.0	26.2	2.1	22.3	22.8	1.6
MUTENGENE	25.0	26.2	2.1	22.3	22.8	1.6
MUYUKA	25.0	26.2	2.1	22.3	22.8	1.6
TIKO	25.0	26.2	2.1	22.3	22.8	1.6
Seasonal average temperatures	**24.1**	**25.2**	**1.1**	**21.2**	**21.9**	**0.7**
Littoral Region						
DIZANGUE	25.0	27.6	4.4	22.3	23.8	3.8
DOUALA	25.0	27.6	4.4	22.3	23.8	3.8
EDEA	25.0	27.6	4.4	22.3	23.8	3.8
LOUM	21.2	22.4	-0.8	17.7	19.2	-0.8
MANJO	21.2	22.3	-0.8	17.7	19.2	-0.8
MBANGA	25.0	26.2	3.0	22.3	22.8	2.7
MELONG	21.2	22.4	-0.8	17.7	19.2	-0.8
NKONGSAMBA	21.2	22.4	-0.8	17.7	19.2	-0.8
Seasonal average temperatures	**23.1**	**24.8**	**1.6**	**20.0**	**21.4**	**1.4**

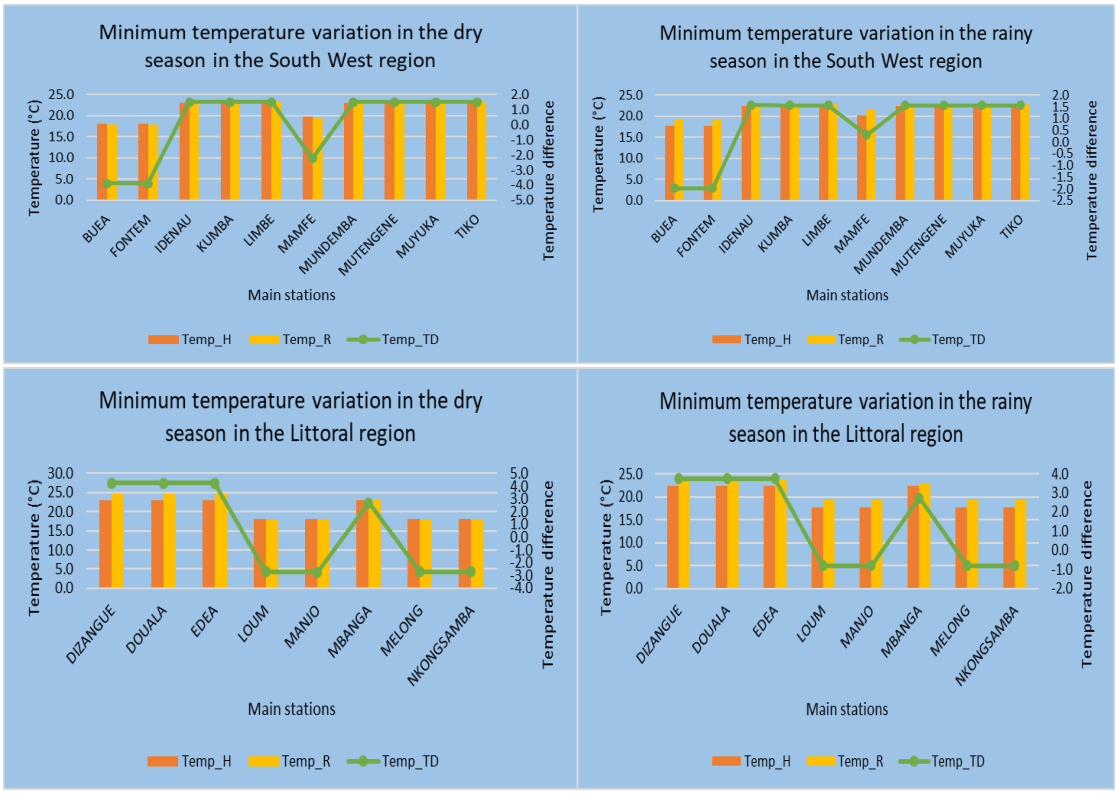


Figure 63: Characteristics of seasonal minimum temperatures relative to historical values in the monomodal rainforest zone- Evolution of average temperatures

Seasonal average temperatures were 26.9°C and 25.4°C in the South-West Region for the dry and rainy seasons, compared to average temperatures of 27.0°C and 25.4°C in the Littoral Region for the dry and rainy seasons respectively (table 33 below).

Compared to the seasonal average temperatures recorded for this agro-ecological zone over the period from 1978 to 2015, it was noticed that the year 2020 was observed to have an overall increase in average temperature. Thus, in the dry season, average differences with temperatures of 1.6°C and 2.4°C were observed in both regions, respectively in the South-West and the Littoral, while the average differences in temperature in the rainy season was 1.3°C and 2.0°C, respectively as seen below in figure 64.

Table 33: Characteristics of seasonal average temperatures in the monomodal rainforest zone.

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
South-West Region						
BUEA	22.8	25.1	-0.1	21.3	23.6	-0.6
FONTEM	22.8	25.2	-0.1	21.3	23.6	-0.6
IDENAU	26.3	27.9	2.6	25.3	26.5	2.4
KUMBA	26.3	27.9	2.6	25.3	26.5	2.4
LIMBE	26.3	27.9	2.6	25.3	26.5	2.4
MAMFE	25.4	26.2	1.0	24.6	25.4	1.3
MUNDEMBA	26.3	27.9	2.6	25.3	26.5	2.4
MUTENGENE	26.3	27.9	2.6	25.3	26.5	2.4
MUYUKA	26.3	27.9	2.6	25.3	26.5	2.4
TIKO	24.0	24.7	-0.6	22.3	22.8	-1.4
Seasonal average temperatures	**25.3**	**26.9**	**1.6**	**24.1**	**25.4**	**1.3**
Littoral Region						
DIZANGUE	26.3	29.0	4.4	25.3	27.3	3.9
DOUALA	26.3	29.0	4.4	25.3	27.3	3.9
EDEA	26.3	29.0	4.4	25.3	27.3	3.9
LOUM	22.8	25.2	0.6	21.5	23.6	0.2
MANJO	22.8	25.2	0.6	21.3	23.6	0.2
MBANGA	26.3	27.9	3.4	25.3	26.5	3.2
MELONG	22.8	25.2	0.6	21.3	23.6	0.2
NKONGSAMBA	22.8	25.2	0.6	21.3	23.6	0.2
Seasonal average temperatures	**24.6**	**27.0**	**2.4**	**23.3**	**25.4**	**2.0**

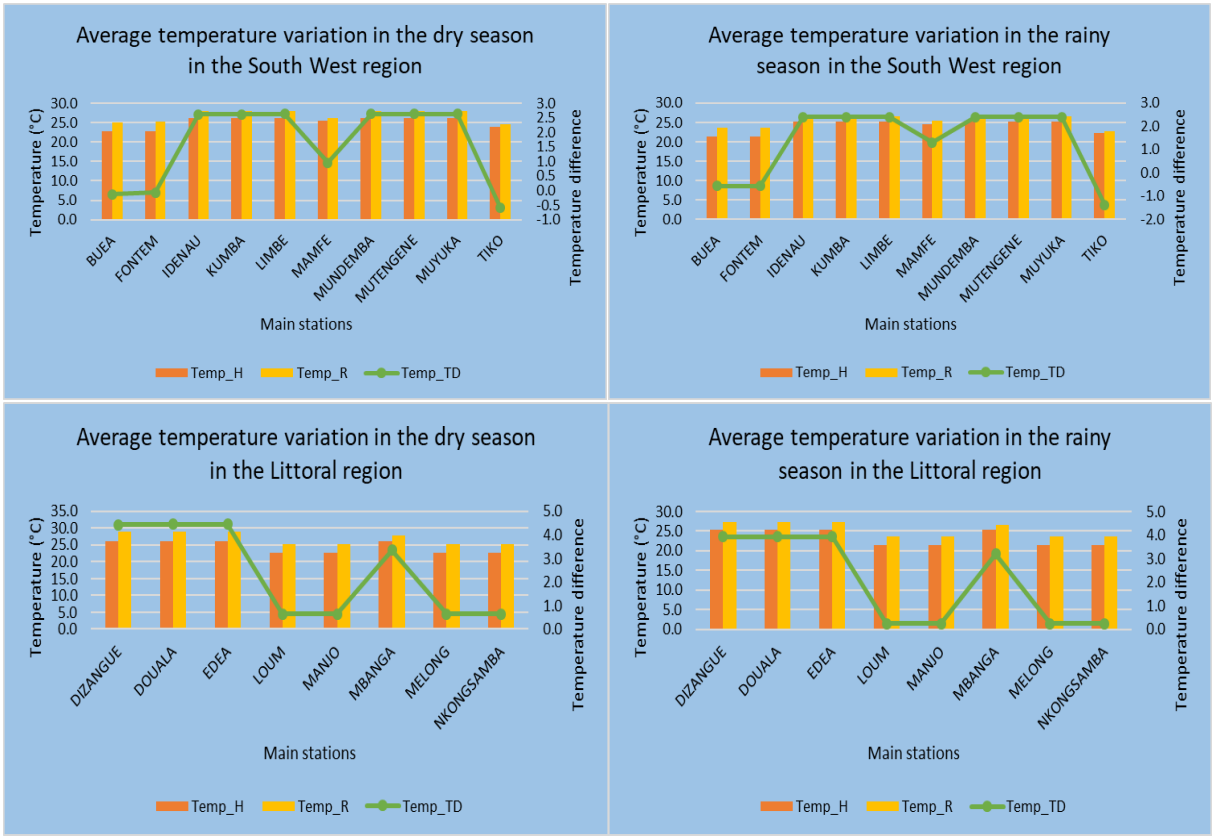


Figure 64: Characteristics of seasonal average temperatures relative to historical values in the monomodal rainforest zone

3.4.2. Evolution of maximum, minimum and average temperatures on a monthly scale in the Monomodal rainforest zone

a- Maximum temperatures

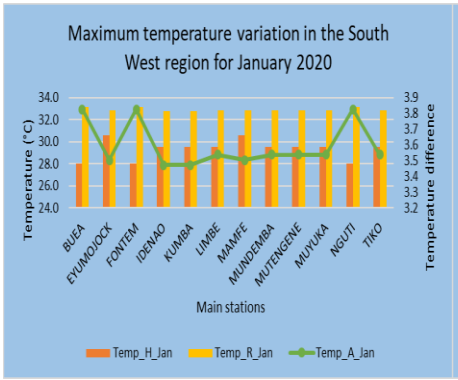
The monthly maximum average temperatures in the Monomodal rainforest zone ranged from 27.3°C in July to 33.4°C in February in the Littoral region. while in the South-West region, the average maximum temperatures ranged from 27.2°C in July to 33.4°C in February (table 34 below).

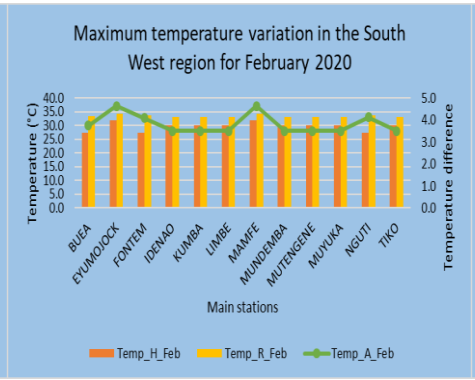
By comparing the average maximum temperatures recorded over the period from 1979 to 2018 with the average maximum real temperatures for the same period, it was observed that the year 2020 was generally warmer than the historical averages in the two constituent regions of the monomodal rainforest zone. Thus, the average maximum and minimum temperature deviations were 4.5°C (in February) and 1.8°C (in July) in the Littoral Region whereas, the South-West Region registered average maximum and minimum temperature deviations of 3.8°C (in February) and hence reduced by -0.1°C as (in December).

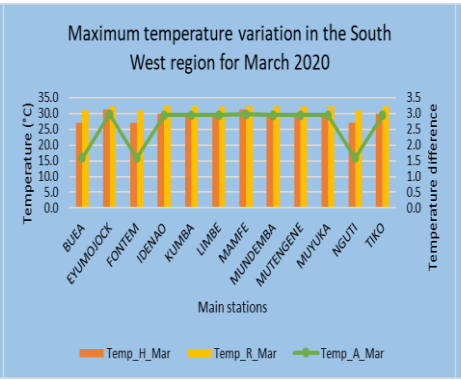
Table 34: Characteristics of monthly maximum temperature in the monomodal rainforest zone of Cameroon in 2020.

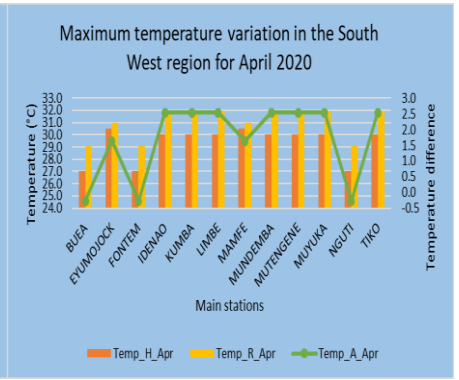
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
South-West region	BUEA	28.0	33.2	3.8	27.3	33.4	3.7	27.0	31.0	1.6	27.0	29.1	-0.3	25.9	28.7	0.1	24.4	27.4	0.2
	EYUMOJOCK	30.6	32.8	3.5	31.9	34.3	4.6	31.2	32.4	3.0	30.5	31.0	1.6	29.5	30.1	1.5	28.1	28.3	1.1
	FONTEM	28.0	33.2	3.8	27.3	33.7	4.1	27.0	31.0	1.6	27.0	29.1	-0.3	25.9	28.7	0.1	24.4	27.4	0.2
	IDENAU	29.5	32.8	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.0	30.0	2.8
	KUMBA	29.5	32.8	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.0	30.0	2.8
	LIMBE	29.5	32.9	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.0	30.0	2.8
	MAMFE	30.6	32.8	3.5	31.9	34.3	4.6	31.2	32.4	3.0	30.5	31.0	1.6	29.5	30.1	1.5	28.1	28.3	1.1
	MUNDEMBA	29.5	32.9	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.2	30.0	2.8
	MUTENGENE	29.5	32.9	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.0	30.0	2.8
	MUYUKA	29.5	32.9	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.0	30.0	2.8
	NGUTI	28.0	33.2	3.8	27.3	33.8	4.1	27.0	31.0	1.6	27.0	29.1	-0.3	25.9	28.7	0.1	24.4	27.4	0.2
	TIKO	29.5	32.9	3.5	30.0	33.1	3.5	30.0	32.4	2.9	30.0	31.9	2.5	29.5	32.0	3.4	28.0	30.0	2.8
Monthly regional average		**29.3**	**32.9**	**3.6**	**29.6**	**33.4**	**3.8**	**29.5**	**32.1**	**2.6**	**29.3**	**31.1**	**1.7**	**28.6**	**30.9**	**2.3**	**27.1**	**29.1**	**1.9**
Littoral region	DIZANGUE	29.5	33.7	4.8	30.0	33.3	4.4	30.0	33.0	4.2	30.0	32.0	3.2	29.5	32.5	4.4	28.0	30.9	4.0
	DOUALA	29.5	33.7	4.8	30.0	33.3	4.4	30.0	33.0	4.2	30.0	32.0	3.2	29.5	32.5	4.4	28.0	30.9	4.1
	EDEA	29.5	33.7	4.8	30.0	33.3	4.4	30.0	33.0	4.2	30.0	32.0	3.2	29.5	32.5	4.4	28.0	30.9	4.3
	LOUM	28.0	33.2	4.2	27.3	33.7	4.8	27.0	31.0	2.2	27.0	29.1	0.3	25.9	28.7	0.6	28.0	27.4	0.9
	MANJO	28.0	33.2	4.2	27.3	33.7	4.8	27.0	31.0	2.2	27.0	29.1	0.3	25.9	28.7	0.6	24.4	27.4	1.2
	MBANGA	29.5	32.9	3.9	30.0	33.1	4.2	30.0	32.4	3.6	30.0	31.9	3.1	29.5	32.0	3.9	28.0	30.0	3.4
	MELONG	28.0	33.2	4.2	27.3	33.7	4.8	27.0	31.0	2.2	27.0	29.1	0.3	25.9	28.7	0.6	24.4	27.4	1.2
	MOUANGKO	29.5	33.7	4.8	30.0	33.3	4.4	30.0	33.0	4.2	30.0	32.0	3.2	29.5	32.5	4.4	28.0	30.9	4.1
	NKONGSAMBA	28.0	33.2	4.2	27.3	33.7	4.8	27.0	31.0	2.2	27.0	29.1	0.3	25.9	28.7	0.6	24.4	27.4	1.2
	YABASSI	29.5	32.9	3.9	30.0	33.1	4.2	30.0	32.4	3.6	30.0	31.9	3.1	29.5	32.0	3.9	28.0	30.0	2.0
Monthly regional average		**28.9**	**33.3**	**4.4**	**28.9**	**33.4**	**4.5**	**28.8**	**32.1**	**3.3**	**28.8**	**30.8**	**2.0**	**28.1**	**30.9**	**2.8**	**26.9**	**29.3**	**2.6**

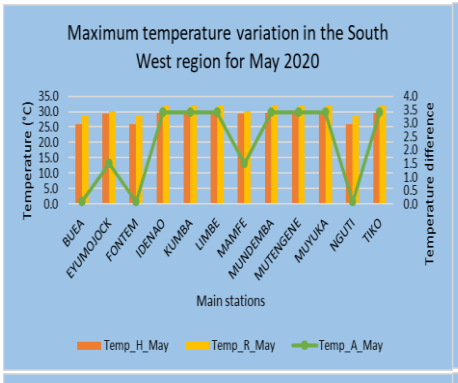
	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
South-West region	BUEA	23.3	25.6	-0.7	23.4	26.5	0.4	24.0	26.7	0.3	24.1	27.9	1.3	25.7	28.7	0.5	27.7	30.5	1.5
	EYUMOJOCK	28.0	26.2	-0.1	27.1	27.6	1.5	27.9	28.1	1.7	28.5	29.8	3.2	29.9	31.1	2.9	30.6	31.4	2.4
	FONTEM	23.3	25.6	-0.7	23.4	26.5	0.4	24.0	26.7	0.3	24.1	27.9	1.3	25.7	28.7	0.5	27.7	30.5	1.5
	IDENAU	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
	KUMBA	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
	LIMBE	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
	MAMFE	28.0	26.2	-0.1	27.1	27.6	1.5	27.9	28.1	1.7	28.5	29.8	3.2	29.9	31.1	2.9	30.6	31.4	2.4
	MUNDEMBA	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
	MUTENGENE	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
	MUYUKA	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
	NGUTI	23.3	25.6	-0.7	23.4	26.5	0.4	24.0	26.7	0.3	24.1	27.9	1.3	27.4	28.7	0.5	27.7	30.5	1.5
	TIKO	27.0	28.1	1.8	27.0	28.7	2.6	27.0	28.8	2.4	27.2	30.0	3.4	28.5	30.8	2.6	29.0	31.2	2.3
Monthly regional average		**26.2**	**27.2**	**0.9**	**26.1**	**28.0**	**1.9**	**26.4**	**28.2**	**1.8**	**26.6**	**29.4**	**2.8**	**28.2**	**30.3**	**2.1**	**28.9**	**31.1**	**2.1**
Littoral region	DIZANGUE	27.0	28.6	3.1	27.0	29.2	3.7	27.0	28.6	2.8	27.2	30.5	4.6	28.5	31.7	4.3	29.0	32.6	4.1
	DOUALA	27.0	28.6	3.1	27.0	29.2	3.7	27.0	28.6	2.8	27.2	30.5	4.6	28.5	31.7	4.3	29.0	32.6	4.1
	EDEA	27.0	28.6	3.1	27.0	29.2	3.7	27.0	28.6	2.8	27.2	30.5	4.6	28.5	31.7	4.3	29.0	32.6	4.1
	LOUM	23.3	25.6	0.1	23.4	26.5	1.0	24.0	26.7	0.9	24.1	27.9	1.9	25.7	28.7	1.3	27.7	30.5	2.0
	MANJO	23.3	25.6	0.1	23.4	26.5	1.0	24.0	26.7	0.9	24.1	27.9	1.9	25.7	28.7	1.3	27.7	30.5	2.0
	MBANGA	27.0	28.1	2.5	27.0	28.7	3.2	27.0	28.8	3.0	27.2	30.0	4.1	28.5	30.8	3.4	29.0	31.2	2.7
	MELONG	23.3	25.6	0.1	23.4	26.5	1.0	24.0	26.7	0.9	24.1	27.9	1.9	25.7	28.7	1.3	27.7	30.5	2.0
	MOUANGKO	27.0	28.6	3.1	27.0	29.1	3.6	27.0	28.6	2.8	27.2	30.5	4.6	28.5	31.7	4.3	29.0	32.6	4.1
	NKONGSAMBA	23.3	25.6	0.1	23.4	26.5	1.0	24.0	26.7	0.9	24.1	27.9	1.9	25.7	28.7	1.3	27.7	30.5	2.0
	YABASSI	27.0	28.1	2.6	27.0	28.7	3.2	27.0	28.8	3.0	27.2	30.0	4.1	28.5	30.8	3.4	29.0	31.2	2.7
Monthly regional average		**25.5**	**27.3**	**1.8**	**25.6**	**28.0**	**2.5**	**25.8**	**27.9**	**2.1**	**26.0**	**29.4**	**3.4**	**27.4**	**30.3**	**2.9**	**28.5**	**31.5**	**3.0**

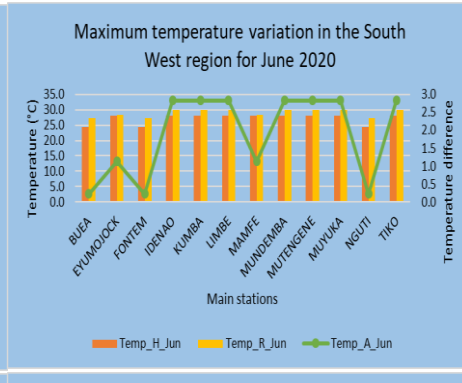

Maximum temperature variation in the South West region for January 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

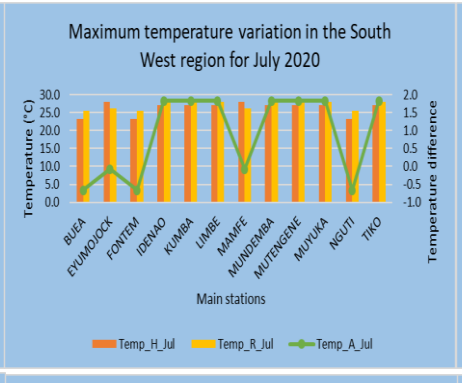

Maximum temperature variation in the South West region for February 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

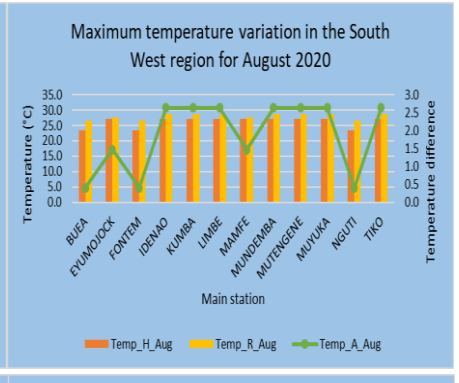

Maximum temperature variation in the South West region for March 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

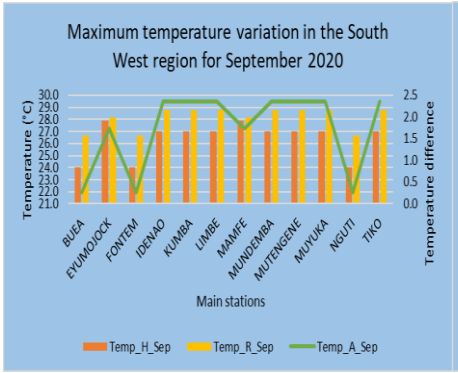

Maximum temperature variation in the South West region for April 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

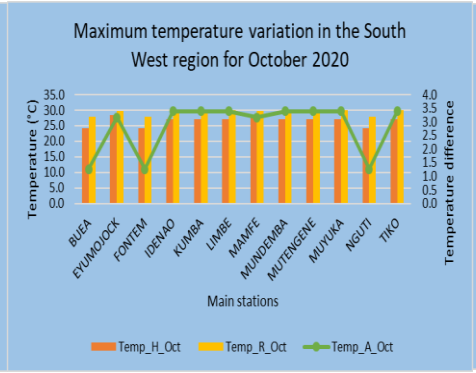

Maximum temperature variation in the South West region for May 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

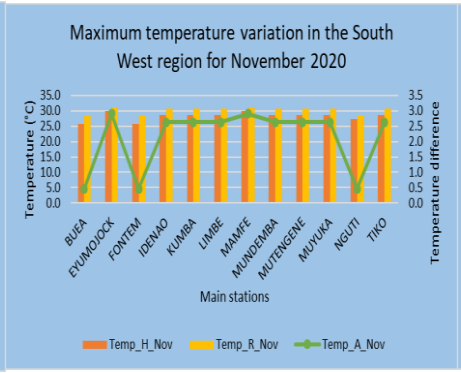

Maximum temperature variation in the South West region for June 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

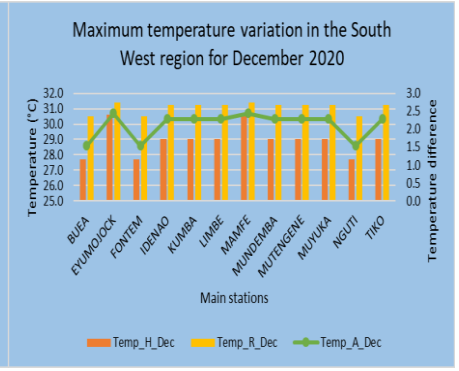

Maximum temperature variation in the South West region for July 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul


Maximum temperature variation in the South West region for August 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main station
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Maximum temperature variation in the South West region for September 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Maximum temperature variation in the South West region for October 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Maximum temperature variation in the South West region for November 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Maximum temperature variation in the South West region for December 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

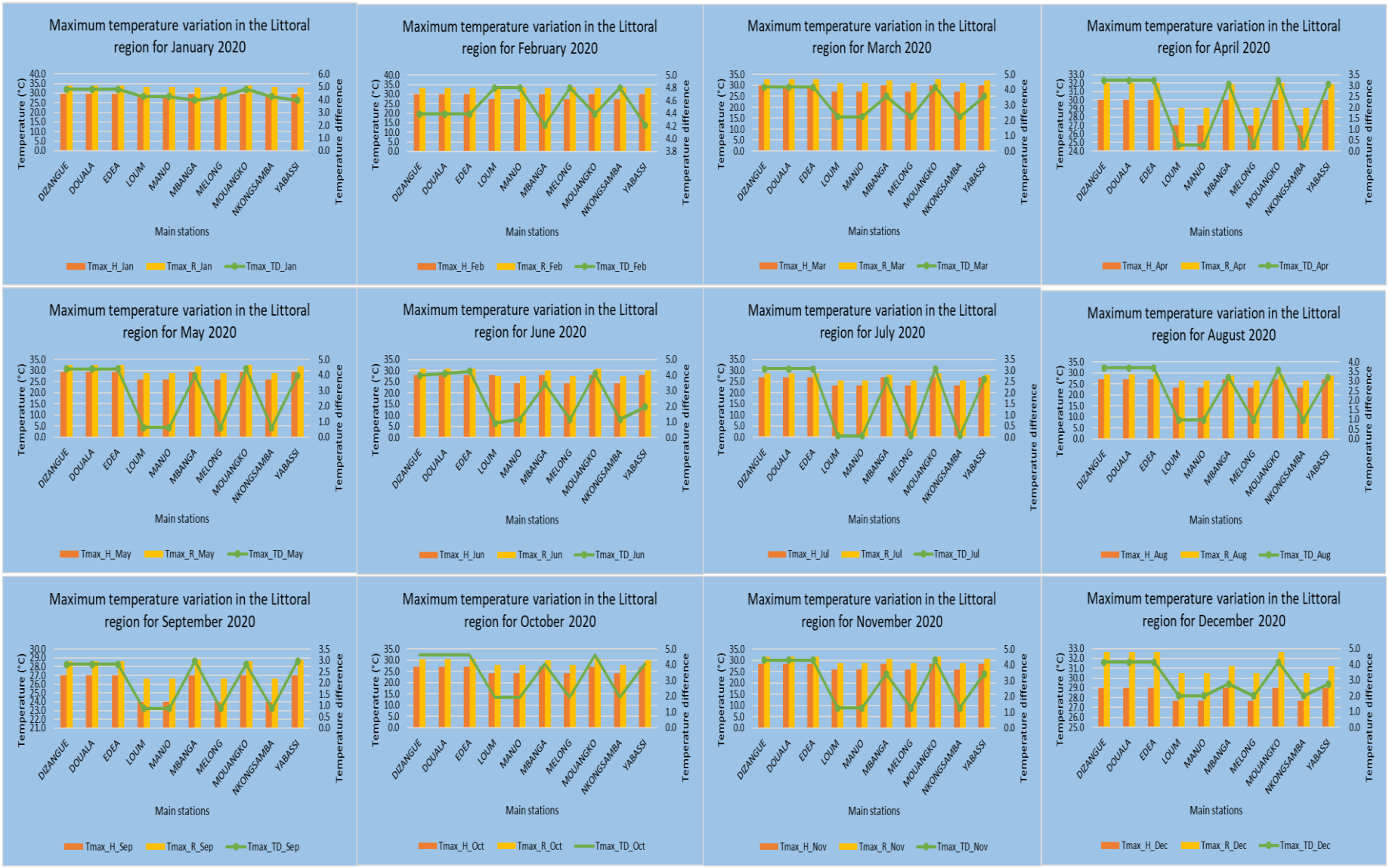


Figure 65: Characteristics of monthly maximum temperatures relative to historical values in the monomodal rainforest zone in 2020.

b- Minimum temperatures

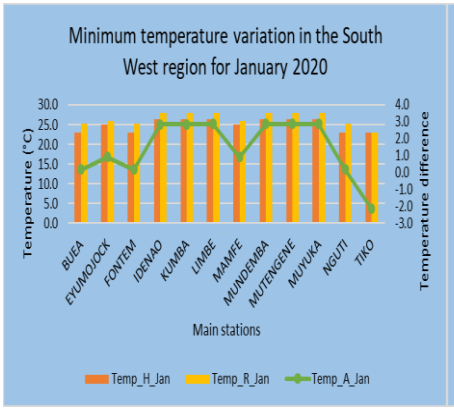
onthly minimum average temperatures in the monomodal rainforest zone varied from 24.2°C in July to 28.0°C in February in the Littoral Region. These temperatures correspondingly ranged from 23.5°C from the month in December to 27.4°C in February in the Southwest Region, (table 35).

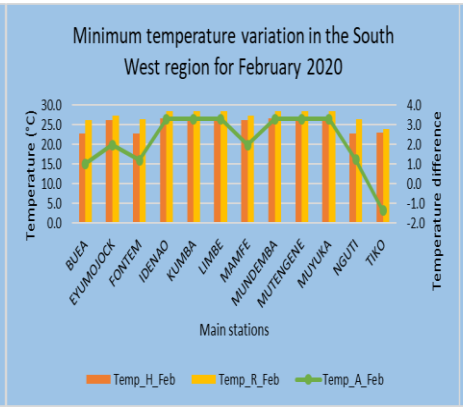
By comparing the average minimum historic temperatures recorded over the period from 1979 to 2018, with the average real temperatures for the same period, it was observed that the year 2020 was generally warmer than historical averages in the two constituent regions of the monomodal rainforest zone. It should be noted however that, in both the Littoral and South-West Regions, December was recorded to be generally cooler than normal. Consequently, the maximum and minimum differences were respectively 3.0°C (in February) and 1.4°C (in July) in the Littoral Region, while in the South-West Region these differences were respectively 2.2°C (in February) and hence reduced by -1.3°C (in December) as seen in Figure 66 below.

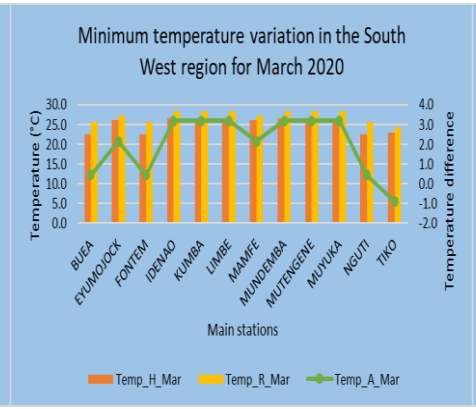
Table 35: Characteristics of monthly minimum temperature in the monomodal rainforest zone of Cameroon in 2020.

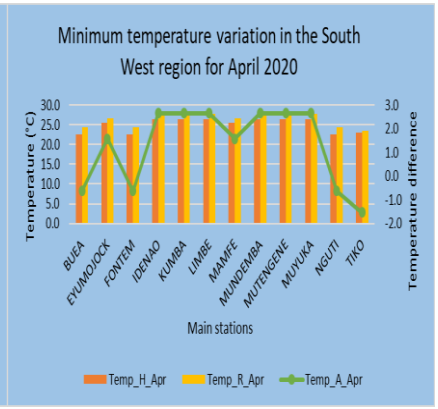
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
South-West region	BUEA	23.0	25.1	0.2	22.7	26.2	1.0	22.5	25.6	0.5	22.5	24.4	-0.6	21.9	24.2	-0.3	21.2	23.3	-0.3
	EYUMOJOCK	25.0	25.9	0.9	26.2	27.2	2.0	26.1	27.3	2.2	25.5	26.6	1.6	24.9	26.2	1.7	24.1	25.0	1.3
	FONTEM	23.0	25.1	0.2	22.7	26.4	1.2	22.5	25.6	0.5	22.5	24.4	-0.6	21.9	24.2	-0.3	21.2	23.3	-0.3
	IDENAU	26.3	27.8	2.8	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	KUMBA	26.3	27.8	2.8	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	LIMBE	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	MAMFE	25.0	25.9	0.9	26.2	27.2	2.0	26.1	27.3	2.2	25.5	26.6	1.6	24.9	26.2	1.7	24.1	25.0	1.3
	MUNDEMBA	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.1	26.2	2.5
	MUTENGENE	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	MUYUKA	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	NGUTI	23.0	25.1	0.2	22.7	26.4	1.2	22.5	25.6	0.5	22.5	24.4	-0.6	21.9	24.2	-0.3	21.2	23.3	-0.3
	TIKO	23.0	22.8	-2.1	23.0	23.8	-1.4	23.0	24.3	-0.9	23.0	23.5	-1.5	22.5	23.2	-1.4	22.0	22.4	-1.3
Monthly regional average		**25.0**	**26.4**	**1.5**	**25.2**	**27.4**	**2.2**	**25.1**	**27.1**	**2.0**	**25.0**	**26.3**	**1.3**	**24.5**	**26.2**	**1.6**	**23.7**	**25.0**	**1.3**
Littoral region	DIZANGUE	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.4
	DOUALA	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.6
	EDEA	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.8
	LOUM	23.0	25.1	0.2	22.7	26.4	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	23.0	23.3	0.2
	MANJO	23.0	25.1	0.2	22.7	26.3	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	21.2	23.3	0.2
	MBANGA	26.3	27.9	2.9	26.5	28.5	3.5	26.5	28.3	3.4	26.5	27.7	2.8	26.0	27.6	3.2	25.0	26.2	2.7
	MELONG	23.0	25.1	0.2	22.7	26.4	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	21.2	23.3	0.2
	MOUANGKO	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.4
	NKONGSAMBA	23.0	25.1	0.2	22.7	26.4	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	21.2	23.3	0.2
	YABASSI	26.3	27.9	2.9	26.5	28.5	3.5	26.5	28.3	3.4	26.5	27.7	2.8	26.0	27.6	3.2	25.0	26.2	1.2
Monthly regional average		**25.0**	**27.3**	**2.3**	**25.0**	**28.0**	**3.0**	**24.9**	**27.4**	**2.5**	**24.9**	**26.6**	**1.7**	**24.4**	**26.6**	**2.2**	**23.7**	**25.4**	**1.9**

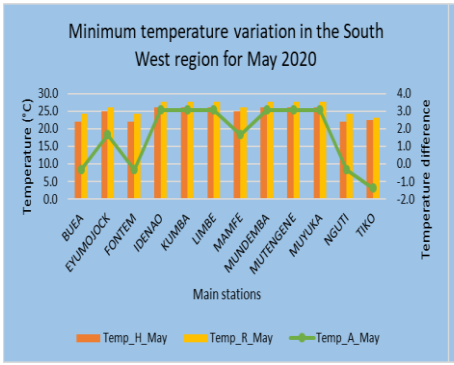
	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
South-West region	BUEA	20.1	22.1	-1.0	20.3	22.7	-0.4	21.0	22.7	-0.6	20.5	23.5	0.2	21.9	23.7	-0.7	22.9	23.3	-1.5
	EYUMOJOCK	24.0	23.5	0.4	23.6	24.3	1.2	24.0	24.6	1.3	24.2	25.6	2.3	25.0	26.0	1.7	25.0	24.4	-0.4
	FONTEM	20.1	22.1	-1.0	20.3	22.7	-0.4	21.0	22.7	-0.6	20.5	23.5	0.2	21.9	23.7	-0.7	22.9	23.3	-1.5
	IDENAU	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	-0.2
	KUMBA	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	-0.2
	LIMBE	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	-0.2
	MAMFE	24.0	23.5	0.4	23.6	24.3	1.2	24.0	24.6	1.3	24.2	25.6	2.3	25.0	26.0	1.7	25.0	24.4	-0.4
	MUNDEMBA	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	-0.2
	MUTENGENE	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	-0.2
	MUYUKA	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	-0.2
	NGUTI	20.1	22.1	-1.0	20.3	22.7	-0.4	21.0	22.7	-0.6	20.5	23.5	0.2	22.7	23.7	-0.7	22.9	23.3	-1.5
	TIKO	22.0	21.9	-1.2	22.0	22.2	-0.9	22	22.1	-1.3	22.0	22.5	-0.8	22.5	22.8	-1.5	23.0	15.8	-9.0
Monthly regional average		**23.1**	**23.8**	**0.7**	**23.1**	**24.3**	**1.2**	**23.3**	**24.3**	**1.0**	**23.3**	**25.2**	**1.9**	**24.3**	**25.6**	**1.2**	**24.8**	**23.5**	**-1.3**
Littoral region	DIZANGUE	24.5	25.8	3.0	24.5	26.3	3.5	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	DOUALA	24.5	25.8	3.0	24.5	26.3	3.5	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	EDEA	24.5	25.8	3.0	24.5	26.3	3.5	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	LOUM	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	MANJO	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	MBANGA	24.5	25.0	2.2	24.5	25.5	2.6	24.5	25.4	2.3	24.6	26.3	3.3	25.5	26.8	2.8	26.0	24.6	-0.2
	MELONG	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	MOUANGKO	24.5	25.8	3.0	24.5	26.2	3.4	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	NKONGSAMBA	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	YABASSI	24.5	25.0	2.3	24.5	25.5	2.6	24.5	25.4	2.3	24.6	26.3	3.3	25.5	26.8	2.8	26.0	24.6	-0.2
Monthly regional average		**22.7**	**24.2**	**1.4**	**22.8**	**24.7**	**1.8**	**23.1**	**24.5**	**1.4**	**23.0**	**25.5**	**2.5**	**24.1**	**26.0**	**1.9**	**24.8**	**24.5**	**-0.3**

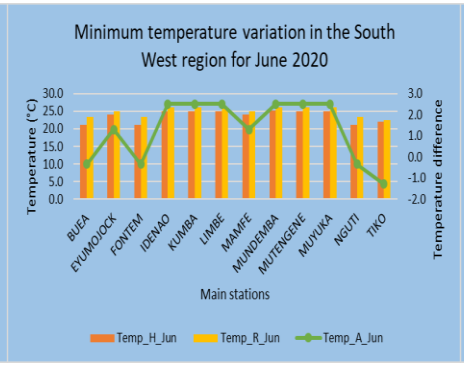

Minimum temperature variation in the South West region for January 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jan Temp_R_Jan Temp_A_Jan

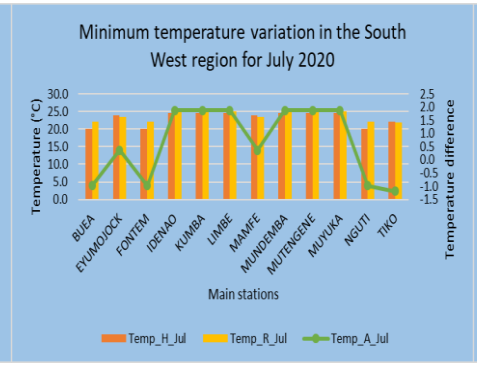

Minimum temperature variation in the South West region for February 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Feb Temp_R_Feb Temp_A_Feb

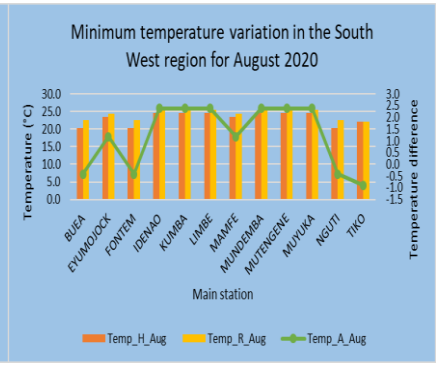

Minimum temperature variation in the South West region for March 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Mar Temp_R_Mar Temp_A_Mar

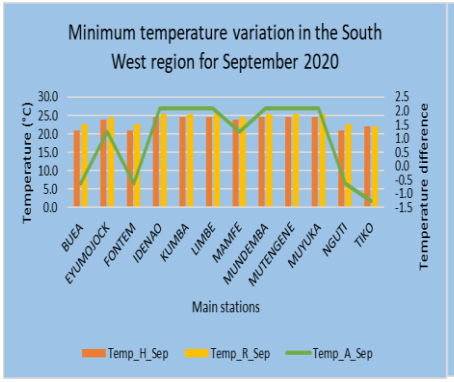

Minimum temperature variation in the South West region for April 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Apr Temp_R_Apr Temp_A_Apr

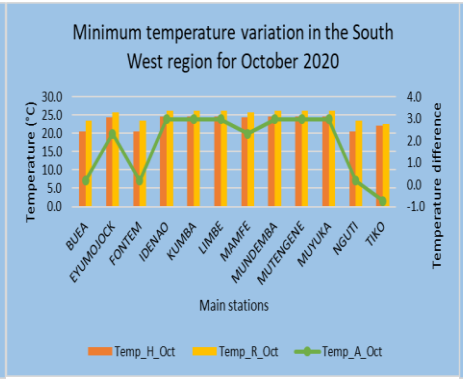

Minimum temperature variation in the South West region for May 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_May Temp_R_May Temp_A_May

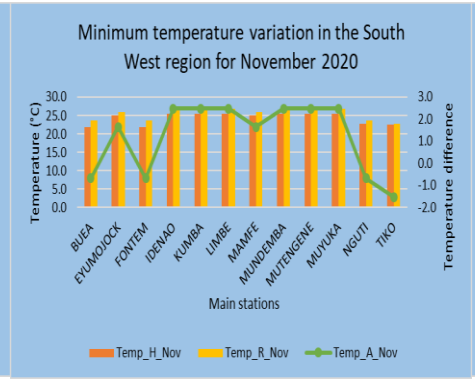

Minimum temperature variation in the South West region for June 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jun Temp_R_Jun Temp_A_Jun

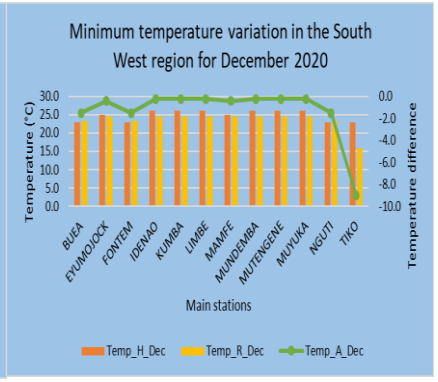

Minimum temperature variation in the South West region for July 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jul Temp_R_Jul Temp_A_Jul


Minimum temperature variation in the South West region for August 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main station
Temp_H_Aug Temp_R_Aug Temp_A_Aug


Minimum temperature variation in the South West region for September 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Sep Temp_R_Sep Temp_A_Sep


Minimum temperature variation in the South West region for October 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Oct Temp_R_Oct Temp_A_Oct


Minimum temperature variation in the South West region for November 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Nov Temp_R_Nov Temp_A_Nov


Minimum temperature variation in the South West region for December 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Dec Temp_R_Dec Temp_A_Dec

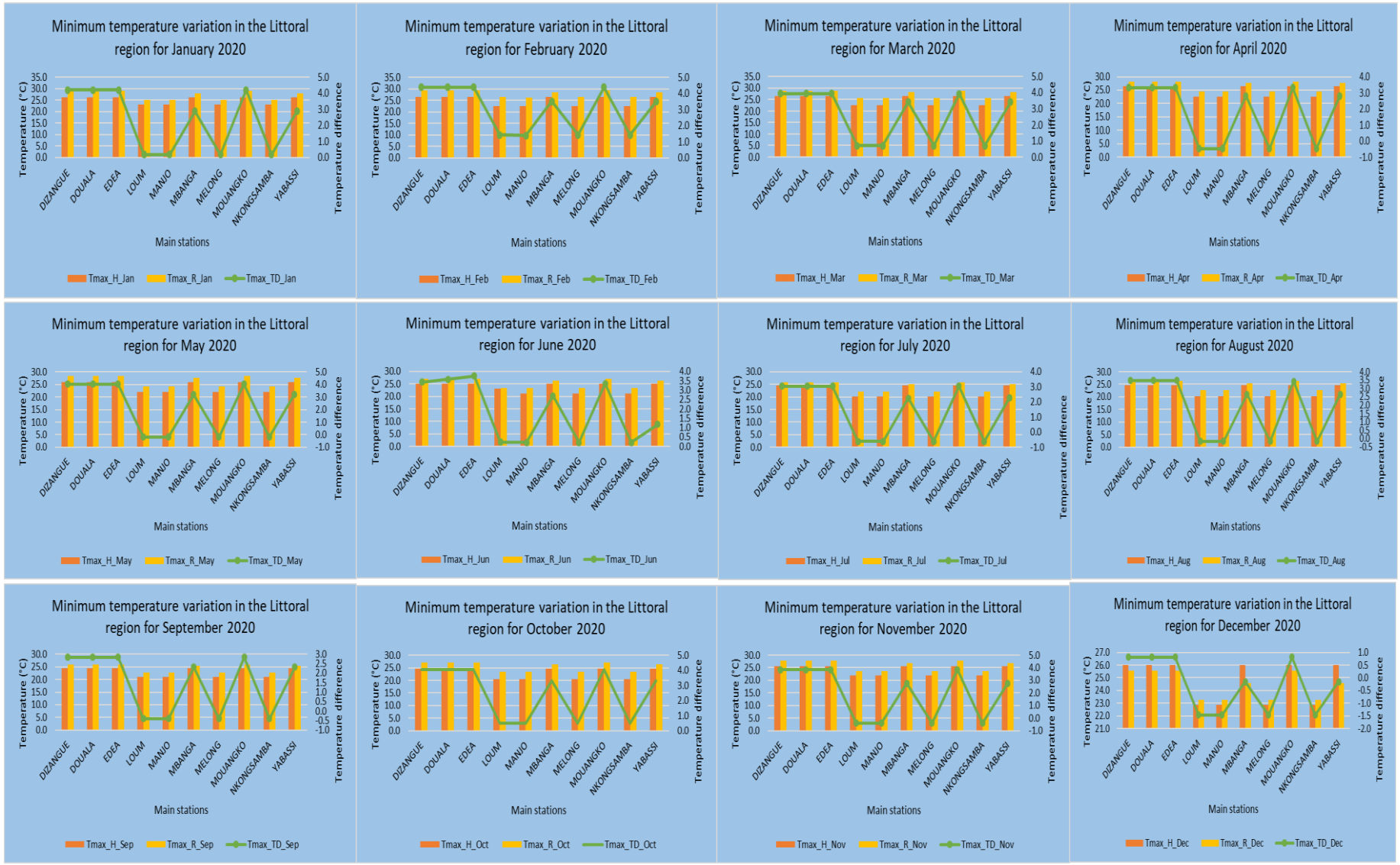


Figure 66: Characteristics monthly minimum temperatures relative to historical values in the monomodal rainforest zone in 2020

c- Average temperatures

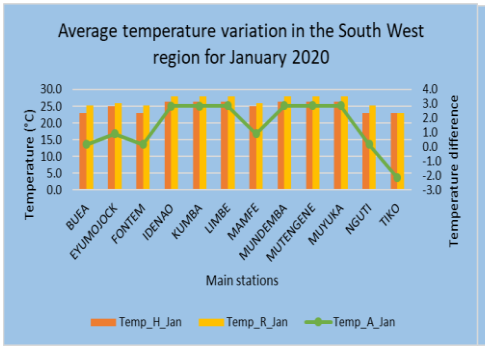
Monthly average temperatures in the monomodal rainforest zone varied from 24.2°C in July to 28.0°C in February in the Littoral Region. These temperatures similarly ranged from 23.8°C in the month of July to 27.4°C in February in the South-West Region (table 36).

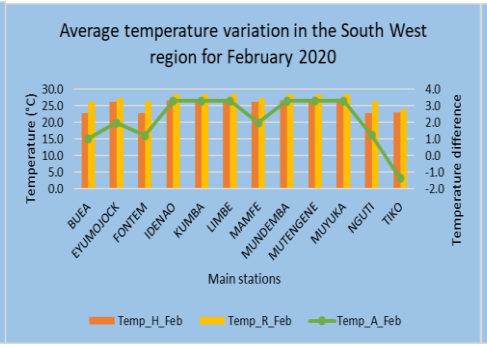
By comparing the average historic temperatures recorded over the period from 1978 to 2018 with the average real temperatures for the same period, it was observed that the year 2020 was generally warmer than the historical averages. It should be conversely noted that, in the Littoral region, December was generally cooler than normal in the South-West Region. Thus, the maximum and minimum temperature differences were respectively 3.0°C, as recorded in February and -0.3°C, as recorded in December in the Littoral Region. Whereas in the South-West Region these differences were respectively 2.2°C in February and reduced by 0.5°C in December as seen in Figure 67.

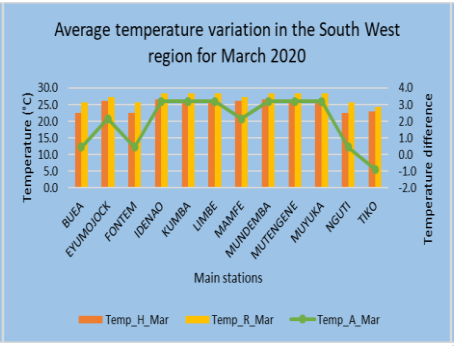
Table 36: Characteristics of monthly average temperature in the monomodal rainforest zone of Cameroon in 2020

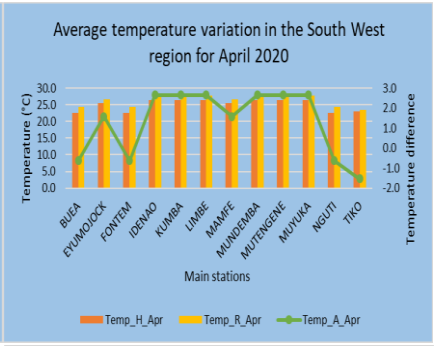
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
South-West region	BUEA	23.0	25.1	0.2	22.7	26.2	1.0	22.5	25.6	0.5	22.5	24.4	-0.6	21.9	24.2	-0.3	21.2	23.3	-0.3
	EYUMOJOCK	25.0	25.9	0.9	26.2	27.2	2.0	26.1	27.3	2.2	25.5	26.6	1.6	24.9	26.2	1.7	24.1	25.0	1.3
	FONTEM	23.0	25.1	0.2	22.7	26.4	1.2	22.5	25.6	0.5	22.5	24.4	-0.6	21.9	24.2	-0.3	21.2	23.3	-0.3
	IDENAU	26.3	27.8	2.8	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	KUMBA	26.3	27.8	2.8	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	LIMBE	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	MAMFE	25.0	25.9	0.9	26.2	27.2	2.0	26.1	27.3	2.2	25.5	26.6	1.6	24.9	26.2	1.7	24.1	25.0	1.3
	MUNDEMBA	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.1	26.2	2.5
	MUTENGENE	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	MUYUKA	26.3	27.9	2.9	26.5	28.5	3.3	26.5	28.3	3.2	26.5	27.7	2.7	26.0	27.6	3.1	25.0	26.2	2.5
	NGUTI	23.0	25.1	0.2	22.7	26.4	1.2	22.5	25.6	0.5	22.5	24.4	-0.6	21.9	24.2	-0.3	21.2	23.3	-0.3
	TIKO	23.0	22.8	-2.1	23.0	23.8	-1.4	23.0	24.3	-0.9	23.0	23.5	-1.5	22.5	23.2	-1.4	22.0	22.4	-1.3
Monthly regional average		**25.0**	**26.4**	**1.5**	**25.2**	**27.4**	**2.2**	**25.1**	**27.1**	**2.0**	**25.0**	**26.3**	**1.3**	**24.5**	**26.2**	**1.6**	**23.7**	**25.0**	**1.3**
Littoral region	DIZANGUE	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.4
	DOUALA	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.4
	EDEA	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.4
	LOUM	23.0	25.1	0.2	22.7	26.4	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	23.0	23.3	-0.3
	MANJO	23.0	25.1	0.2	22.7	26.3	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	21.2	23.3	-0.3
	MBANGA	26.3	27.9	2.9	26.5	28.5	3.5	26.5	28.3	3.4	26.5	27.7	2.8	26.0	27.6	3.2	25.0	26.2	2.5
	MELONG	23.0	25.1	0.2	22.7	26.4	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	21.2	23.3	-0.3
	MOUANGKO	26.3	29.2	4.2	26.5	29.3	4.4	26.5	28.8	3.9	26.5	28.2	3.3	26.0	28.4	4.0	25.0	27.1	3.4
	NKONGSAMBA	23.0	25.1	0.2	22.7	26.4	1.4	22.5	25.6	0.7	22.5	24.4	-0.5	21.9	24.2	-0.2	21.2	23.3	-0.3
	YABASSI	26.3	27.9	2.9	26.5	28.5	3.5	26.5	28.3	3.4	26.5	27.7	2.8	26.0	27.6	3.2	25.0	26.2	2.5
Monthly regional average		**25.0**	**27.3**	**2.3**	**25.0**	**28.0**	**3.0**	**24.9**	**27.4**	**2.5**	**24.9**	**26.6**	**1.7**	**24.4**	**26.6**	**2.2**	**23.7**	**25.4**	**1.7**

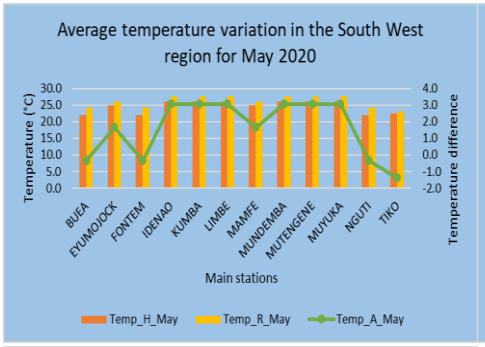
	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
South-West region	BUEA	20.1	22.1	-1.0	20.3	22.7	-0.4	21.0	22.7	-0.6	20.5	23.5	0.2	21.9	23.7	-0.7	22.9	23.3	-0.7
	EYUMOJOCK	24.0	23.5	0.4	23.6	24.3	1.2	24.0	24.6	1.3	24.2	25.6	2.3	25.0	26.0	1.7	25.0	24.4	0.4
	FONTEM	20.1	22.1	-1.0	20.3	22.7	-0.4	21.0	22.7	-0.6	20.5	23.5	0.2	21.9	23.7	-0.7	22.9	23.3	-0.7
	IDENAU	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	0.6
	KUMBA	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	0.6
	LIMBE	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	0.6
	MAMFE	24.0	23.5	0.4	23.6	24.3	1.2	24.0	24.6	1.3	24.2	25.6	2.3	25.0	26.0	1.7	25.0	24.4	0.4
	MUNDEMBA	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	0.6
	MUTENGENE	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	0.6
	MUYUKA	24.5	25.0	1.9	24.5	25.5	2.4	24.5	25.4	2.1	24.6	26.3	3.0	25.5	26.8	2.5	26.0	24.6	0.6
	NGUTI	20.1	22.1	-1.0	20.3	22.7	-0.4	21.0	22.7	-0.6	20.5	23.5	0.2	22.7	23.7	-0.7	22.9	23.3	-0.7
	TIKO	22.0	21.9	-1.2	22.0	22.2	-0.9	22	22.1	-1.3	22.0	22.5	-0.8	22.5	22.8	-1.5	23.0	15.8	-8.2
Monthly regional average		**23.1**	**23.8**	**0.7**	**23.1**	**24.3**	**1.2**	**23.3**	**24.3**	**1.0**	**23.3**	**25.2**	**1.9**	**24.3**	**25.6**	**1.2**	**24.8**	**23.5**	**-0.5**
Littoral region	DIZANGUE	24.5	25.8	3.0	24.5	26.3	3.5	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	DOUALA	24.5	25.8	3.0	24.5	26.3	3.5	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	EDEA	24.5	25.8	3.0	24.5	26.3	3.5	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	LOUM	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	MANJO	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	MBANGA	24.5	25.0	2.2	24.5	25.5	2.6	24.5	25.4	2.3	24.6	26.3	3.3	25.5	26.8	2.8	26.0	24.6	-0.2
	MELONG	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	MOUANGKO	24.5	25.8	3.0	24.5	26.2	3.4	24.5	25.9	2.8	24.6	27.0	4.0	25.5	27.9	3.8	26.0	25.6	0.8
	NKONGSAMBA	20.1	22.1	-0.6	20.3	22.7	-0.2	21.0	22.7	-0.4	20.5	23.5	0.5	21.9	23.7	-0.4	22.9	23.3	-1.5
	YABASSI	24.5	25.0	2.3	24.5	25.5	2.6	24.5	25.4	2.3	24.6	26.3	3.3	25.5	26.8	2.8	26.0	24.6	-0.2
Monthly regional average		**22.7**	**24.2**	**1.4**	**22.8**	**24.7**	**1.8**	**23.1**	**24.5**	**1.4**	**23.0**	**25.5**	**2.5**	**24.1**	**26.0**	**1.9**	**24.8**	**24.5**	**-0.3**

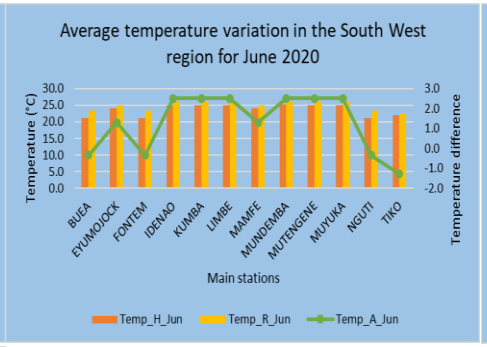

Average temperature variation in the South West region for January 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

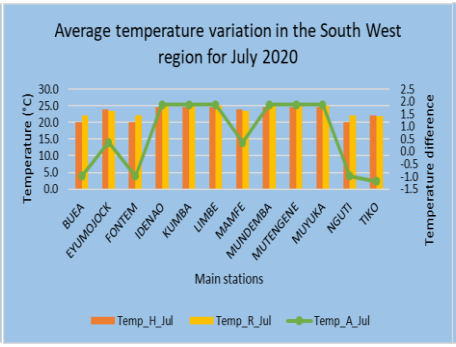

Average temperature variation in the South West region for February 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

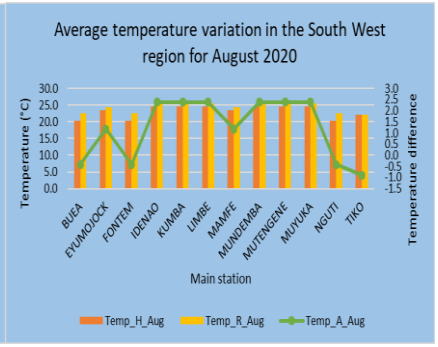

Average temperature variation in the South West region for March 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

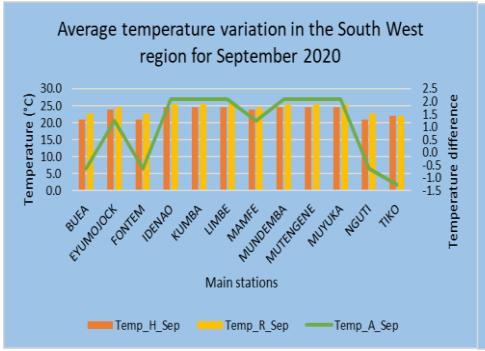

Average temperature variation in the South West region for April 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

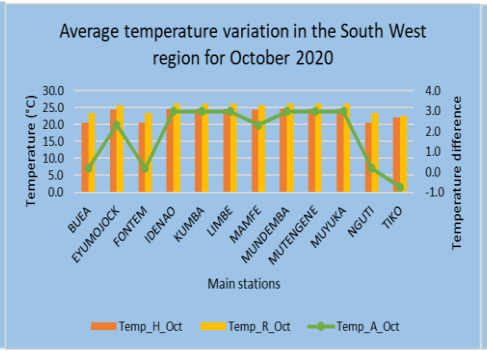

Average temperature variation in the South West region for May 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

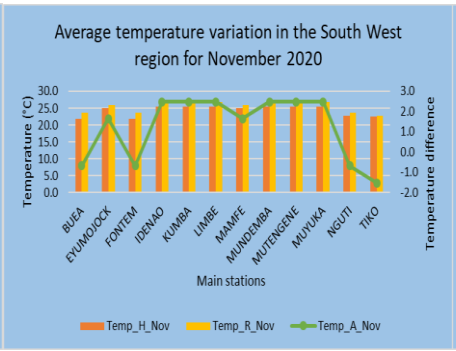

Average temperature variation in the South West region for June 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

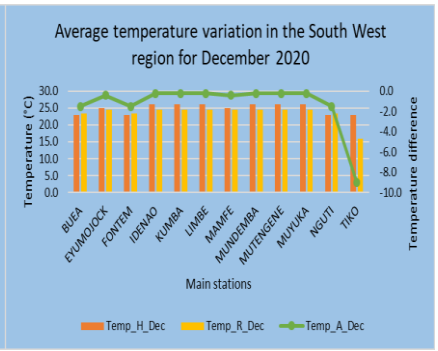

Average temperature variation in the South West region for July 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul


Average temperature variation in the South West region for August 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main station
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Average temperature variation in the South West region for September 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Average temperature variation in the South West region for October 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Average temperature variation in the South West region for November 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Average temperature variation in the South West region for December 2020
Temperature (°C)
Temperature difference
BUEA EYUMOJOCK FONTEM IDENAO KUMBA LIMBE MAMFE MUNDEMBA MUTENGENE MUYUKA NGUTI TIKO
Main stations
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

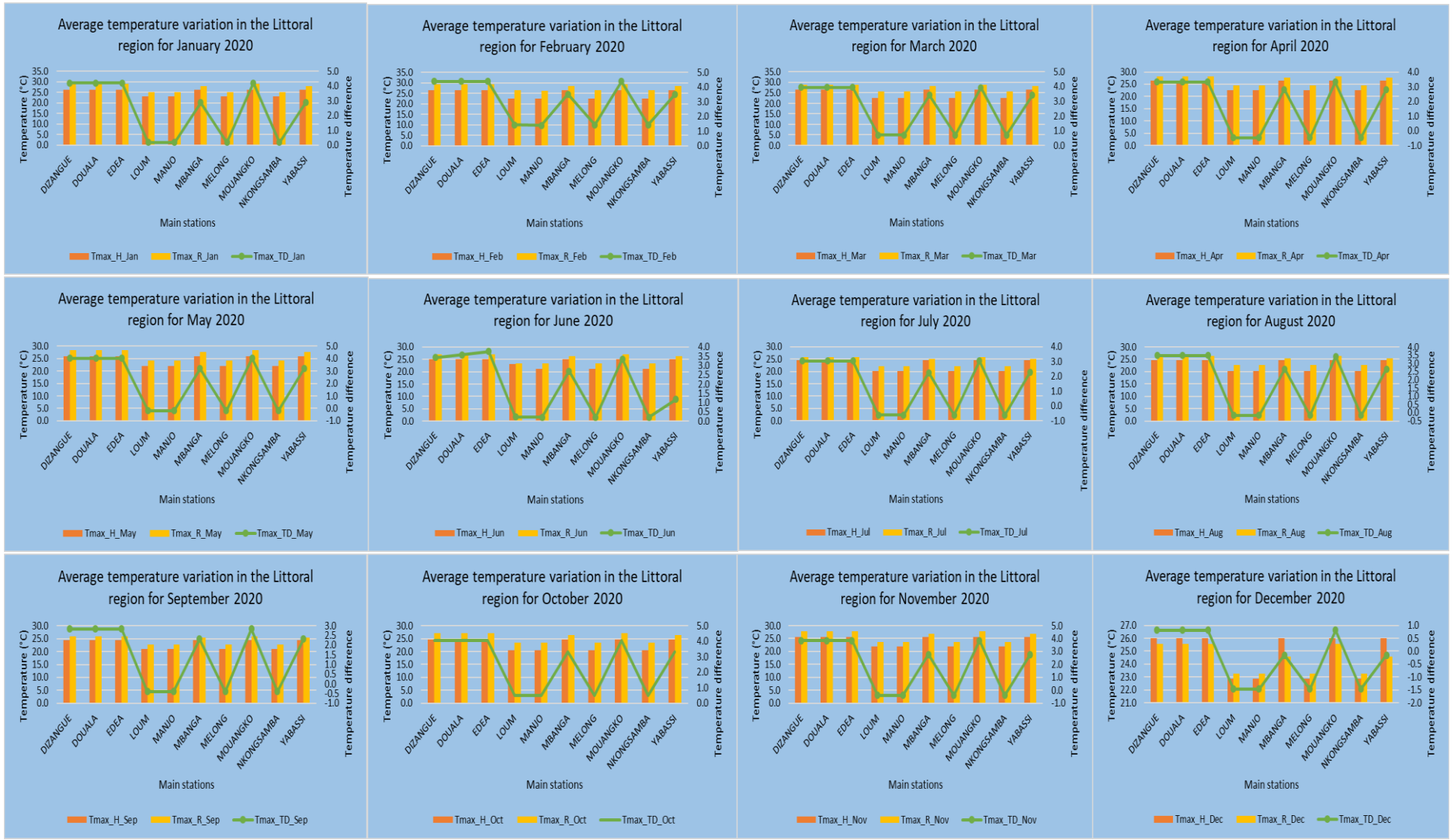


Figure 67: Characteristics of 2020 monthly average temperatures relative to historical values in the monomodal rainforest zone

3.5. HIGHLAND ZONE

3.5.1 Changes in seasonal temperatures in the highland zone

a- Evolution of maximum temperatures

Seasonal maximum average temperatures recorded average temperatures of 22.6°C and 17.9°C in the West region for the dry and rainy seasons, compared to maximum average temperatures of 22.0°C and 17.2°C in the North-West region for the dry and rainy seasons respectively as seen below in table 37.

By comparing these values to average seasonal maximum temperatures recorded for this agro-ecological zone over the period from 1979 to 2018, it was evident that the year 2020 observed higher seasonal maximum temperatures. As a result, the Southern part of this agro-ecological zone, represented by the West region observed average deviations of 0.6°C and 1.1°C for the dry and rainy seasons respectively. At the same time, the Northern part of the highland zone, represented by the North-West Region, registered average deviations of 0.2°C and 0.8°C for the dry and rainy seasons respectively. Table 34 similarly shows that seasonal maximum temperatures for both the dry and rainy seasons recorded equal temperatures of 22.0°C and 17.2°C in all stations of the North-West Region (figure 68 below).

Table 37: Characteristics of seasonal maximum temperatures in the highland zone.

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
West Region						
BAFANG	22.4	23.9	1.9	17.7	19.3	2.5
BAFOUSSAM	21.8	22.0	0.0	16.3	17.2	0.4
BANGANGTE	21.8	22.0	0.0	16.3	17.2	0.4
DSCHANG	22.4	23.9	1.9	17.7	19.3	2.5
FOUMBAN	21.8	22.0	0.0	16.3	17.2	0.4
FOUMBOT	21.8	22.0	0.0	16.3	17.2	0.4
MBOUDA	21.8	22.0	0.0	16.3	17.2	0.4
TONGA	21.8	22.0	0.0	16.3	17.2	0.4
BAZOU	22.4	23.9	1.9	17.7	19.3	2.5
Seasonal average temperatures	**22.0**	**22.6**	**0.6**	**16.8**	**17.9**	**1.1**
North-West Region						
BALI	21.8	22.0	0.2	16.3	17.2	0.8
BAMENDA	21.8	22.0	0.2	16.3	17.2	0.8
FUNDONG	21.8	22.0	0.2	16.3	17.2	0.8
KUMBO	21.8	22.0	0.2	16.3	17.2	0.8
Seasonal average temperatures	**21.8**	**22**	**0.2**	**16.3**	**17.2**	**0.8**

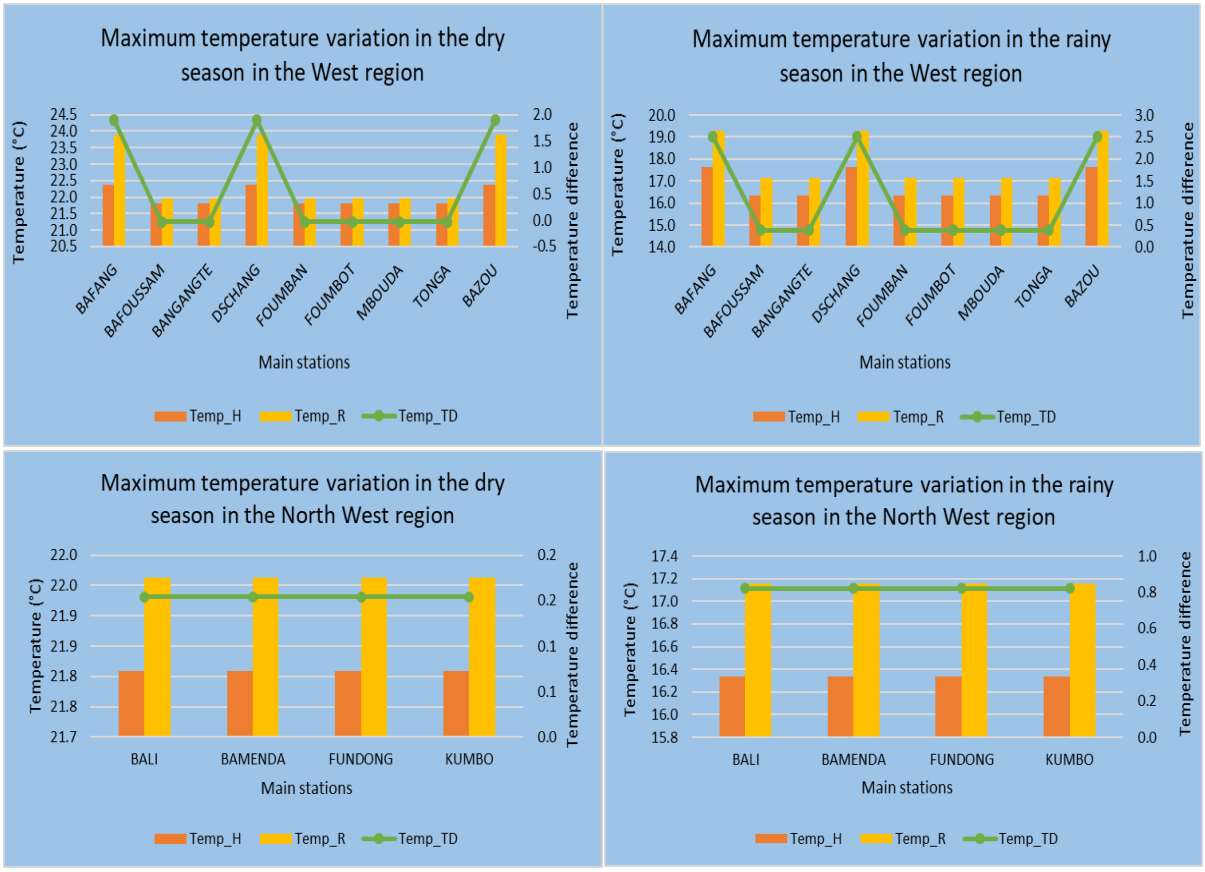


Figure 68: Characteristics of seasonal maximum temperatures relative to historical values in the highland zone

b- Evolution of minimum temperatures

Table 38 below indicates that in the West region, the mean seasonal minimum temperatures were 15.7°C and 17.9°C for the dry and rainy seasons respectively. For this same period in the North-West region, 14.4°C and 17.2°C were recorded for the dry and rainy seasons respectively.

By comparing the seasonal average minimum temperatures recorded for this agro-ecological zone over the period from 1979 to 2018; the year 2020 observed seasonal minimum temperatures to be below the historic average temperature during the dry season in both regions. Whereas, the seasonal minimum temperatures were above the historic average temperature during the rainy season in both regions. The southern part of this agro-ecological zone represented by the West region registered average deviations of -0.6°C and 1.1°C for the dry and rainy seasons respectively. At the same time, the northern part of the highland zone, represented by the North-West Region observed average deviations of -1°C and 0.8°C for the dry and rainy seasons respectively.

Table 38: Characteristics of seasonal minimum temperatures in the highland zone.

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
West Region						
BAFANG	18.0	18.2	1.9	17.7	19.3	2.5
BAFOUSSAM	15.4	14.4	-1.9	16.3	17.2	0.4
BANGANGTE	15.4	14.4	-1.9	16.3	17.2	0.4
DSCHANG	18.0	18.2	1.9	17.7	19.3	2.5
FOUMBAN	15.4	14.4	-1.9	16.3	17.2	0.4
FOUMBOT	15.4	14.4	-1.9	16.3	17.2	0.4
MBOUDA	15.4	14.4	-1.9	16.3	17.2	0.4
TONGA	15.4	14.4	-1.9	16.3	17.2	0.4
BAZOU	18.0	18.2	1.9	17.7	19.3	2.5
Seasonal average temperatures	**16.3**	**15.7**	**-0.6**	**16.8**	**17.9**	**1.1**
North-West Region						
BALI	15.4	14.4	-1.0	16.3	17.2	0.8
BAMENDA	15.4	14.4	-1.0	16.3	17.2	0.8
FUNDONG	15.4	14.4	-1.0	16.3	17.2	0.8
KUMBO	15.4	14.4	-1.0	16.3	17.2	0.8
Seasonal average temperatures	**15.4**	**14.4**	**-1**	**16.3**	**17.2**	**0.8**

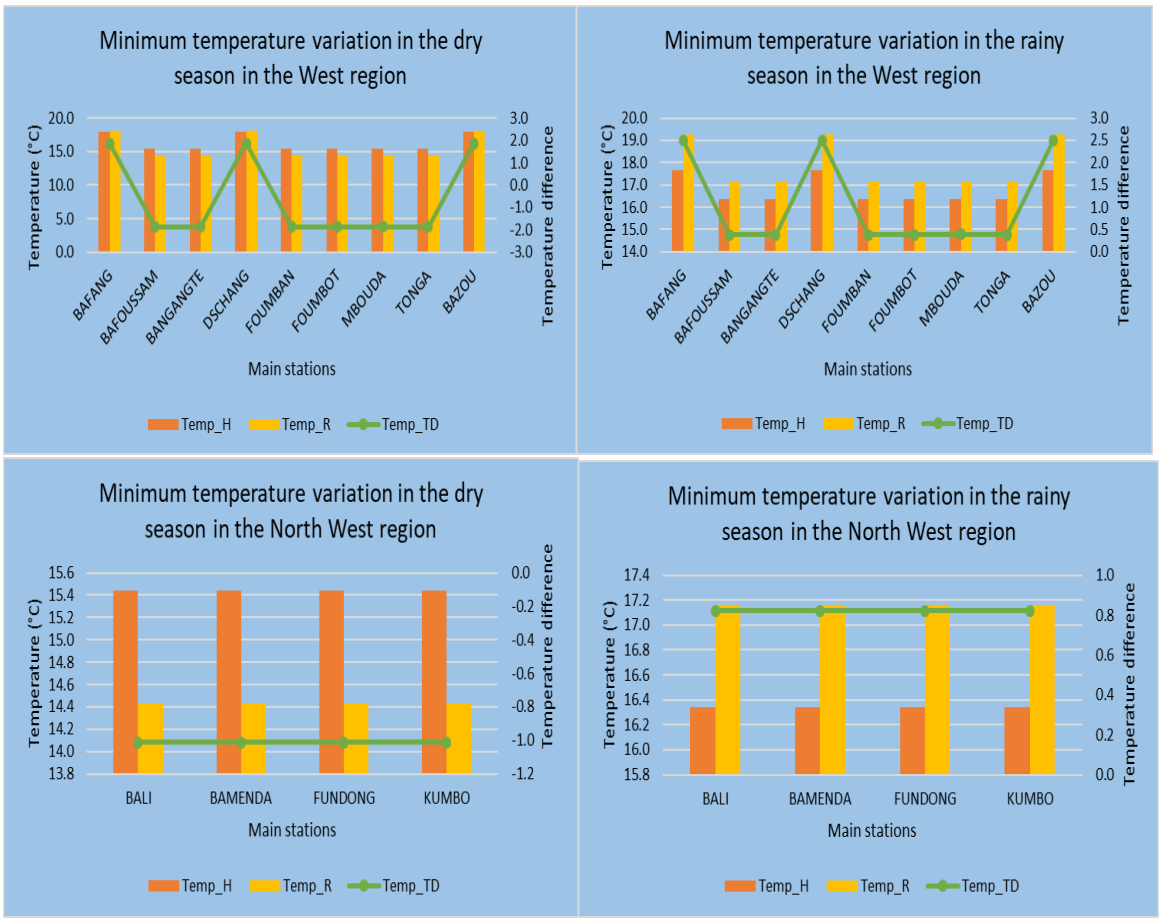


Figure 69: Characteristics of seasonal minimum temperatures relative to historical values in the highland zone

c- Evolution of average temperatures

The West region observed seasonal average temperatures of 23.8°C and 22.8°C for the dry and rainy season respectively. 23.2°C and 22.4°C were the seasonal average temperatures recorded in the North-West region during the dry and rainy seasons respectively as shown in table 39 below.

By comparing these seasonal average temperatures to the seasonal average temperatures recorded for this agro-ecological zone over the period from 1979 to 2018, it was observed that the year 2020 experienced average temperatures above the historic average. Average deviations of 1.5°C and 1.1°C were observed in the West and North-West regions during the dry season respectively, while the average deviations registered during the rainy season were 1.6°C and 1.2°C in the West and North-West regions respectively (figure 70 below).

Table 39: Characteristics of seasonal average temperatures in the highland zone.

	Dry Season			*Rainy Season*		
Localities	*Max_His_T (DS)*	*Max_Real_T (DS)*	*TD_ (DS)*	*Max_His_T (RS)*	*Max_Real_T (RS)*	*TD_ (RS)*
West Region						
BAFANG	22.6	24.9	2.6	21.3	23.6	2.4
BAFOUSSAM	22.1	23.2	0.9	21.2	22.4	1.2
BANGANGTE	22.1	23.2	0.9	21.2	22.4	1.2
DSCHANG	22.6	24.8	2.5	21.3	23.6	2.4
FOUMBAN	22.1	23.2	0.9	21.2	22.4	1.2
FOUMBOT	22.1	23.2	0.9	21.2	22.4	1.2
MBOUDA	22.1	23.2	0.9	21.2	22.4	1.2
TONGA	22.1	23.2	0.9	21.2	22.4	1.2
BAZOU	22.6	24.9	2.6	21.3	23.6	2.4
Seasonal average temperatures	**22.3**	**23.8**	**1.5**	**21.2**	**22.8**	**1.6**
North-West Region						
BALI	22.1	23.2	1.1	21.2	22.4	1.2
BAMENDA	22.1	23.2	1.1	21.2	22.4	1.2
FUNDONG	22.1	23.2	1.1	21.2	22.4	1.2
KUMBO	22.1	23.2	1.1	21.2	22.4	1.2
Seasonal average temperatures	**22.1**	**23.2**	**1.1**	**21.2**	**22.4**	**1.2**

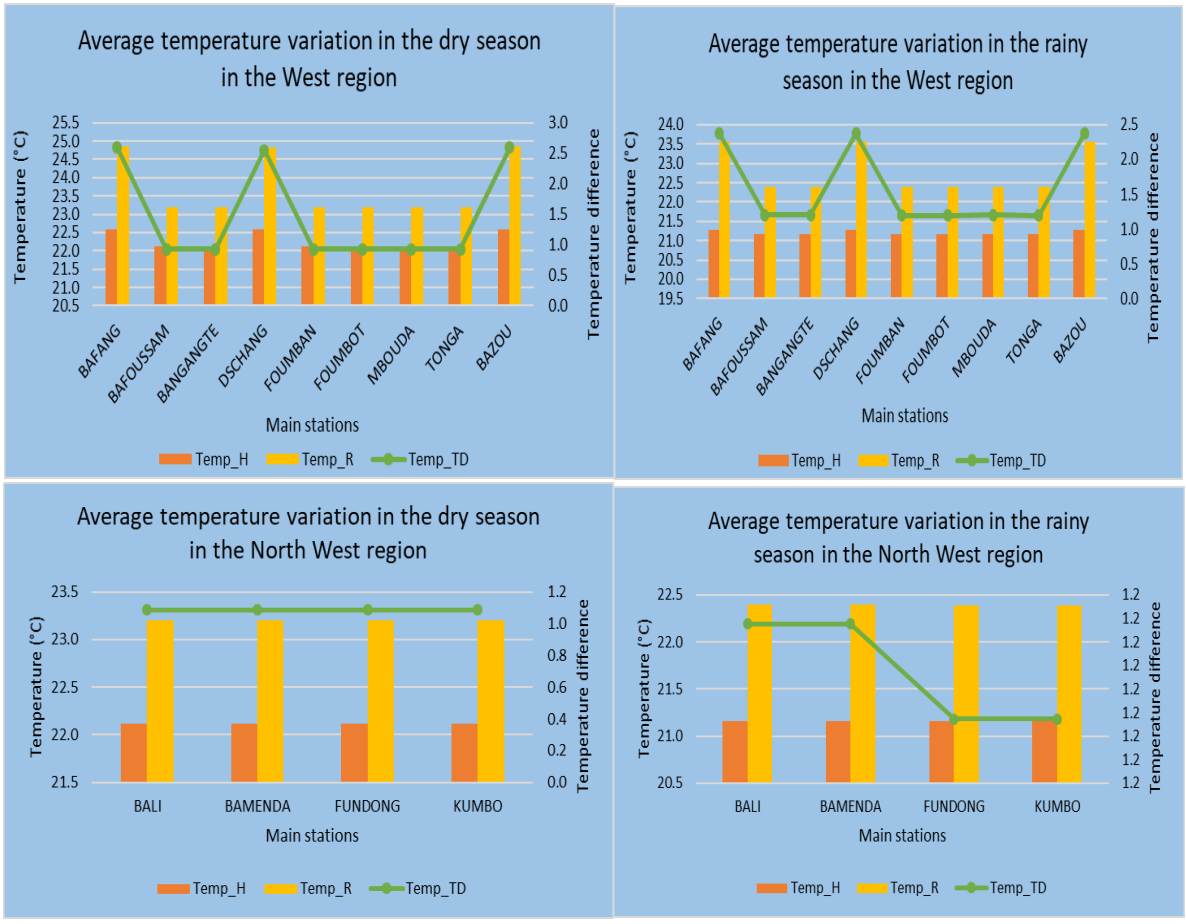


Figure 70: Characteristics of seasonal average temperatures relative to historical values in the highland zone in 2020

3.5.2 Monthly evolution of maximum, minimum and average temperatures in the highland zone

a- Maximum temperature

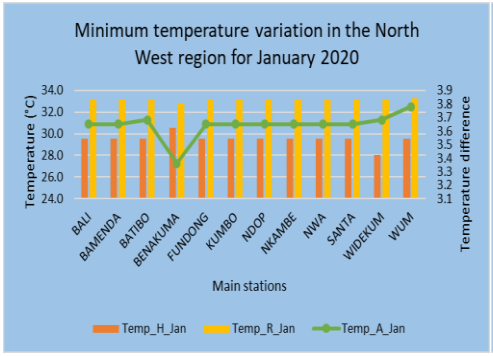
Table 40 below shows that monthly average maximum temperatures in the highland zone ranged from 25.5°C (July) to 34.2°C (February) in the West Region, while in the Northwest region, average maximum temperatures ranged from 25.6°C (August) to 34.3°C (February).

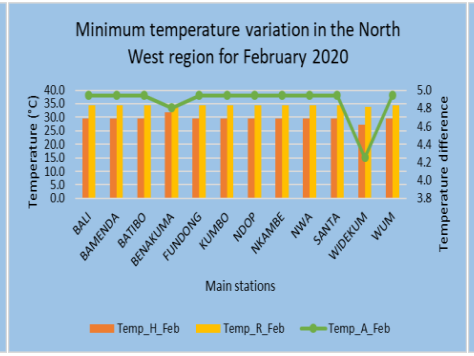
By comparing these temperatures to the monthly average maximum temperatures recorded over the period from 1979 to 2018, the year 2020 was generally observed to be warmer than the historic maximum temperatures in the two regions of this agro-ecological zone. However, it should be noted that January, May, September and October registered similar real average maximum temperature values of 33.1°C, 28.1°C, 26.3°C and 27.4°C respectively, in both the West and North-West regions. None of the months registered maximum temperatures lower than the normal historical values. Thus, the maximum and minimum temperature differences were respectively 5.4°C (February) and 1.0°C (July) in the West region, whereas, in the Northwest region, these deviations were respectively 4.8°C (February) and 0.5°C (August) figure 71.

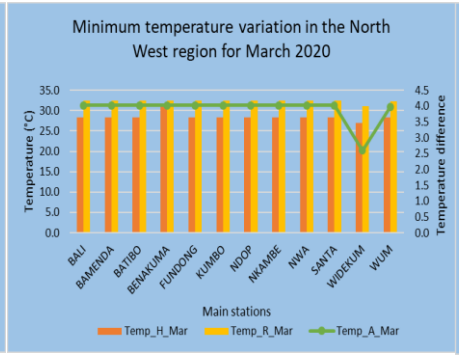
Table 40: Characteristics of monthly maximum temperature in the highland zone of Cameroon in 2020

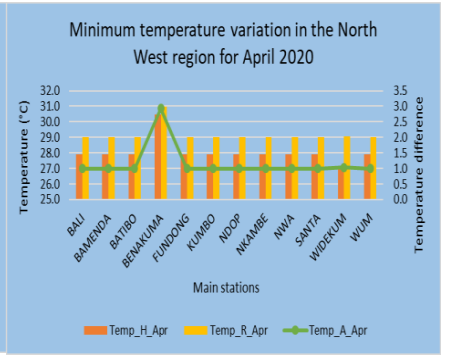
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
West region	BAFANG	28.0	33.2	4.1	27.3	33.7	4.9	27.0	31.0	3.2	27.0	29.1	1.4	25.9	28.7	2.3	24.4	27.4	2.5
	BAFOUSSAM	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
	BANGANGTE	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
	BATCHAM	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
	BAZOU	28.0	33.2	4.1	27.3	33.7	4.9	27.0	31.0	3.2	27.0	29.1	1.4	25.9	28.7	2.3	24.4	27.4	2.5
	DSCHANG	28.0	33.2	4.1	27.3	33.4	4.6	27.0	31.0	3.2	27.0	29.1	1.4	25.9	28.7	2.3	24.4	27.4	2.5
	FOUMBAN	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
	FOUMBOT	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
	MBOUDA	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
	TONGA	29.5	33.1	4.1	29.4	34.4	5.6	28.3	32.4	4.5	27.9	29.0	1.4	26.5	27.8	1.4	25.1	26.5	1.6
Monthly regional average		**29.1**	**33.1**	**4.1**	**28.8**	**34.2**	**5.4**	**27.9**	**32.0**	**4.1**	**27.6**	**29.0**	**1.4**	**26.3**	**28.1**	**1.7**	**24.9**	**26.8**	**1.9**
North-West region	BALI	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	BAMENDA	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	BATIBO	29.5	33.2	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	BENAKUMA	30.6	32.8	3.4	31.9	34.3	4.8	31.2	32.4	4.0	30.5	31.0	2.9	29.5	30.1	3.4	28.1	28.3	3.0
	FUNDONG	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	KUMBO	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	NDOP	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	NKAMBE	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	NWA	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	SANTA	29.5	33.1	3.7	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
	WIDIKUM	28.0	33.2	3.7	27.3	33.7	4.3	27.0	31.0	2.6	27.0	29.1	1.0	25.9	28.7	1.9	24.4	27.4	2.1
	WUM	29.5	33.3	3.8	29.4	34.4	4.9	28.3	32.4	4.0	27.9	29.0	1.0	26.5	27.8	1.0	25.1	26.5	1.2
Monthly regional average		**29.5**	**33.1**	**3.7**	**29.4**	**34.3**	**4.8**	**28.4**	**32.3**	**3.9**	**28.0**	**29.2**	**1.2**	**26.7**	**28.1**	**1.3**	**25.3**	**26.7**	**1.4**

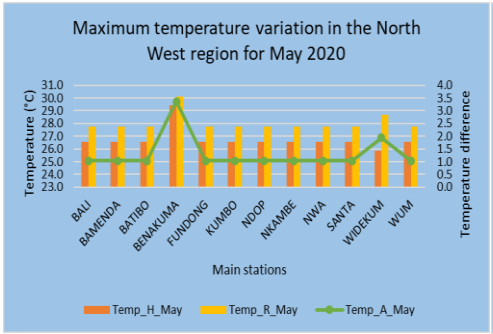
	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
West region	BAFANG	23.3	25.6	1.1	23.4	26.5	2.5	24.0	26.7	2.0	24.1	27.9	2.7	25.7	28.7	1.8	27.7	30.5	2.0
	BAFOUSSAM	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.2	2.0	27.4	29.3	2.5	28.8	31.9	3.4
	BANGANGTE	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.2	2.0	27.4	29.3	2.5	28.8	31.9	3.4
	BATCHAM	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.2	2.0	27.4	29.3	2.5	28.8	31.9	3.4
	BAZOU	23.3	25.6	1.1	23.4	26.5	2.5	24.0	26.7	2.0	24.1	27.9	2.7	25.7	28.7	1.8	27.7	30.5	2.0
	DSCHANG	23.3	25.6	1.1	23.4	26.5	2.5	24.0	26.7	2.0	24.1	27.9	2.7	25.7	28.7	1.8	27.7	30.5	2.0
	FOUMBAN	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.1	1.9	27.4	29.3	2.5	28.8	31.9	3.4
	FOUMBOT	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.1	1.9	27.4	29.3	2.5	28.8	31.9	3.4
	MBOUDA	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.1	1.9	27.4	29.3	2.5	28.8	31.9	3.4
	TONGA	25.0	25.5	1.0	24.4	26.5	2.5	25.0	26.1	1.4	25.6	27.1	1.9	27.4	29.3	2.5	28.8	31.9	3.4
Monthly regional average		**24.5**	**25.5**	**1.0**	**24.1**	**26.5**	**2.5**	**24.7**	**26.3**	**1.6**	**25.2**	**27.4**	**2.2**	**26.9**	**29.1**	**2.3**	**28.5**	**31.5**	**3.0**
North-West region	BALI	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.2	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	BAMENDA	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.2	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	BATIBO	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.2	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	BENAKUMA	28.1	28.3	3.0	28.0	26.2	1.1	27.9	28.1	3.0	28.5	29.8	4.0	29.9	31.1	3.5	30.6	31.4	2.5
	FUNDONG	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	KUMBO	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	NDOP	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	NKAMBE	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	NWA	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	SANTA	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
	WIDIKUM	24.4	27.4	2.1	23.3	25.6	0.5	24.0	26.7	1.5	24.1	27.9	2.1	27.4	28.7	1.1	27.7	30.5	1.6
	WUM	25.1	26.5	1.2	25.0	25.5	0.4	25.0	26.1	1.0	25.6	27.1	1.4	27.4	29.3	1.8	28.8	31.9	3.0
Monthly regional average		**25.3**	**26.7**	**1.4**	**25.1**	**25.6**	**0.5**	**25.2**	**26.3**	**1.2**	**25.7**	**27.4**	**1.7**	**27.6**	**29.4**	**1.9**	**28.9**	**31.7**	**2.8**

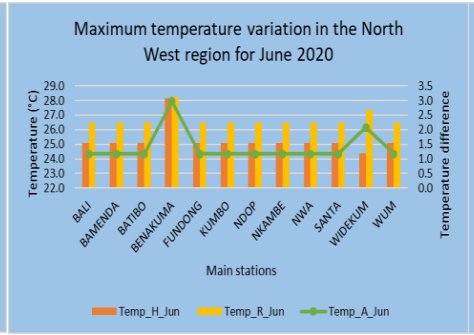

Minimum temperature variation in the North West region for January 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

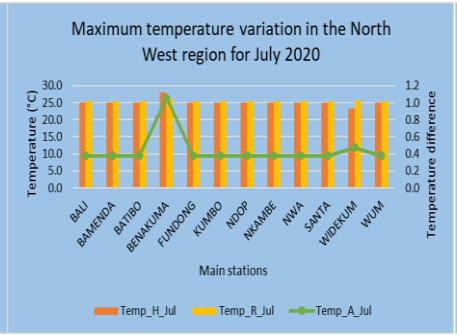

Minimum temperature variation in the North West region for February 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

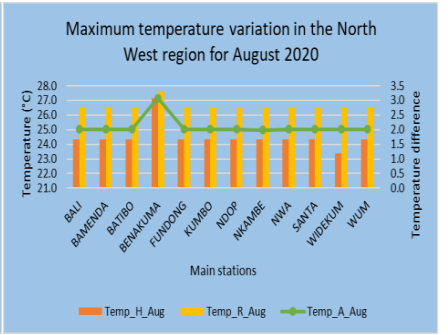

Minimum temperature variation in the North West region for March 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

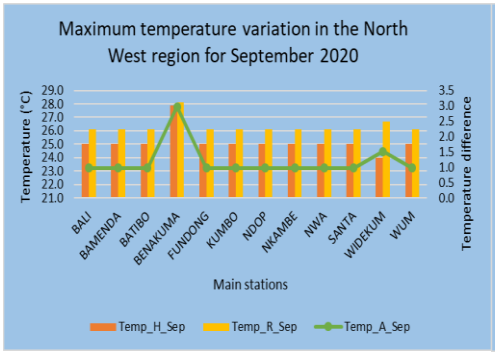

Minimum temperature variation in the North West region for April 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

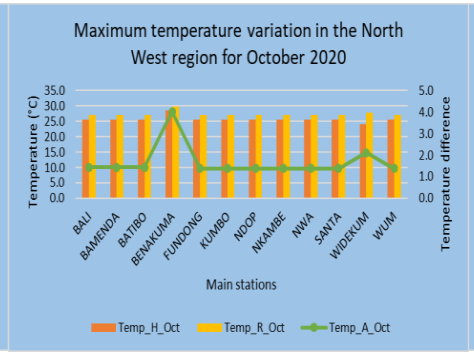

Maximum temperature variation in the North West region for May 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

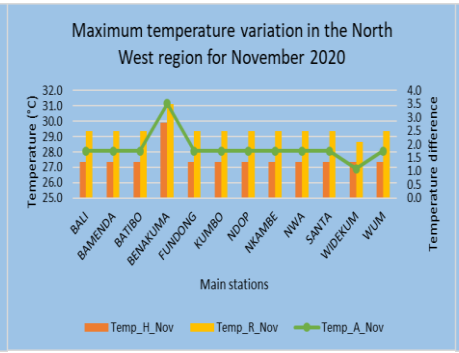

Maximum temperature variation in the North West region for June 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun

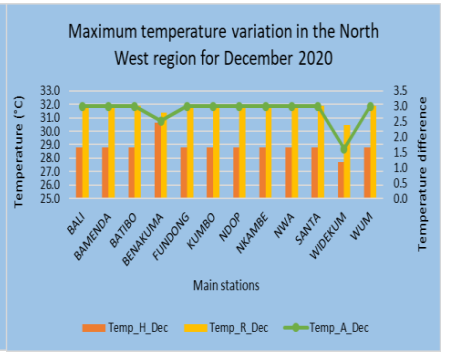

Maximum temperature variation in the North West region for July 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul


Maximum temperature variation in the North West region for August 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Maximum temperature variation in the North West region for September 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Maximum temperature variation in the North West region for October 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Maximum temperature variation in the North West region for November 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov


Maximum temperature variation in the North West region for December 2020
Temperature (°C)
Temperature difference
BALI BAMENDA BATIBO BENAKUMA FUNDONG KUMBO NDOP NKAMBE NWA SANTA WIDEKUM WUM
Main stations
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

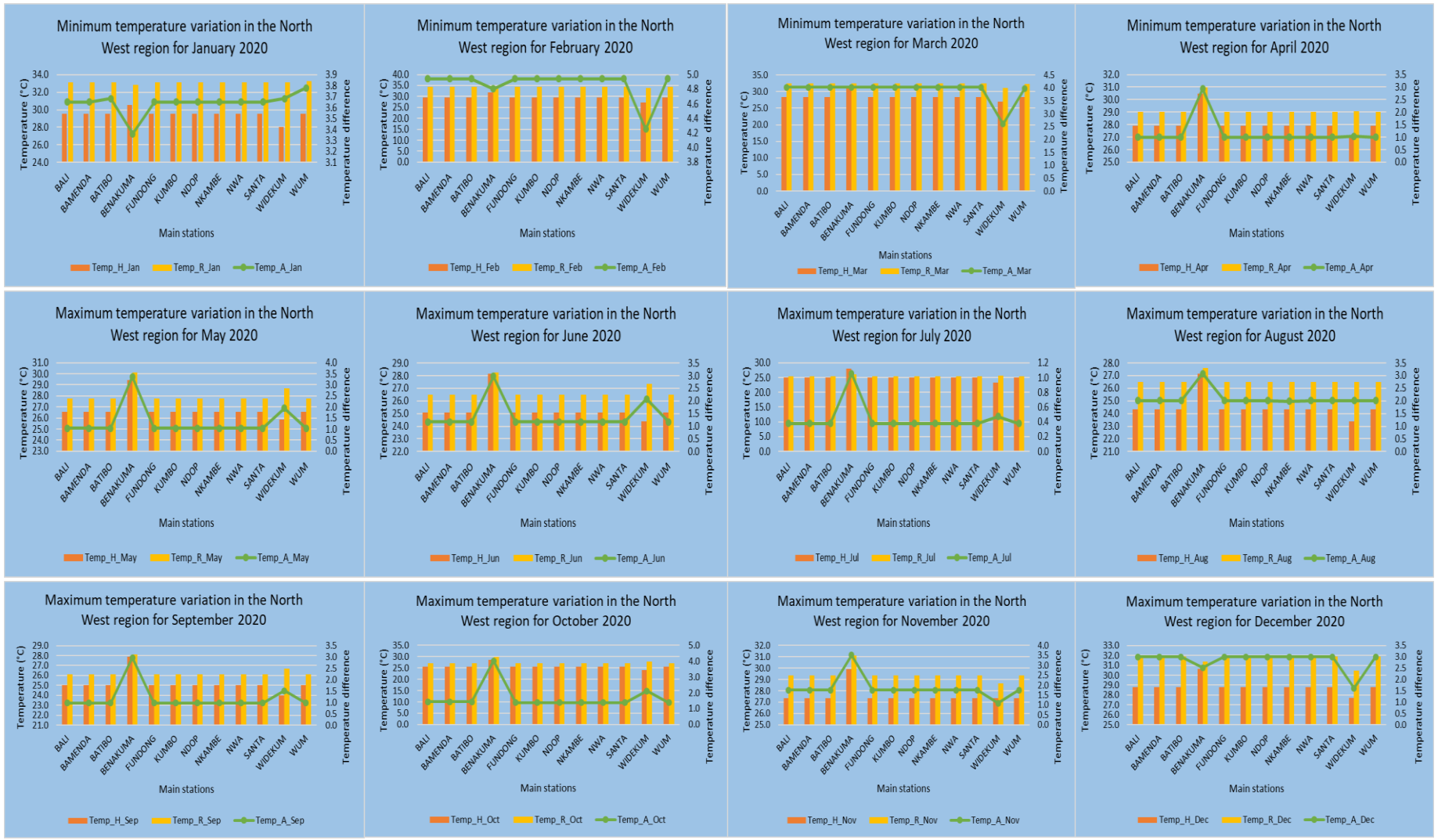


Figure 71: Characteristics of 2020 monthly maximum temperatures relative to historical values in the highland zone.

b- Minimum temperature

Monthly average minimum temperatures in both the West and North-West regions of the highland zone ranged from 21.5°C (July) to 25.0°C (February and March). By comparing these temperatures to the monthly average minimum temperatures recorded over the period from 1979 to 2018, the year 2020 was observed to be generally warmer than the historic maximum temperatures in the two regions making up this agro-ecological zone, table 38.

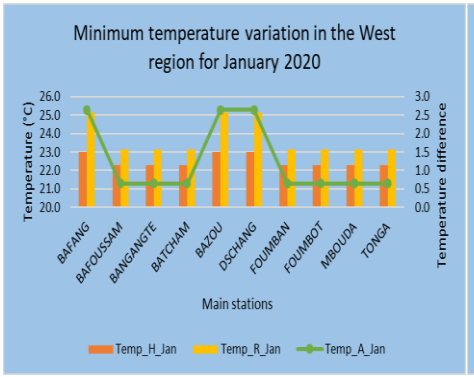
It should be however noted that no month experienced real minimum temperatures below the historical normal in both the West and North-West Regions; hence, no month was colder than the period from 1979 to 2018. As a result, the maximum and minimum temperature differences were registered at 2.4°C (March) and 1.1°C (July) in the West region whereas in the Northwest region, these temperature differences were respectively 2.1°C in March and 1.0°C (January) and (November) as seen in Figure 72 below.

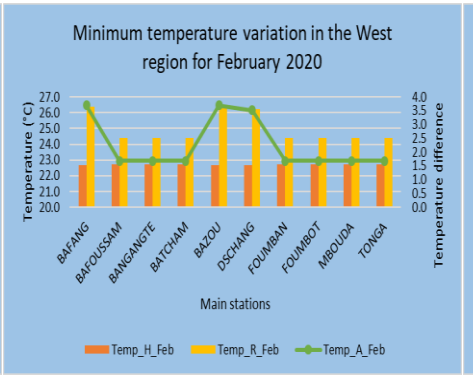
Table 41: Characteristics of monthly minimum temperature in the highland zone of Cameroon in 2020

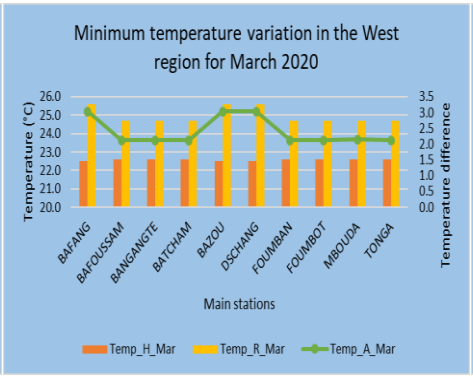
	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
West region	BAFANG	23.0	25.1	2.6	22.7	26.4	3.7	22.5	25.6	3.0	22.5	24.4	2.0	21.9	24.2	2.5	21.2	23.3	2.6
	BAFOUSSAM	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	BANGANGTE	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	BATCHAM	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	BAZOU	23.0	25.1	2.6	22.7	26.4	3.7	22.5	25.6	3.0	22.5	24.4	2.0	21.9	24.2	2.5	21.2	23.3	2.6
	DSCHANG	23.0	25.1	2.6	22.7	26.2	3.5	22.5	25.6	3.0	22.5	24.4	2.0	21.9	24.2	2.5	21.2	23.3	2.6
	FOUMBAN	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	FOUMBOT	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	MBOUDA	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	TONGA	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
Monthly regional average		**22.5**	**23.7**	**1.2**	**22.7**	**25.0**	**2.3**	**22.6**	**25.0**	**2.4**	**22.5**	**23.8**	**1.3**	**21.8**	**23.2**	**1.5**	**20.8**	**22.2**	**1.5**
North-West region	BALI	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	BAMENDA	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	BATIBO	22.3	23.2	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	BENAKUMA	25.0	25.9	3.3	26.2	27.2	4.2	26.1	27.3	4.4	25.5	26.6	3.9	24.9	26.2	4.2	24.1	25.0	4.1
	FUNDONG	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	KUMBO	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	NDOP	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	NKAMBE	22.3	23.1	0.6	22.7	26.5	3.5	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	NWA	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	SANTA	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	WIDIKUM	23.0	25.1	2.6	22.7	26.4	3.4	22.5	25.6	2.7	22.5	24.4	1.7	21.9	24.2	2.2	21.2	23.3	2.4
	WUM	22.3	23.2	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
Monthly regional average		**22.6**	**23.5**	**1.0**	**23.0**	**25.0**	**2.0**	**22.9**	**25.0**	**2.1**	**22.8**	**23.8**	**1.1**	**22.0**	**23.1**	**1.2**	**20.9**	**22.1**	**1.2**

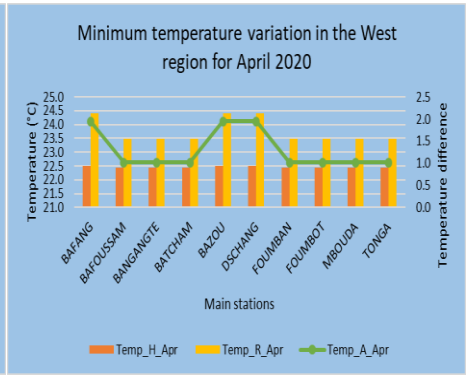
We	LOCALITIES	JUL	AUG	SEPT	OCT	NOV	DEC

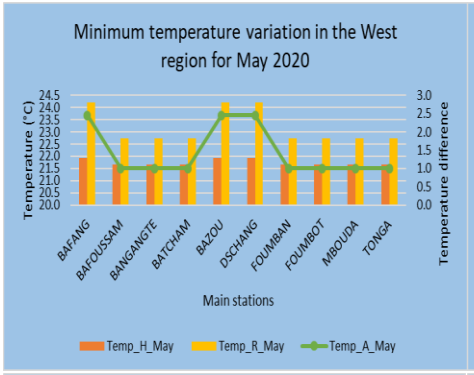
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
	BAFANG	20.1	22.1	1.8	20.3	22.7	2.4	21.0	22.7	2.1	20.5	23.5	2.7	21.9	23.7	2.0	22.9	23.3	1.1
	BAFOUSSAM	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	BANGANGTE	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	BATCHAM	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	BAZOU	20.1	22.1	1.8	20.3	22.7	2.4	21.0	22.7	2.1	20.5	23.5	2.7	21.9	23.7	2.0	22.9	23.3	1.1
	DSCHANG	20.1	22.1	1.8	20.3	22.7	2.4	21.0	22.7	2.1	20.5	23.5	2.7	21.9	23.7	2.0	22.9	23.3	1.1
	FOUMBAN	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	FOUMBOT	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	MBOUDA	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	TONGA	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
Monthly regional average		**20.4**	**21.5**	**1.1**	**20.2**	**22.0**	**1.8**	**20.7**	**21.9**	**1.3**	**20.7**	**22.5**	**1.7**	**21.6**	**22.9**	**1.2**	**22.2**	**23.5**	**1.3**
North-West region	BALI	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	1.0	21.5	22.5	0.6	21.9	23.6	1.4
	BAMENDA	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	1.0	21.5	22.5	0.6	21.9	23.6	1.4
	BATIBO	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	1.0	21.5	22.5	0.6	21.9	23.6	1.4
	BENAKUMA	24.0	23.5	2.7	23.6	24.3	3.8	24.0	24.6	3.7	24.2	25.6	4.5	25.0	26.0	4.1	25.0	24.4	2.1
	FUNDONG	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	KUMBO	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	NDOP	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	NKAMBE	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	NWA	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	SANTA	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	WIDIKUM	20.1	22.1	1.4	20.3	22.7	2.2	21.0	22.7	1.9	20.5	23.5	2.4	22.7	23.7	1.8	22.9	23.3	1.0
	WUM	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
Monthly regional average		**20.8**	**21.5**	**0.8**	**20.5**	**22.0**	**1.5**	**20.8**	**21.9**	**1.1**	**21.1**	**22.4**	**1.4**	**21.9**	**22.9**	**1.0**	**22.2**	**23.6**	**1.4**

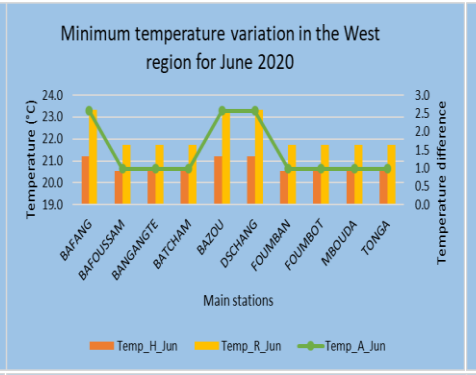

Minimum temperature variation in the West region for January 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Jan
Temp_R_Jan
Temp_A_Jan

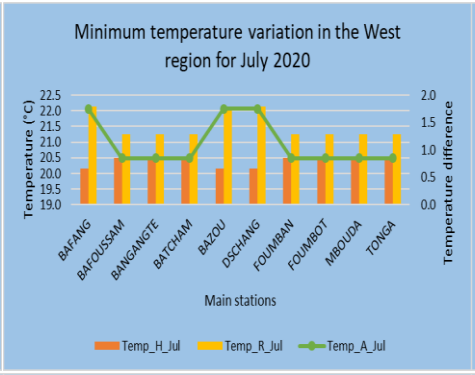

Minimum temperature variation in the West region for February 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Feb
Temp_R_Feb
Temp_A_Feb

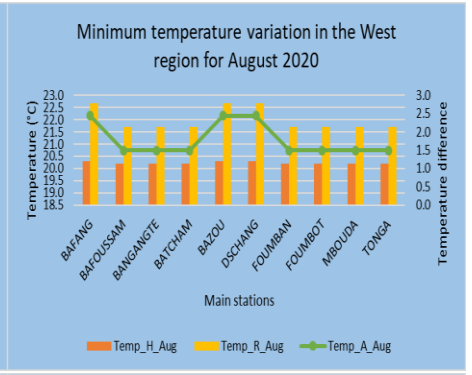

Minimum temperature variation in the West region for March 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Mar
Temp_R_Mar
Temp_A_Mar

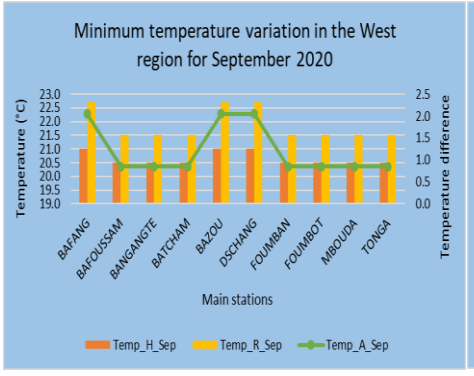

Minimum temperature variation in the West region for April 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Apr
Temp_R_Apr
Temp_A_Apr

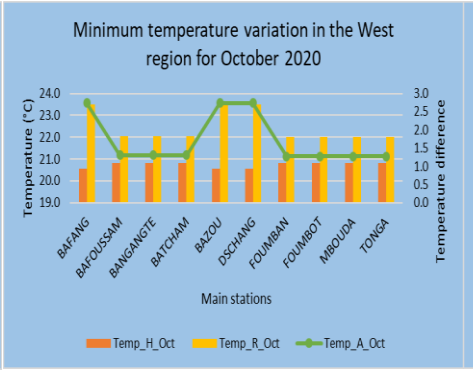

Minimum temperature variation in the West region for May 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_May
Temp_R_May
Temp_A_May

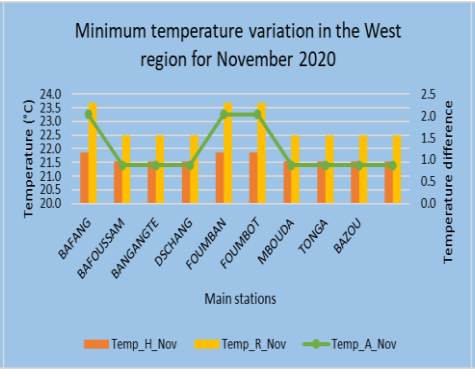

Minimum temperature variation in the West region for June 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Jun
Temp_R_Jun
Temp_A_Jun


Minimum temperature variation in the West region for July 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Jul
Temp_R_Jul
Temp_A_Jul


Minimum temperature variation in the West region for August 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Aug
Temp_R_Aug
Temp_A_Aug


Minimum temperature variation in the West region for September 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Sep
Temp_R_Sep
Temp_A_Sep


Minimum temperature variation in the West region for October 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Oct
Temp_R_Oct
Temp_A_Oct


Minimum temperature variation in the West region for November 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
BAZOU
Main stations
Temp_H_Nov
Temp_R_Nov
Temp_A_Nov

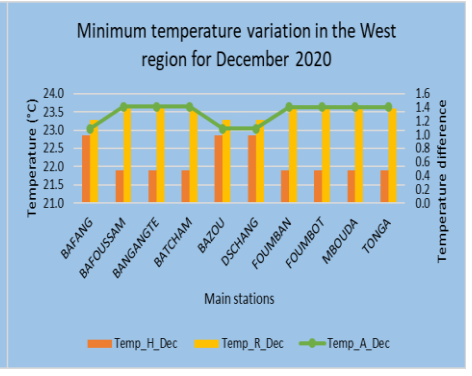

Minimum temperature variation in the West region for December 2020
Temperature (°C)
Temperature difference
BAFANG
BAFOUSSAM
BANGANGTE
BATCHAM
BAZOU
DSCHANG
FOUMBAN
FOUMBOT
MBOUDA
TONGA
Main stations
Temp_H_Dec
Temp_R_Dec
Temp_A_Dec

Figure 72: Characteristics of 2020 monthly minimum temperatures relative to historical values in the highland zone.

c- Average temperature

Monthly average temperatures in the highland area ranged from 21.5°C (July) to 25.0°C (February and March) in the West region while in the North-West region average temperatures ranged from 21.5°C (July) to 25.0°C (February and March) table 42, figure 73**.**

By comparing these temperatures to the monthly average temperatures recorded over the period from 1979 to 2018, the year 2020 was generally warmer than the historic average temperatures in both the West and North-West regions. It should however be noted that in both the Northwest and West Regions, no month experienced real average temperatures below the historical average, hence no month was colder than the period from 1979 to 2018. As a result, the maximum and minimum temperature deviations were 2.4°C (March) and 1.1°C (July) respectively in the West Region while in the North-West Region, the maximum and minimum temperature deviations were 2.1°C (March) and 0.8°C in July respectively.

Table 42: Characteristics of monthly average temperature in the highland zone of Cameroon in 2020

	LOCALITIES	JAN			FEB			MAR			APR			MAY			JUN		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
West region	BAFANG	23.0	25.1	2.6	22.7	26.4	3.7	22.5	25.6	3.0	22.5	24.4	2.0	21.9	24.2	2.5	21.2	23.3	2.6
	BAFOUSSAM	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	BANGANGTE	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	BATCHAM	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	BAZOU	23.0	25.1	2.6	22.7	26.4	3.7	22.5	25.6	3.0	22.5	24.4	2.0	21.9	24.2	2.5	21.2	23.3	2.6
	DSCHANG	23.0	25.1	2.6	22.7	26.2	3.5	22.5	25.6	3.0	22.5	24.4	2.0	21.9	24.2	2.5	21.2	23.3	2.6
	FOUMBAN	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	FOUMBOT	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	MBOUDA	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
	TONGA	22.3	23.1	0.6	22.7	24.4	1.7	22.6	24.7	2.1	22.5	23.5	1.0	21.7	22.7	1.0	20.6	21.7	1.0
Monthly regional average		**22.5**	**24.5**	**1.2**	**22.7**	**25.0**	**2.3**	**22.6**	**25.0**	**2.4**	**22.5**	**23.8**	**1.3**	**21.8**	**23.2**	**1.5**	**20.8**	**22.2**	**1.5**
North-West region	BALI	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	BAMENDA	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	BATIBO	22.3	23.2	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	BENAKUMA	25.0	25.9	3.3	26.2	27.2	4.2	26.1	27.3	4.4	25.5	26.6	3.9	24.9	26.2	4.2	24.1	25.0	4.1
	FUNDONG	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	KUMBO	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	NDOP	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	NKAMBE	22.3	23.1	0.6	22.7	26.5	3.5	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	NWA	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	SANTA	22.3	23.1	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
	WIDIKUM	23.0	25.1	2.6	22.7	26.4	3.4	22.5	25.6	2.7	22.5	24.4	1.7	21.9	24.2	2.2	21.2	23.3	2.4
	WUM	22.3	23.2	0.6	22.7	24.4	1.4	22.6	24.7	1.8	22.5	23.5	0.8	21.7	22.7	0.8	20.6	21.7	0.8
Monthly regional average		**22.6**	**23.5**	**1.0**	**23.0**	**25.0**	**2.0**	**22.9**	**25.0**	**2.1**	**22.8**	**23.8**	**1.1**	**22.0**	**23.1**	**1.2**	**20.9**	**22.1**	**1.2**

	LOCALITIES	JUL			AUG			SEPT			OCT			NOV			DEC		
		H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD	H_T	R_T	TD
West region	BAFANG	20.1	22.1	1.8	20.3	22.7	2.4	21.0	22.7	2.1	20.5	23.5	2.7	21.9	23.7	2.0	22.9	23.3	1.1
	BAFOUSSAM	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	BANGANGTE	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	BATCHAM	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	BAZOU	20.1	22.1	1.8	20.3	22.7	2.4	21.0	22.7	2.1	20.5	23.5	2.7	21.9	23.7	2.0	22.9	23.3	1.1
	DSCHANG	20.1	22.1	1.8	20.3	22.7	2.4	21.0	22.7	2.1	20.5	23.5	2.7	21.9	23.7	2.0	22.9	23.3	1.1
	FOUMBAN	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	FOUMBOT	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	MBOUDA	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
	TONGA	20.5	21.2	0.8	20.2	21.7	1.5	20.5	21.5	0.9	20.8	22.0	1.3	21.5	22.5	0.9	21.9	23.6	1.4
Monthly regional average		**20.4**	**21.5**	**1.1**	**20.2**	**22.0**	**1.8**	**20.7**	**21.9**	**1.3**	**20.7**	**22.5**	**1.7**	**21.6**	**22.9**	**1.2**	**22.2**	**23.5**	**1.3**
North-West region	BALI	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	1.0	21.5	22.5	0.6	21.9	23.6	1.4
	BAMENDA	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	1.0	21.5	22.5	0.6	21.9	23.6	1.4
	BATIBO	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	1.0	21.5	22.5	0.6	21.9	23.6	1.4
	BENAKUMA	24.0	23.5	2.7	23.6	24.3	3.8	24.0	24.6	3.7	24.2	25.6	4.5	25.0	26.0	4.1	25.0	24.4	2.1
	FUNDONG	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	KUMBO	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	NDOP	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	NKAMBE	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	NWA	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	SANTA	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
	WIDIKUM	20.1	22.1	1.4	20.3	22.7	2.2	21.0	22.7	1.9	20.5	23.5	2.4	22.7	23.7	1.8	22.9	23.3	1.0
	WUM	20.5	21.2	0.5	20.2	21.7	1.2	20.5	21.5	0.7	20.8	22.0	0.9	21.5	22.5	0.6	21.9	23.6	1.4
Monthly regional average		**20.8**	**21.5**	**0.8**	**20.5**	**22.0**	**1.5**	**20.8**	**21.9**	**1.1**	**21.1**	**22.4**	**1.4**	**21.9**	**22.9**	**1.0**	**22.2**	**23.6**	**1.4**


Average temperature variation in the West region for January 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Jan Temp_R_Jan Temp_A_Jan
Average temperature variation in the West region for February 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Feb Temp_R_Feb Temp_A_Feb
Average temperature variation in the West region for March 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Mar Temp_R_Mar Temp_A_Mar
Average temperature variation in the West region for April 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Apr Temp_R_Apr Temp_A_Apr
Average temperature variation in the West region for May 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_May Temp_R_May Temp_A_May
Average temperature variation in the West region for June 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Jun Temp_R_Jun Temp_A_Jun
Average temperature variation in the West region for July 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Jul Temp_R_Jul Temp_A_Jul
Average temperature variation in the West region for August 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Aug Temp_R_Aug Temp_A_Aug
Average temperature variation in the West region for September 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Sep Temp_R_Sep Temp_A_Sep
Average temperature variation in the West region for October 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Oct Temp_R_Oct Temp_A_Oct
Average temperature variation in the West region for November 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA BAZOU
Main stations
Temp_H_Nov Temp_R_Nov Temp_A_Nov
Average temperature variation in the West region for December 2020
Temperature (°C)
Temperature difference
BAFANG BAFOUSSAM BANGANGTE BATCHAM BAZOU DSCHANG FOUMBAN FOUMBOT MBOUDA TONGA
Main stations
Temp_H_Dec Temp_R_Dec Temp_A_Dec

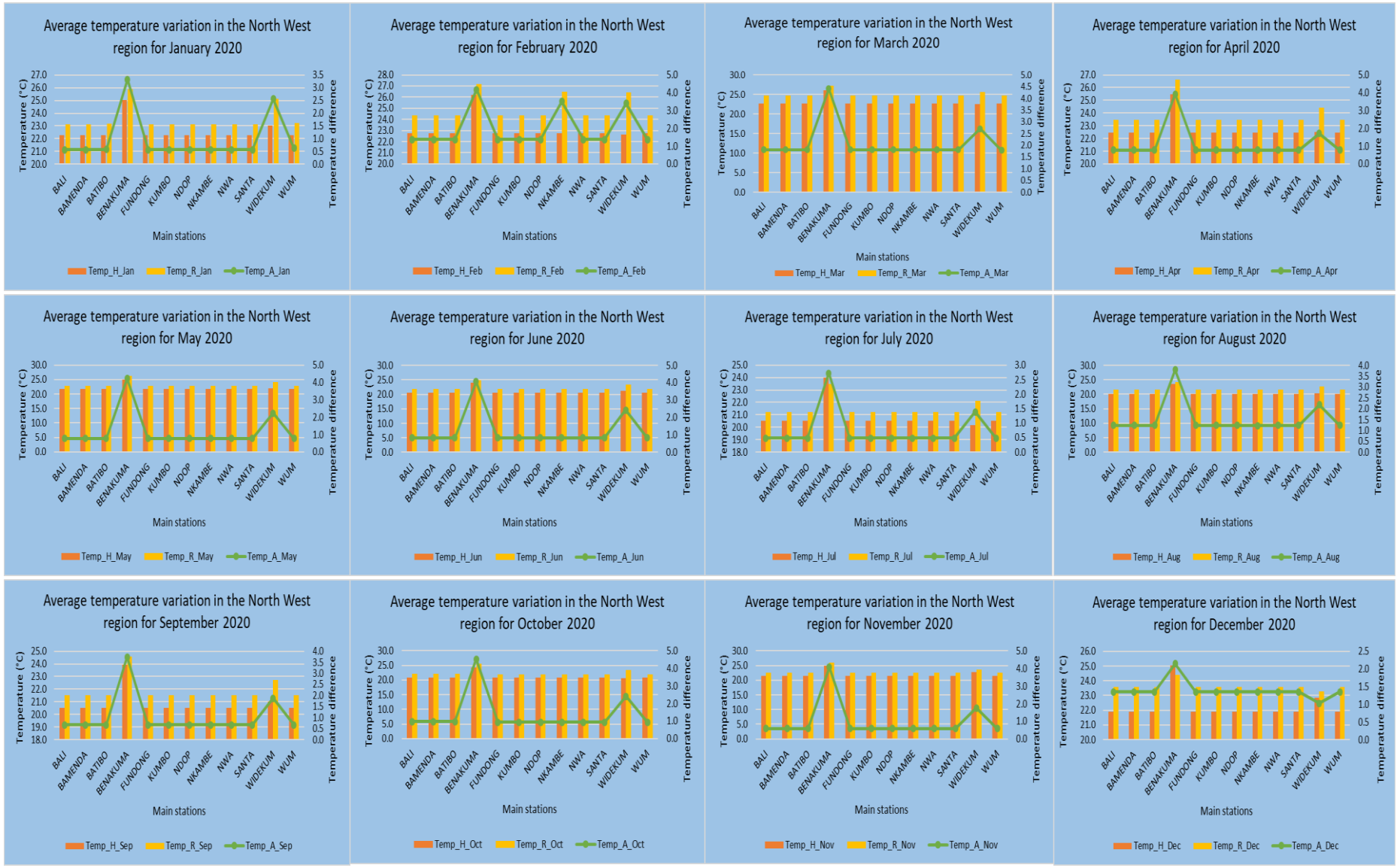


Figure 73: Characteristics of 2020 monthly average temperatures relative to historical values in the highland zone.

PART 4:

SPATIAL EVOLUTION OF TEMPERATURES IN CAMEROON IN 2020

4. COMPARATIVE ANALYSES OF THE SPATIAL EVOLUTION OF TEMPERATURES IN 2020 IN CAMEROON COMPARED TO THE HISTORICAL PERIOD 1979-2018

4.1 Minimum temperatures

4.1.1. Spatial variation of minimum temperatures in January

The spatial distribution of minimum temperatures in January 2020 presented in Figure 74 shows slight fluctuations in minimum temperatures during this month as compared to historical values in January 1979-2018.

Temperatures in the Sudano-Sahelian zone ranged from 15.6°C to 18.1°C in the Far-North region in January 2020, while remaining relatively stable in the localities of Kaele, Mindif, Dembo and the North region. In the Guinean High Savannah zone, minimum temperatures remained relatively stable around the historical values. The same trend was observed in the bimodal rainforest zone, except for the locality of Moloundou, which experienced a slight increase in temperatures between 18.2ºC and 20.5ºC as compared to historical values. The Monomodal Rain Forest Zone experienced temperature increase in localities such as Kumba, Buea, Tiko and Campo, where temperatures varied between 20.6ºC and 22.9ºC, although the temperatures are relatively stable in the other localities. This stability extended to the Highland zones throughout January 2020 as compared to historical data.

With regards to the anomalies, the greatest thermal fluctuation was recorded in the Littoral and South regions, where the locality of Campo experienced a peak increase of 2ºC. On the other hand, a decrease of about 1.2ºC was recorded from the southern margin of the Far-North region, especially in the localities of Mindif and Kaele, to the marginal savanna-forest transition zone in the southern part of the Adamawa region. This low-temperature variation was also constant in the northern part of the Centre, West and the North West regions.

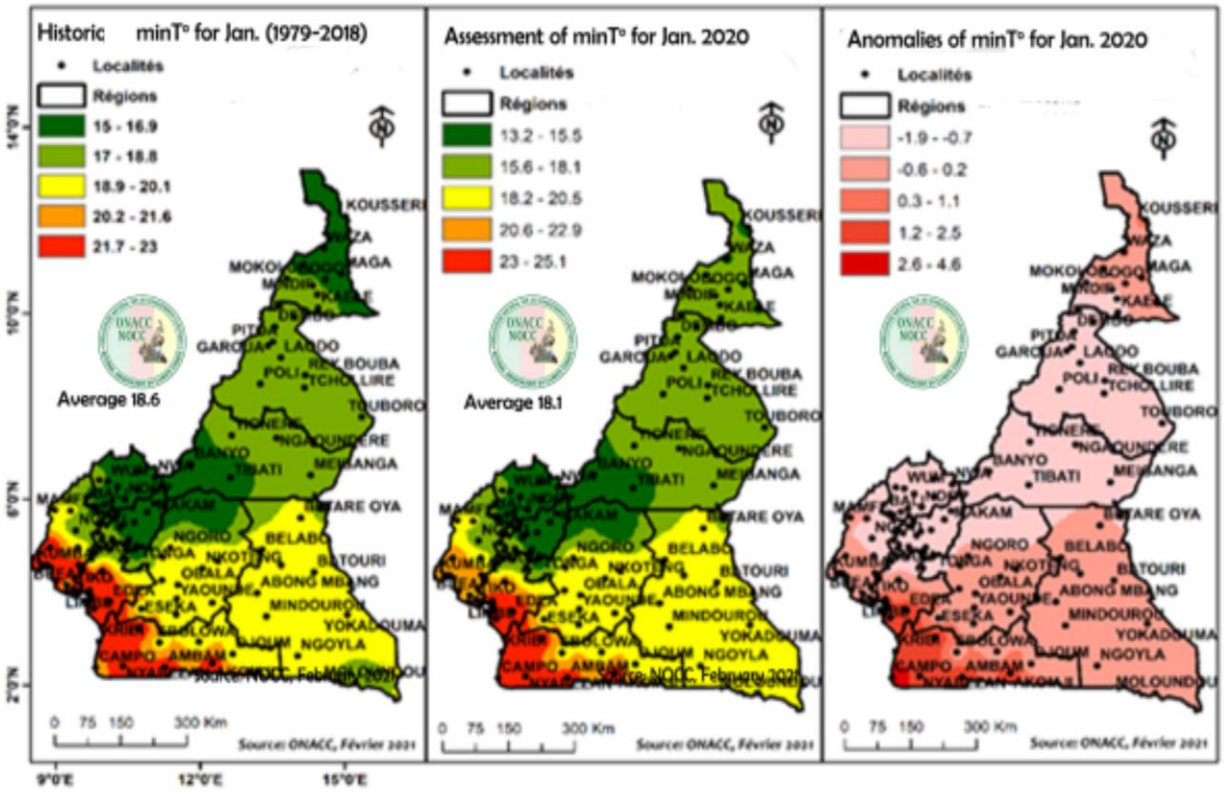


Figure 74: Spatial variation of temperatures in January 2020 compared to historical data

4.1.2 Spatial variation of minimum temperature in February

Figures 75 below show the spatial distribution of minimum temperatures for February 2020. Here, a strong variation in minimum temperatures for this month is observed as compared to historical values (1979 - 2018).

According to this figure, the Sudano-Sahelian zone recorded temperatures between 22.7ºC and 25.7ºC. These are above the historical values in Maga, where temperatures range from 18.9ºC to 20.4ºC. Temperatures below historical values were observed from Kaele to the north-north-eastern part of the Adamawa region, especially in the localities of Tignere, Ngaoundere and Meiganga (Guinean High Savannah Zone). From the central plateau towards the massifs of the Cameroonian ridge in the west-south-west, there is a relatively stable temperatures as compared to the historical data. For the Bimodal Rainforest Zone, temperatures show a slight increase in minimum temperatures. They range from 20.5ºC to 22.6ºC, except in Ambam and Campo, where the values remain around the historical average. This homogeneity extends to the monomodal rainforest zone. Temperatures in the Highland zones also showed constant variations compared to the historical data, except in Wum, where there was a slight decrease, with average values between 16.6ºC and 18.8ºC.

For February 2020, the anomaly map shows significant temperature differences with an average of around 3.1ºC in the localities of Maga (Far-North region) and Campo (South region). On the other hand, the localities in the southern part of the Far-North region (Mindif and Kaele), the North Region, Adamawa, the edge of the savannah-forest contact zone in the northern part of the Centre Region, and the entire Highland zones experienced a decrease in minimum temperatures of around 1.7ºC as compared to the historical average.

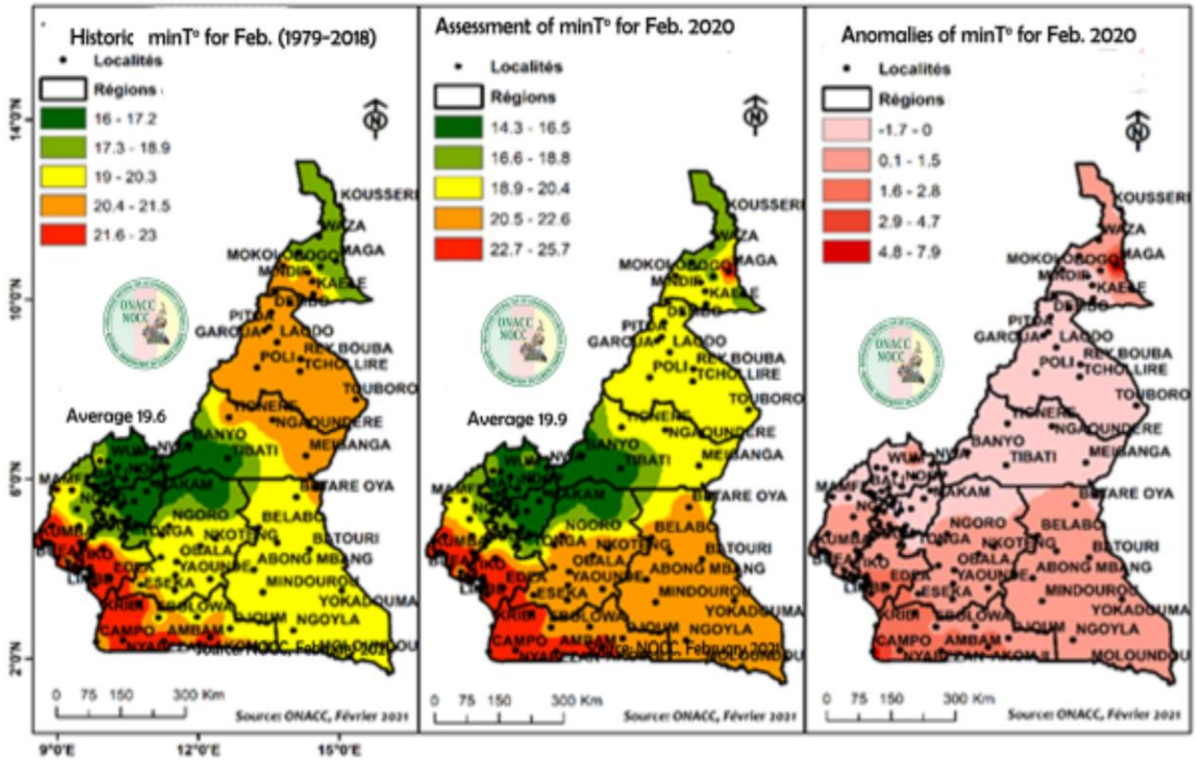


Figure 75: Spatial variation of temperatures in February 2020 as compared to historical data

4.1.3 Spatial variation of minimum temperature in March

The spatial dynamics of minimum temperatures for March 2020 as shown in Figure 76 below highlights a small fluctuation of the said temperatures for this month as compared to historical values (1979-2018).

In the Sudano-Sahelian zone, minimum temperatures were relatively stable for this month as compared to the period from 1979-2018. The same similarity in the Guinean High Savannah zone remains appreciable. On the other hand, in the Bimodal Rainforest Zone, there is a significant increase in temperatures as compared to the historical period, which remained around 20.9ºC and 22.4ºC. Like the previous region, the Monomodal Rainforest Zone shows an increase in minimum temperatures, as the isotherms range between 24ºC and 25.3ºC, which

remain above those of the historical period. In the Highland zones, there is a relative homogeneity of isotherms as compared to those of the historical period.

With regards to the anomaly map below, the southern part of the Far North region (Kaele, Mindif), the entire North region and the northern part of the Adamawa region had very low thermal variations (0.3ºC). However, the East, Centre, South, West, South-West and Littoral regions experienced a significant increase in temperature differences of around 1.7°C.

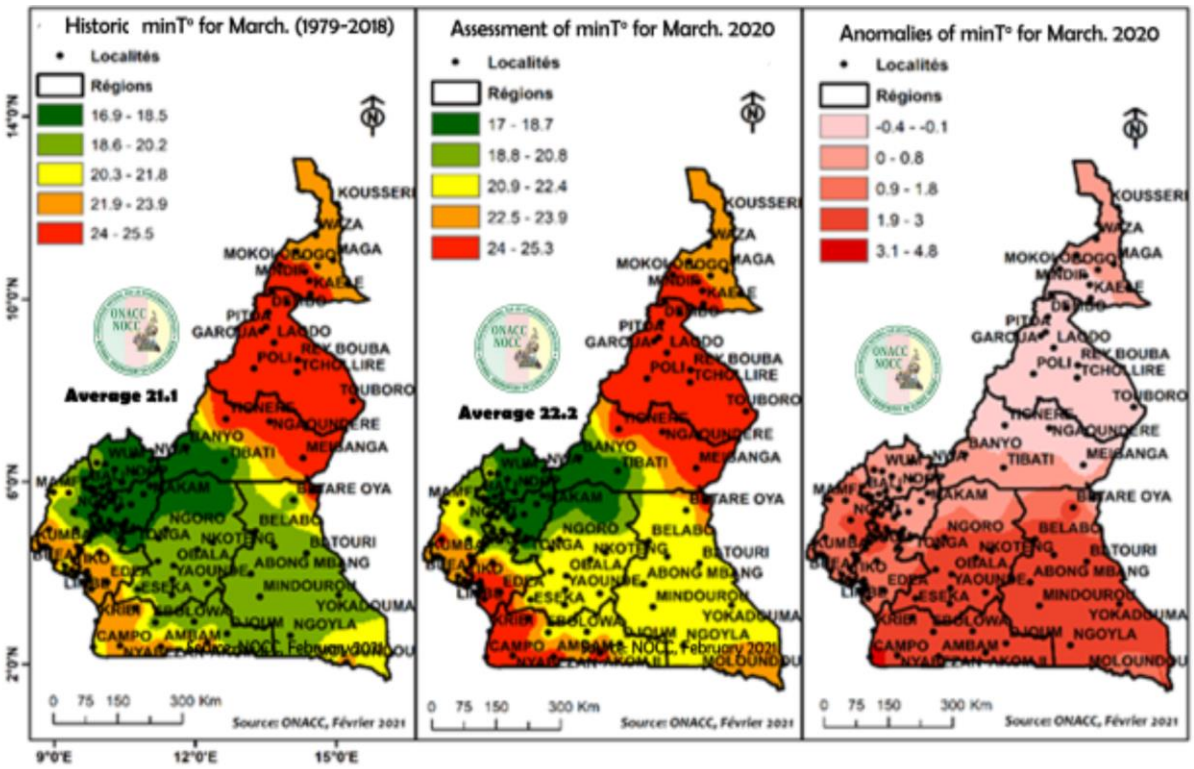


Figure 76: spatial temperature variation in March 2020 as compared to historical data

4.1.4. Spatial variation of minimum temperature in April

The spatial variation of minimum temperatures in April 2020 shows a slight variation as compared to historical values (1979 - 2018), Figure 77 below.

On the national scale, there is a slight increase in minimum temperatures. More specifically, in the Sudano-Sahelian zone, minimum temperatures in April 2020 are relatively stable as compared to the historical record, with an increase ranging from 26.3ºC to 28.7ºC. In the same way, in the Guinean High Savannah zone, the recorded isotherms indicate a similar stability of temperature for this month as compared to the historical ones. In the Bimodal Rainforest Zone, temperatures were relatively stable as compared to historical data, although a slight increase is noticeable in Moloundou 23.4ºC and 26.2ºC. The Monomodal Rainforest Zone experienced a

relative increase in temperature as compared to historical values with a temperature range of 23.4ºC to 26.2ºC. In the Highland zones, stability of the isotherms was observed in the two regions, notably the West and the North-West regions.

Conclusively, the anomaly map below shows that the East, Centre and South regions recorded positive temperature variations of about 0.8ºC, the localities of Kousseri, Waza, Maga, Bogo and Mokolo (Far-North Region), the south-western part of the Adamawa region (Banyo and Tibati), the north-western part of the West region (Makam) and the eastern-north-eastern part of the North West region (Nwa and Ndop) show an average deviation of about 0.6°C for this month.

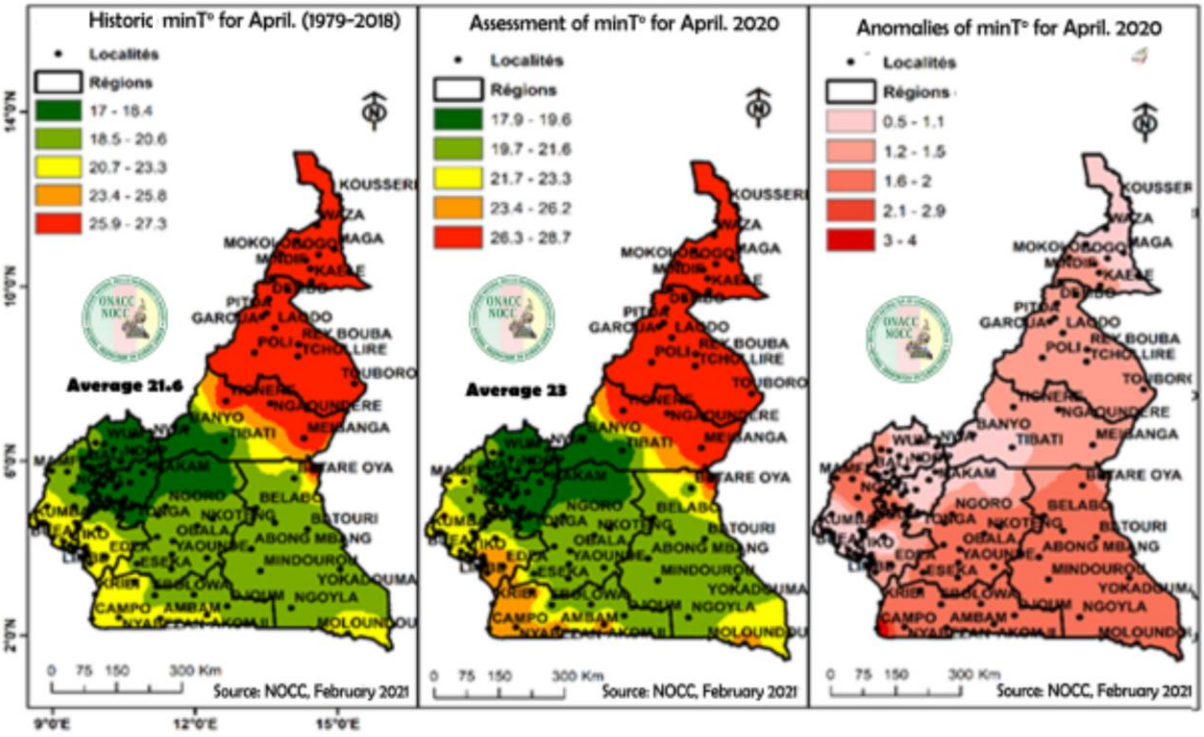


Figure 77: Spatial variation in temperatures in April 2020 as compared to historical data

4.1.5. Spatial variation of minimum temperatures in May

Figure 78 below highlights the variation of these May 2020 temperatures as compared to historical values (1979-2018).

In the Sudano-Sahelian zone (the Far North and North regions), there is a slight variation in temperature, notably in the west-north-western and east-north-western parts of the North region; This variation extends to the Guinean High Savannah Zone (Adamawa region) around the localities of Tignere, Ngaoundere and Meiganga and in the Bimodal Rainforest Zone (Centre, South and East regions), precisely in Betare Oya in the East region, with an increase

ranging between 25.7°C and 27.8°C. Likewise, in the Bimodal Rainforest Zone (Centre, South and East regions), the Monomodal Rainforest Zone (Littoral and South-West regions) and in the Highland zones (West and North-West regions), temperatures remained relatively stable the vast majority of localities; Nevertheless, the localities of Moloundou in the East region, Mamfe and Limbe in the South-West region; Kribi, Campo, Nyabizan and Akom II in the South region, recorded an increase in minimum temperatures, ranging around the 23.3°C and 25.6°C isotherms.

In all, the map of anomalies below shows that Campo was the hottest locality with temperature differences of around 1.3°C. Furthermore, the Sudano-Sahelian zone, notably the west-north-western and northern parts of the Far-North region, the North, South and South-West regions, especially Mamfe and Nguti, were observed to have recorded the most moderate temperature peaks as compared to historic values, with a difference of 0.8°C. The map also shows that the West, North-West, and west-northwestern parts of the Adamawa region and some localities in the Far-North region (Kousseri, Waza, Mage, Kaele and Bogo), and in the South-West region (Kumba, Tiko and Buea) recorded the lowest temperatures in May 2020, with temperature differences of around 0.6°C.

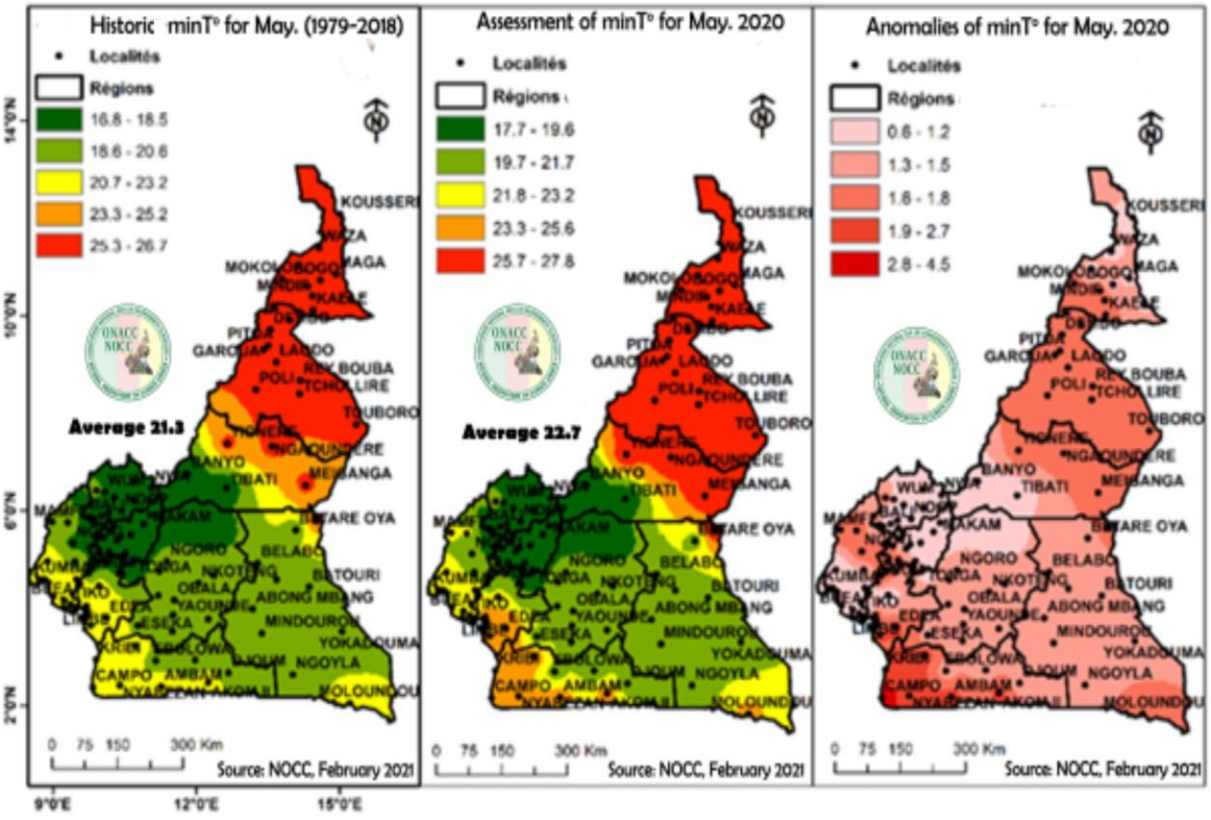


Figure 78: spatial variation of temperatures in May 2020 as compared to historical data

4.1.6. Spatial variation of minimum temperatures in June

The situation of the minimum temperatures for June 2020, as illustrated by figure 79 below, reveals a significant variation of the said temperatures as compared to the historical values.

The evolution of minimum temperatures in the Sudano-Sahelian zone (Far-North and North regions) is reflected by a drop-in temperature, especially in the northern part of the Far-North, the entire North region and the northern part of the Adamawa region, notably Tignere, Ngaoundere and Meiganga, with isotherms of around 22.8°C and 24.6°C. However, the rest of the entire territory, i.e., the southern part of the Adamawa region, the entire Highlands (North-West and West regions), the Bimodal Rainforest Zone (Centre, South and East regions) and the Monomodal Rainforest Zone (Littoral and South-West regions) were generally characterized by constant temperatures. Nevertheless, the localities of Limbe in the South-West, Kribi, Campo, Nyabissan, Ambam and Akom II in the South region, when compared to historical data, show an increase in minimum temperatures ranging between 22.8°C and 24.6°C.

The minimum temperature for this month shows that the Bimodal Rainforest Zone (Centre, South and East regions), notably the localities of Kribi, Nyabizan and Ambam in the South and Eseka in the Centre recorded a slight increase in thermal differences of about 1°C. However, a decrease in the said thermal differences was observed in the Sudano-Sahelian zone (Far-North and North regions), especially in the localities of Kaele, Mindif, in the Far-North, Pitoa, Dembo, Poli, Tchollire, Lagdo, Garoua and Touboro, in the North, and in the Guinean High Savannah Zone (Adamawa region), notably in the localities of Meiganga, Ngaoundere and Tignere, at about 1°C.

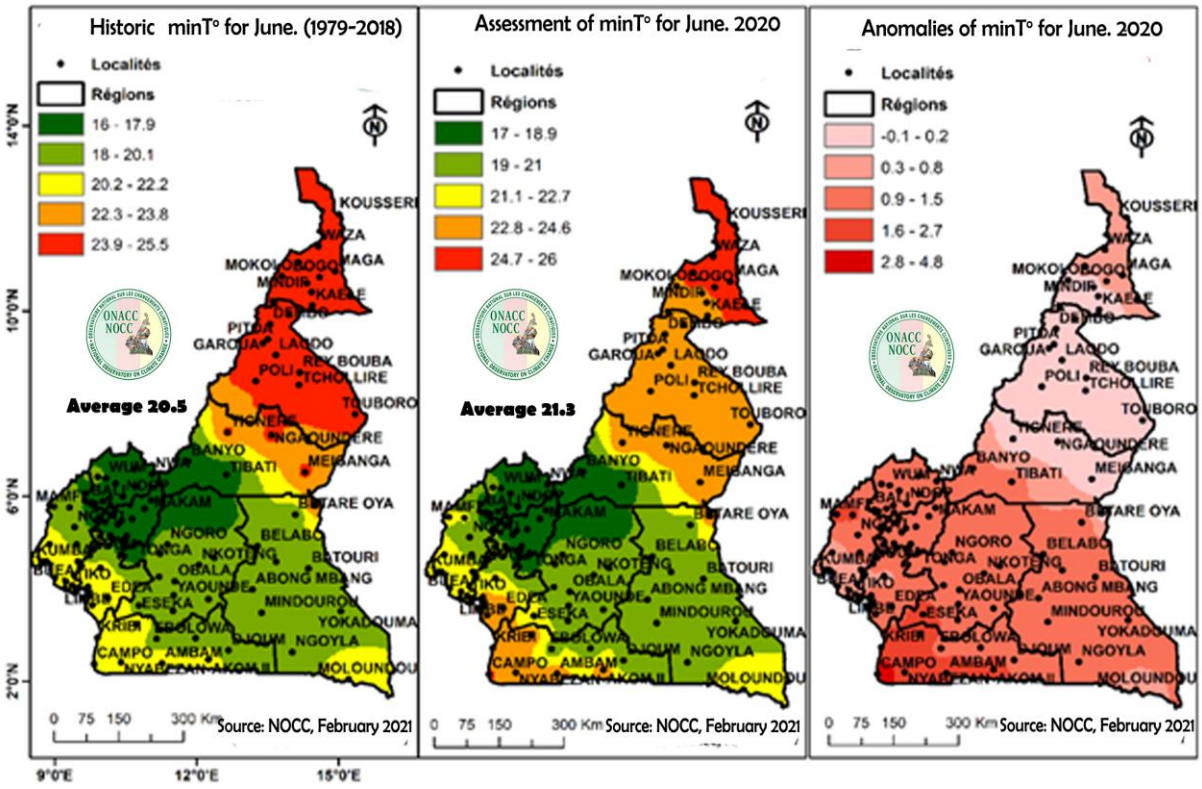


Figure 79: Spatial temperature variation in June 2020 as compared to historical data

4.1.7. Spatial variation of minimum temperatures in July

The spatial distribution of minimum temperatures in July 2020, as shown in Figure 76 below, reveals a significant variation in minimum temperatures as compared to the historical record (1979-2018).

The Sudano-Sahelian zone (Far-North and North regions) and the Guinean high savannah zone (Adamawa region), especially in the localities of Tignere, Ngaoundere and Meiganga, the localities of Kumba and Buea in the South-West region and Tiko in the South-West region, are marked by a significant decrease in temperatures, ranging from 21.9°C to 23.3°C. On the other hand, in the bimodal rainforest zone (Centre, South and East regions), there is an increase in temperature around the 19.9°C and 24.9°C isotherms in the localities of Campo, Nyabizan and Ambam. However, in the Highland zones (West and North-West regions), there is an earlier indication of stability. Nevertheless, in the west-southwestern part of the West region, a slight increase in minimum temperatures of about 18.3°C and 19.8°C of the isotherm is observed.

Generally speaking, the map of anomalies below reveals that the Bimodal Rainforest Zone, especially the localities of Akom II, Zoetele, Ambam and Ebolowa in the South, Eseka, Mbalmayo, Akonolinga, Mbandjock, Monatele, Nkoteng and Yaounde in the Centre region,

experienced a significant increase in minimum temperatures with thermal differences of around 1.1°C in July 2020. On the other hand, the localities of Kousseri, Waza, Maga, Bogo and Mokolo (Far-North region) recorded the lowest temperatures, with temperature differences of 0.8°C.

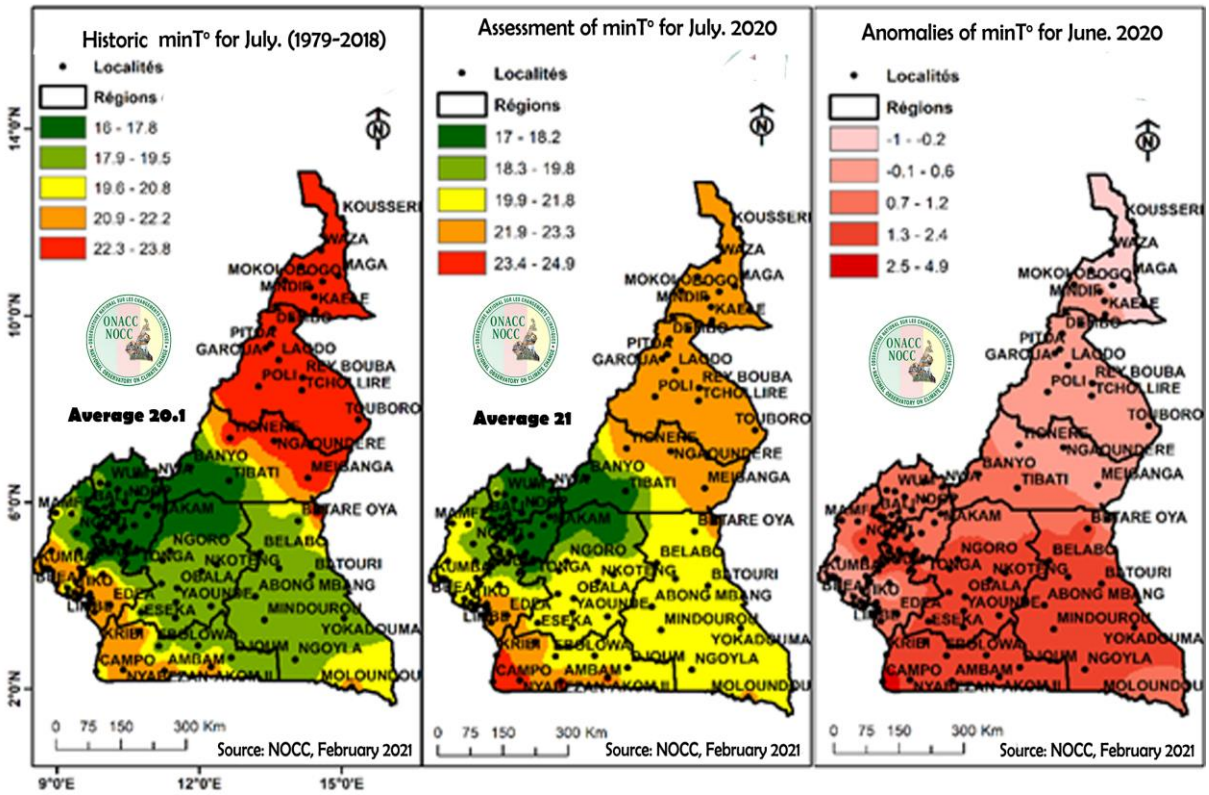


Figure 80: spatial variation of temperatures in July 2020 as compared to historical data

4.1.8. Spatial variation of minimum temperatures in August

The spatial variation of minimum temperatures in August 2020 shown in Figure 81 below reveals a significant increase of the said temperatures at the national scale as compared to historical values (1979-2018).

It is noted that temperatures recorded in the Far-North, North and Adamawa regions in August 2020 remained relatively constant as compared to the historical values collected; nevertheless, an increase in temperatures between 22.8°C and 25°C was recorded in the south-western part of the North and in the west-north-west, North and south-eastern parts of the Adamawa region, notably in the localities of Tignere, Ngaoundere and Meiganga. In the Bimodal Rainforest Zone (Centre, South and East regions), there was a real increase in temperatures relative to the historical period, especially in the locality of Campo in the south-western part of the South region, with isotherms ranging from 22, 8°C and 25°C, with the exception of the locality of Moloundou in the South-Eastern part of the East region and some localities in the North, North-

Western and Western parts of the Centre region where the said temperatures did not show any real variations. On the other hand, in the Highland zones (West and North-West Regions), temperatures remained generally constant; however, in some localities in the western and south-western parts of the West region, temperatures rose between 18.2°C and 19.7°C. Also, in the monomodal rainforest zone (Littoral and South West regions), minimum temperatures remained constant during the month as compared to the historical average, except for the locality of Limbe, which recorded an increase ranging between 22.8°C and 25°C as compared to the historical average.

With regard to the anomalies of this month, Campo (South Region) is one of the localities in the country that recorded the highest minimum temperatures with thermal differences of about 1°C. The map of anomalies in the Bimodal Rainforest Zone (the Centre, South and East regions) shows a general increase in thermal differences of 0.9°C. While in the South-West region, notably in Kumba, Buea and Tiko, and in the Sudano-Sahelian zone, especially in the Far-North region (Kousseri, Waza, Bogo, Mokolo, Maga), lower temperatures were recorded, with a thermal difference of 0.5°C.

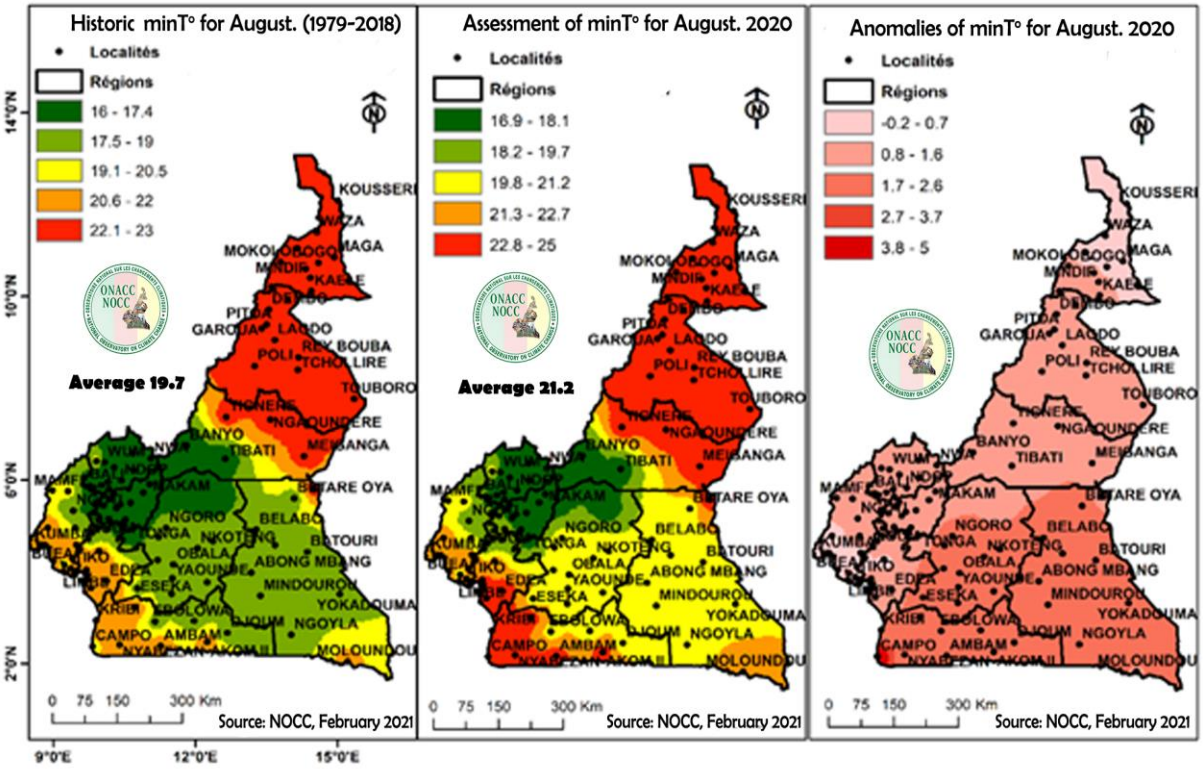


Figure 81: spatial variation of temperatures in August 2020 as compared to historical data

4.1.9. Spatial variation of minimum temperatures in September

The spatial variation of minimum temperatures for September 2020 shows a strong variation of these temperatures relative to historical values (1979-2018), Figure 78 below.

The Sudano-Sahelian zone as a whole, compared to the historical period in 2020, shows a significant fluctuation in minimum temperatures, reflected in a decrease of the said temperatures in the localities of Kousseri, Waza, Bogo, Maga and Yagoua. This is due to the fact that the isotherm recorded in 2020 ranges between 21.3ºC and 22.7ºC, while the historical period is around 22.6°C and 23.6°C. In contrast to the northern part of the Far-North Region, the 22.6°C and 23.6°C isotherm evolves right to the northern part of the Adamawa Region. In the southern part of the Guinean High Savannah zone, the recorded isotherms indicate a slight increase in minimum temperatures as compared to the historical record. The temperatures recorded in 2020 range around 16.9°C-19.7°C, as opposed to 16°C-19.7°C, more precisely in Banyo, Yimbere and Tibati. Like the previous regions, the Bimodal Rainforest Zone shows a general increase in temperatures, which vary between 16.9°C-24°C, compared with 16°C-22.5°C for the historical data. However, some localities in the south regions (Kribi, Ambam, Lolodorf, Nyabizan and Campo) and the East (Moloundou, Libongo and Mambele) stand out with more significant peaks, which range from 22.7°C-24°C compared to 22.5-22.6°C for the historical data. In the Monomodal Rainforest Zone, the localities of Mamfe, Kumba, Buea, Tiko, Bamusso, and Mundemba in the South-West and Douala, Dizangue, Mouanko and Edea in the Littoral Region show significant temperature peaks in 2020 compared to the historical period. In the Highlands, although a similar stability is observed, a slight increase in these temperatures is nevertheless noticeable. The isotherms vary between 16.9°C-21.2°C in 2020 compared to 16°C-20.7°C for the historical period.

The map of anomalies shown below reveals that Campo in the South region (Bimodal Rainforest Zone) recorded a thermal difference of less than 1.2ºC. However, the localities of the Far-North, as well as those in the South-West (Kumba, Nguti, Buea, Tiko) regions recorded a thermal difference of about 1.4ºC.

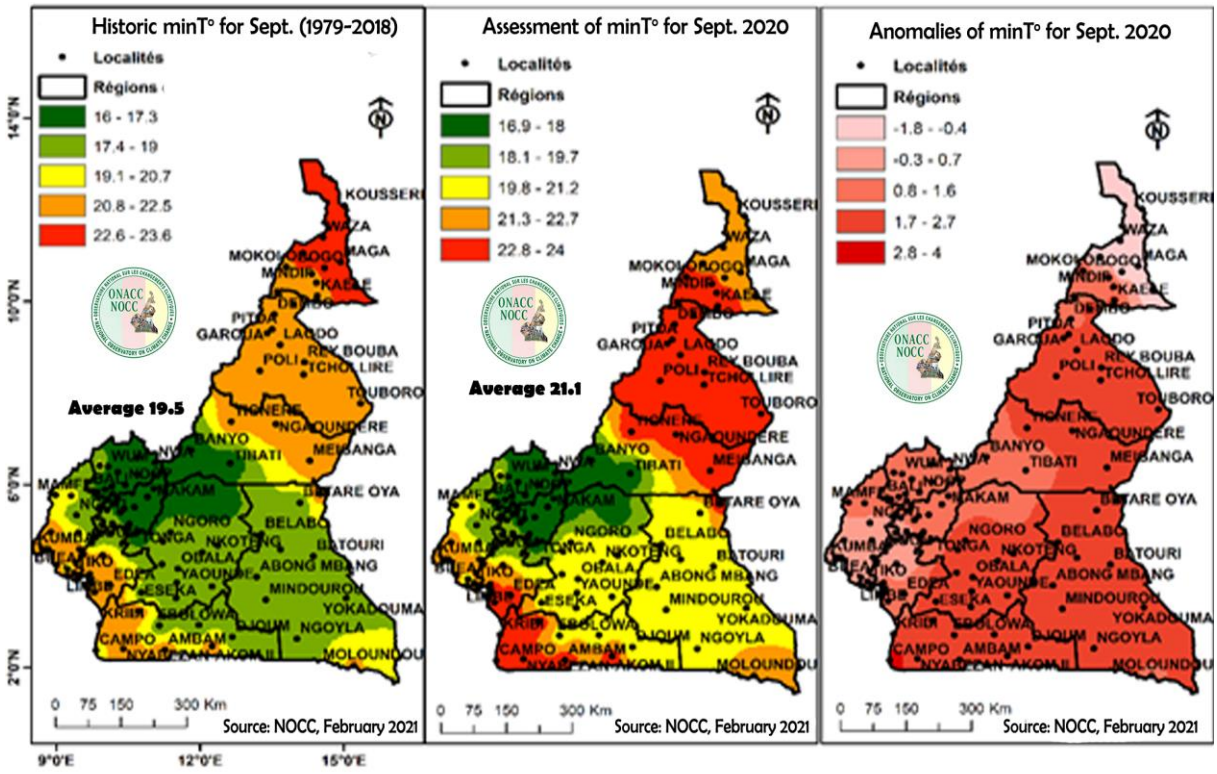


Figure 82: Spatial variation of temperatures in September 2020 compared to historical data

4.1.10. Spatial variation of minimum temperatures in October

The minimum temperature situation in October 2020 shows a slight variability compared to the historical values (1979-2018) figure 79 below.

The Sudano-Sahelian zone recorded temperatures slightly above the historical values, especially in Kousseri, Waza, Maga, Bogo and Mokolo, where temperatures ranged between 17.6ºC and 19.5ºC, compared to 17.5°C-19°C for the historical period. In the southern part of the region, notably in Mindif, Kaele, Dembo and the entire north region, the temperatures observed are above those recorded during the historical period, which ranged from 19.6ºC to 20.7ºC compared to 19.1°C to 20.5°C. This isotherm extends from the northern part of the Adamawa Region to the south-eastern part of the region. Furthermore, despite the stable appearance observed in the western part of the Region, the isotherm recorded Banyo, Yimbere and Tibati, also experienced a slight increase in minimum temperatures during this month. In the Bimodal Rainforest Zone, there was a general increase in temperature compared to the historical values. Although the northern part of the Centre region remained constant, particularly in the localities of Ngoro and Yoko, the entire Bimodal Rainforest Zone experienced an increase in temperature as indicated by the 19.6°C-24.4°C isotherms. Equally, the Monomodal Rainforest Zone recorded minimum temperatures above the historical values,

ranging from 17.5ºC to 24.4ºC. In the Highland zones, the temperatures recorded show a slight increase despite the stability observed.

The map of anomalies below shows a slight variation of 0.6ºC in the localities of Mindif and Kaele, the Far-North Region, the entire North Region and the north-eastern part of the Adamawa Region. On the other hand, the entire south region shows significant temperature differences of about 2.8°C.

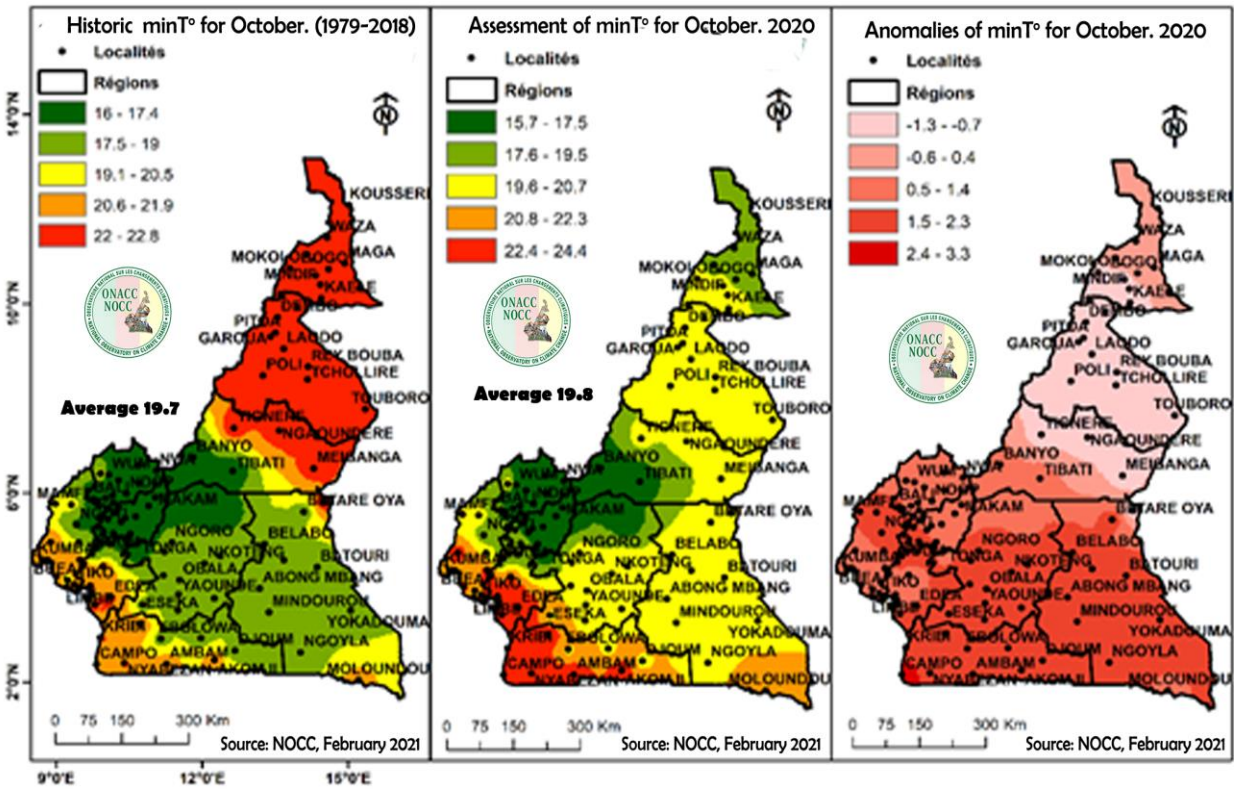


Figure 83: spatial variation of temperatures in October 2020 compared to historical data

4.1.11. Spatial variation of minimum temperatures in November

The variability of minimum temperatures for November 2020, shown in Figure 84 below, shows a slight fluctuation in the spatial distribution of temperatures compared to historical values (1979-2018).

In the Sudano-Sahelian zone, minimum temperatures also showed an increase as compared to the historical period and ranged between 17.6ºC and 19.5ºC in Kousseri, Waza, Maga, Mokolo and Bogo; in the southern part of this region, notably in Mindif, Kaele and Dembo, and in the entire north region, temperatures recorded were above the historical values and ranged between 19.6ºC and 20.7ºC. The Guinean High Savannah zone indicated relatively constant minimum temperatures compared to the historical period, except in Tignere, Ngaoundere and Meiganga, which recorded temperatures slightly above the historical values as shown by the 19.6ºC-

20.7ºC isotherm. In the Bimodal Rainforest Zone, the isotherms for the month also appear to be stable as compared to historical values despite a slight fluctuation. The isotherms compared between November 2020 and the historical period show a difference of 1.1ºC except for the locality of Molundou and Nyabizan where a difference of 4.8ºC was observed. The isotherms range between 19.6ºC and 24.4ºC, indicating a slight increase in the said temperatures as compared to historical data. In addition, the Monomodal Rainforest Zone recorded minimum temperatures above the historical data, except for Buea, where temperatures ranged from 22.4ºC to 24.4ºC, and Mamfe, where they ranged from 19.6ºC to 20.7ºC, respectively. Finally, in the Highlands zone, minimum temperatures show relatively stable isotherms for this month as compared to historical minimum temperatures.

The above irregularities reflect temperature difference anomalies of 1 to 1.1°C in the Far-North, North, West and North-West regions. In the Centre, South, East, South-West and Littoral Regions, the difference in thermal differences is very high, varying from 1.5 to 4.8°C, with prominent peaks in the localities of Moloundou in the East Region, and Campo and Nyabizan in the South region.

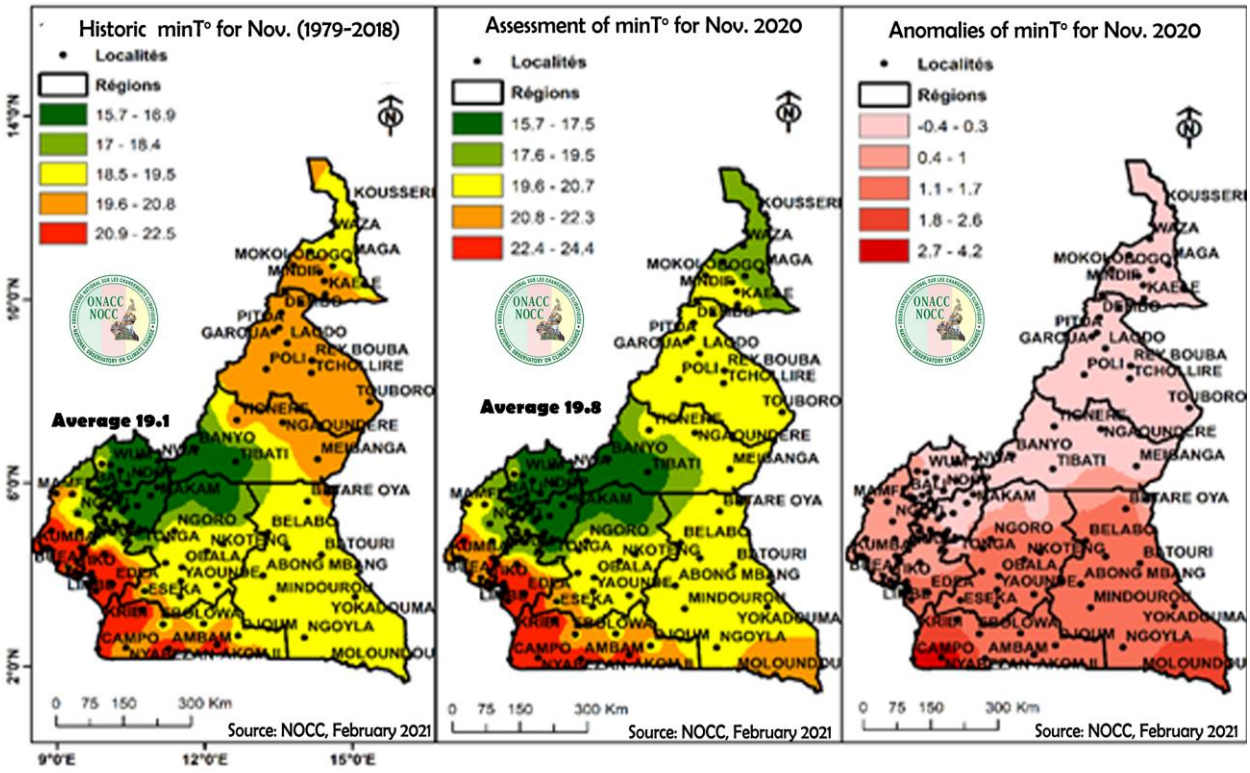


Figure 84: Spatial variation of temperatures in November 2020 as compared to historical data

4.1.12. Spatial variation of minimum temperatures in December

Figure 85 below shows the spatial distribution of minimum temperatures in December 2020. Here, the spatial distribution indicates a slight variation of the said temperatures this month as compared to the historical values (1979 - 2018).

According to this figure, the 18.8°C-19.6°C isotherm that evolves from the northern part of the Far-North Region to the northern part of the Adamawa Region shows a slight increase compared to the historical period mentioned above. However, despite the relative stability in the south-western part of the Adamawa Region, there is a slight increase in minimum temperatures. In the Bimodal Rainforest Zone, the isotherms show a downward trend in minimum temperatures because, unlike the historical period, these isotherms range between 15.3ºC and 19.6ºC, except in Moloundou where temperature peaks remain significant. The monomodal rainforest zone recorded temperatures below the historical mean because the isotherms were between 16.3ºC and 18.7ºC, compared to 16.7°C and 23°C. However, the localities of Buea, Muyuka, Limbe, Tiko, Idenau and Kumba still have high peak temperatures. Temperatures in the highland zones show very little variation, with relatively small temperature differences compared to historical data.

In December 2020, the anomaly map reveals a strong thermal difference of 1.7ºC in the Far-North, North and North Adamawa regions, notably in Mbe, Tignere, Ngaoundere and Meiganga. On the other hand, the whole of the southern part of the country showed a decrease in temperature of around 1.8ºC.

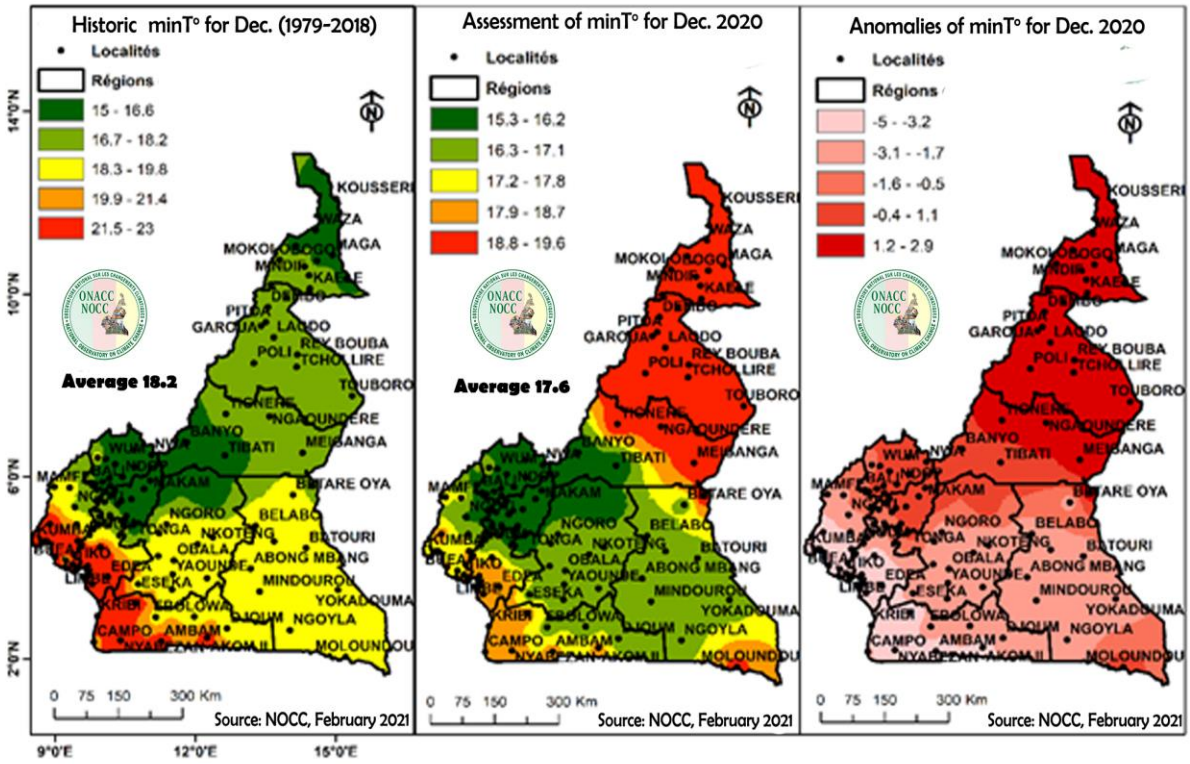


Figure 85: Spatial variation of temperatures in December 2020 compared to historical data

4.2 Maximum temperatures

4.2.1 Spatial variation of maximum temperatures in January

The spatial distribution of maximum temperatures in January 2020, as shown in Figure 86 below, reveals a strong variation in maximum temperatures compared to historical values (1979-2018).

Although there is a general trend towards an increase in maximum temperatures during the month, the northern, eastern and western parts of the Far North region are marked by a decrease in temperatures between 31.4°C and 23.4°C compared to historical data. On the other hand, the southern part of the Far-North region, the North region and the northern part of the Adamawa region recorded a slight increase in the said temperatures compared to historical data. However, the bimodal rainforest zone shows a slight increase in temperature, notably in the forest-savanna transition zone. The isotherms are generally between 31.5°C and 32.4°C, except for Moloundou, which shows a very significant increase, while Kribi, Campo, Nyabizan, Ambam and Lolodorf show a significant decrease in minimum temperatures. The Highlands and the monomodal rainforest zone recorded a general increase in temperature of between 32.5°C and 33.5°C in January 2020.

The map of anomalies below shows that, in the highlands and monomodal rainforest zone, localities such as Penja and Loum in the Littoral, Tiko Limbe, Kumba, Nguti and Buea in the South-West stand out with significant temperature differences of around 1.2°C. Unlike Kousseri, Waza, Maga and Bogo in the Far North region, which have moderate temperatures, Campo, Nyabizan and Akom II in the South are the localities that recorded the lowest temperatures.

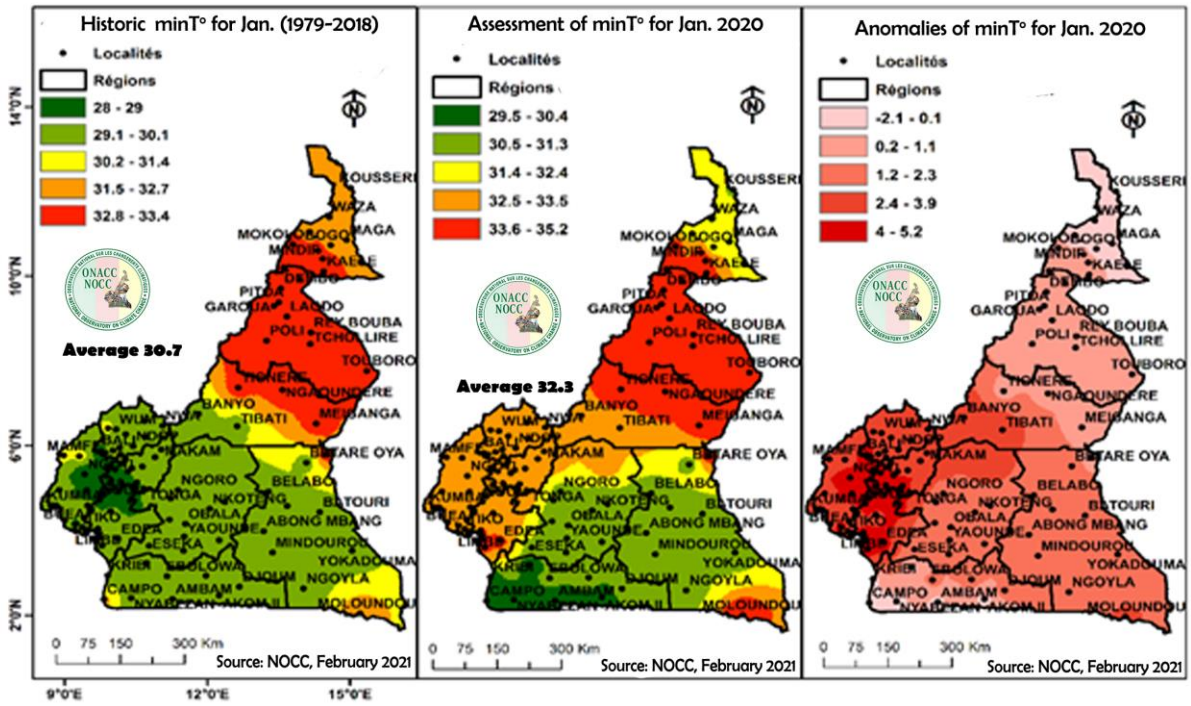


Figure 86: Spatial variation of maximum temperatures in January 2020 compared to historical data

4.2.2. Spatial variation of maximum temperatures in February

The spatial distribution of maximum temperatures in February 2020, (Figure 87) below, shows a strong variation in maximum temperatures compared to historical values (1979-2018).

The month of February 2020 was characterized by a significant variation in maximum temperatures over the entire national territory. The Sudano-Sahelian zone (Far-North and North regions) recorded a drop in temperatures during this month, with isotherms ranging from 32.9°C to 33.8°C despite the apparent slight stability. In the Guinean High Savannah zone (Adamawa region), a real increase in temperatures was generally observed, especially in the south-eastern part of the zone, around the isotherms 33.9°C and 35°C. However, in the Bimodal Rainforest Zone (Centre, East and South regions), the temperature variations here are punctuated by pockets of variation ranging from a very strong increase to a significant decrease. Marked by a relatively stable temperature in the central part, the month of February 2020 was

distinguished by high temperatures in the northern part of the Centre, East and East-South-East Regions, notably in the locality of Moloundou, while the South Region experienced a considerable drop in maximum temperatures, more specifically in the localities of Kribi, Campo, Nyabizan, Akom II, Ambam and Lolodorf. The Highland zones (North West and West regions) and the Monomodal Rainforest zone (Littoral and South-West regions) are also marked by a significant increase in temperatures around 32.9°C and 35°C isotherms.

With regards to the map of anomalies, a drop in temperatures was observed with thermal differences of around 0. 5°C in the Sudano-Sahelian zone (Far-North and North regions), the Guinean high savannah zone (Adamawa region), notably the localities of Tignere, Ngaoundere and Meiganga, and in the south-western part of the South Region, especially the localities of Campo, Ambam, Akom II, Lolodorf and Nyabizan, in the Bimodal Rainforest Zone. However, in the highland zones, there is a significant increase in temperature differences of about 1.9°C compared to historical data.

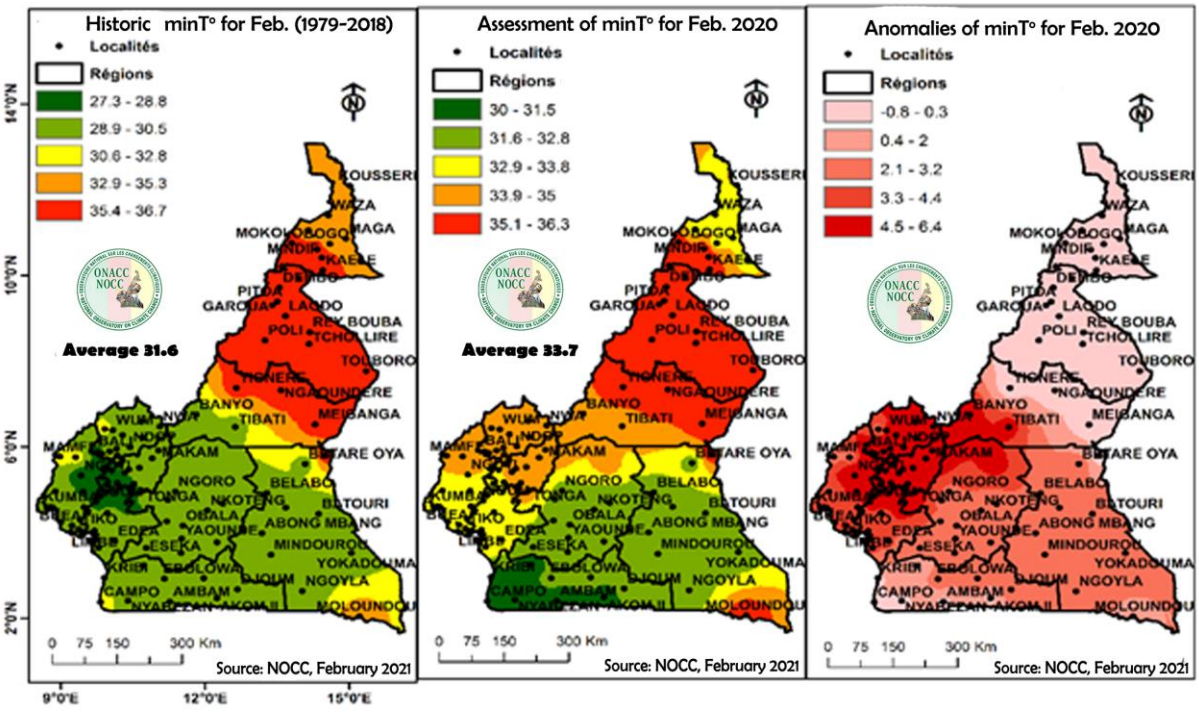


Figure 87: Spatial variation of maximum temperatures in February 2020 compared to historical data

4.2.2 Spatial variation of maximum temperatures in March.

Figure 88 below highlights the situation of maximum temperatures in March 2020 compared to the historical values recorded from 1979-2018.

The recorded data show that in the Sudano-Sahelian zone (the Far North and North regions), maximum temperatures during this month remained relatively stable in comparison. In the

Guinean High Savannah zone (Adamawa region), there was a slight variation in maximum temperatures expressed by an increase in isotherms between 32°C and 33.4°C. The localities of Banyo and Tibati clearly illustrate this. On the other hand, in the Bimodal Rainforest Zone (Centre, South and East regions), there is a significant decrease in maximum temperatures compared to those recorded during the historical period. Isotherms fluctuate between 30.5°C and 31.9°C, except for the localities of Betare Oya and Moloundou in the East region, which remained relatively stable compared to the historical period. On the other hand, in the highland zones (West and North-West regions) there was a slight increase in these temperatures, which were around the 32°C and 33.4°C isotherms. Despite the relative stability observed in the Monomodal Rainforest Zone, notably in the West, North-West and South-West confluence, the entire monomodal rainforest zone experienced a slight increase in maximum temperatures. The isotherms range between 32°C and 33.4°C.

From the map of anomalies below, it is exceptionally observed that in the South region, more precisely in the localities of Campo, Ambam, Lolodorf, Nyabizan, AkomII and Kribi, are identified as those having recorded the lowest temperatures with thermal differences around 0.9°C during March 2020.

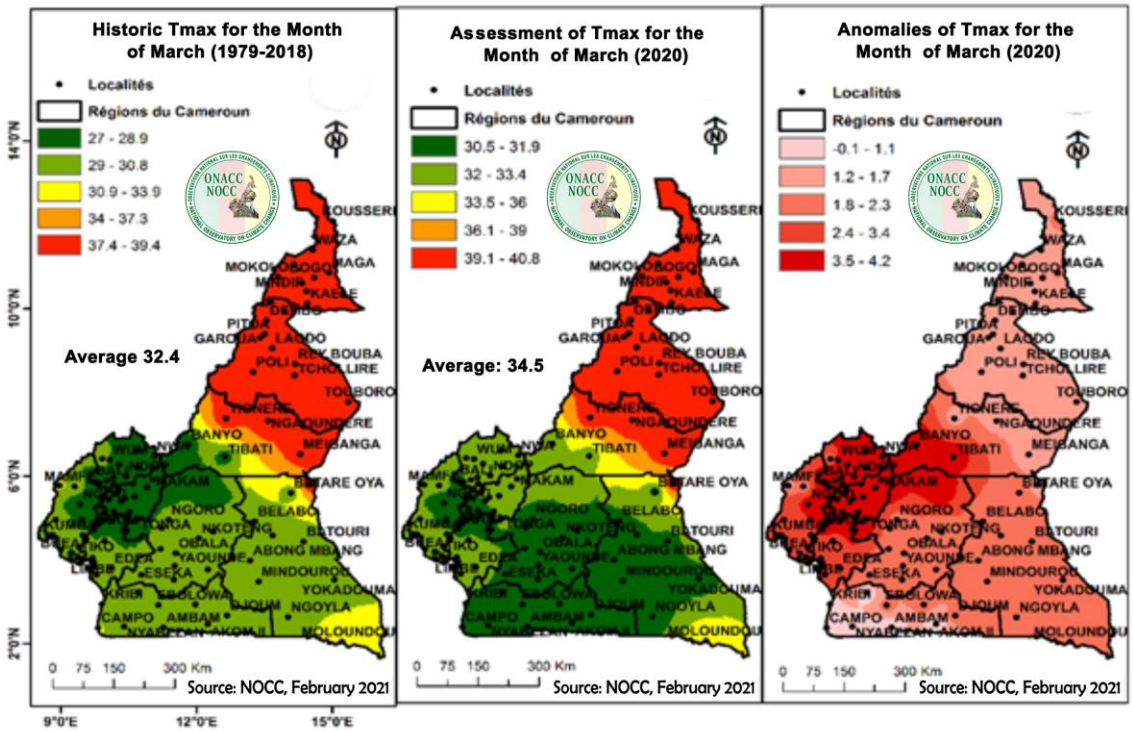


Figure 88: Spatial variation of maximum temperatures in March 2020 compared to historical data

4.2.3. Spatial variation of maximum temperatures in April

The spatial distribution of maximum temperatures in April 2020, as shown in Figure 89 below, reveals a large variation in maximum temperatures compared to historical values (1979-2018).

The month of April 2020, shows that in the Sudano-Sahelian zone (the Far North and North regions), maximum temperatures remained relatively stable compared to historical data. In the Guinean High Savannah zone (Adamawa region), an increase in maximum temperatures was observed in almost the entire region, except for Banyo, Tignere, Ngaoundere, Meiganga and Tibati where temperatures remained more or less stable. In the Bimodal Rainforest Zone (Centre, South and East regions), there was a significant drop in maximum temperatures compared to the historical period, except for Moloundou in the East region, which recorded a drop in temperature of between 30.9°C and 33.6°C. On the other hand, in the highland zones (West and North-West regions), temperatures remained stable. In the Monomodal Rainforest Zone, temperatures fell between 29°C and 30.8°C, except for Mamfe, Kumba, Buea, Tiko and Limbe in the South-West region, and Douala, Dizangue, Mouanko and Edea in the Littoral region, where maximum temperatures remained stable.

In summary, the maximum temperature recorded for April 2020 shows that the Sudano-Sahelian zone, notably the localities of Kousseri, Waza, Bogo and Mokolo, recorded significant temperatures with thermal differences of almost 0.8°C. Conversely, it appears that the localities of Campo in the South region and Moloundou in the East region (Sudano-Sahelian zone) were the coldest with a temperature difference of almost 0.6°C.

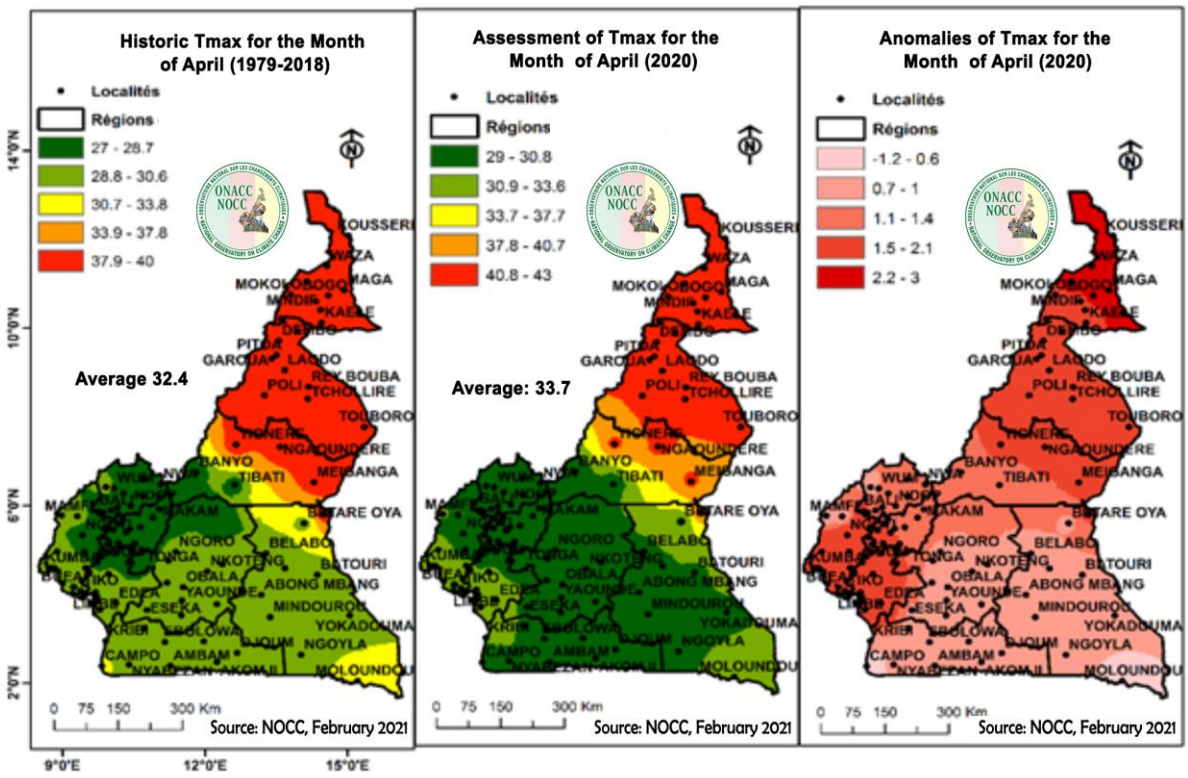


Figure 89: Spatial variation of maximum temperatures in April 2020 compared to historical data

4.2.4. Spatial variation of maximum temperatures in May

The spatial distribution of maximum temperatures in May 2020, as shown in Figure 90 below, reveals a significant variation in maximum temperatures compared to historical values (1979-2018).

The Sudano-Sahelian zone (Far-North and North regions), at first glance, did not show any evolution in terms of temperatures recorded in May 2020 compared to historical data. However, in the Guinean High Savannah zone (Adamawa region), especially the south-eastern part of the Adamawa region, there has been a decrease in temperatures of between 29.9°C and 32.8°C. In the same variation, all the other three zones, including the Bimodal Rainforest Zone, the Monomodal Rainforest Zone and the highland zones, are marked by a general decrease in temperature of between 27.5°C and 29.8°C; in the localities of Campo and Moloundou it ranges between 29.9°C and 32.8°C.

The map of anomalies below shows that the localities of Campo and Moloundou are the least warm with a temperature difference of 0.1°C. On the other hand, the Sudano-Sahelian zone, notably the North region and the North-western and Northern parts of the Far North region, the Littoral region, the South-west region and the localities of Kaele and Nguti are the hottest parts with a difference of 0.8°C. Also, these anomalies show that the Western, North-Western, West-

North-Western parts of the Adamawa region and some localities in the Far North region (Kousseri, Waza, Mage, Kaele and Bogo), in the South-West region (Kumba, Buea) and the Littoral region (Tiko) recorded the lowest temperatures in May 2020 with a difference of 0.6°C.

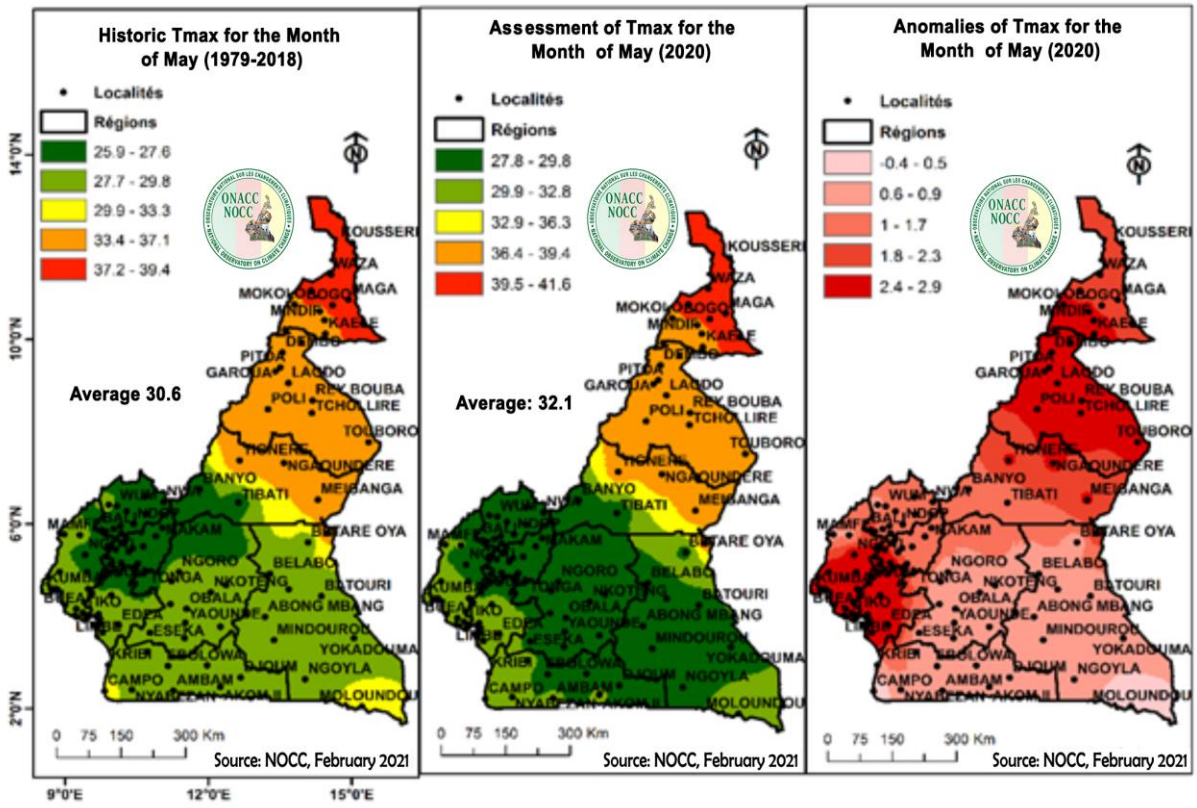


Figure 90: Spatial variation of maximum temperatures in May 2020 compared to historical data

4.2.5. Spatial variation of maximum temperatures in June

The spatial distribution of maximum temperatures in June 2020 shows significant variation in maximum temperatures compared to historical values from 1979-2018, Figure 91.

At first glance, the maximum temperature situation in the Sudano-Sahelian zone (the Far North and North regions) did not change much with regard to the spatialization of isotherms compared to historical data. Nevertheless, in the Guinean High Savannah zone (Adamawa region), precisely in the south-eastern part of the Adamawa region, there is a decrease in temperatures around 29.9°C and 32.8°C isotherms. The spatial distribution of isotherms in all three other agro-ecological zones, notably the Bimodal Rainforest Zone, the Monomodal Rainforest Zone and the Highland zones, is marked by a general decrease in temperatures around 27.5°C and 29.8°C. In addition, a small peculiarity around the localities of Campo in the South region and Moloundou in the East region, places them among the localities that have experienced a significant decrease in maximum temperatures.

The climate assessment for June 2020 compared with historical temperatures for the same month shows that the localities of Limbe and Nguti in the South-West and Campo in the South are the hottest localities with temperature differences of around 0.3°C. However, in general, the bimodal rainforest zone, except for Nyabizan, Kribi and Campo in the South, Eseka in the Centre and Betare Oya in the East, recorded the lowest maximum temperatures with temperature differences of around 0.5°C.

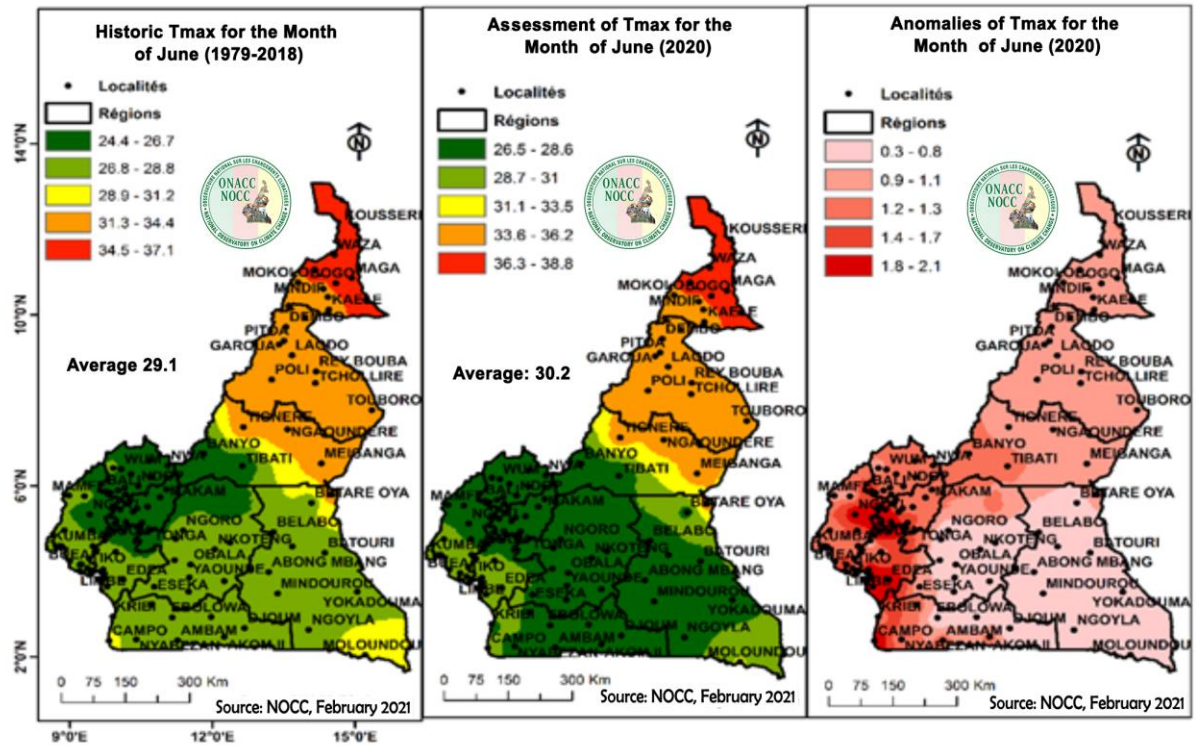


Figure 91: Spatial variation of maximum temperatures in June 2020 compared to historical data

4.2.6. Spatial variation of maximum temperatures in July

The spatial distribution of maximum temperatures in July 2020, as shown in Figure 92 below, reveals a strong fluctuation in maximum temperatures compared to historical values (1979-2018).

At first sight, the maximum temperature situation in the Sudano-Sahelian zone (Far North and North regions) did not change enough with regard to the spatialization of isotherms compared to historical data. Nevertheless, in the High Savannah Guinean zone (Adamaoua region), precisely in the east-south-eastern part of Adamaoua, there is a decrease in temperatures around the 29.9°C and 32.8°C isotherms. The spatial distribution of isotherms in all three other agro-ecological zones, namely the forest zone with bimodal rainfall, the forest zone with monomodal rainfall and the High Plateaux zone, is marked by an overall decrease in temperatures around

the 27.5°C and 29.8°C isotherms. In addition, a small peculiarity around the localities of Campo in the southern region and in Moloundou in the eastern region, places them among the localities that have experienced a significant decrease in maximum temperatures.

The maximum temperature recorded for July 2020 shows that the localities of Campo in the South, Nguti in the South-West and Loum in the Littoral recorded an increase in thermal differences of 0.8°C. However, a decrease in temperature differences of 1°C was observed in the Bimodal Rainforest Zone (Centre, East and South regions), especially in the localities of Nkoteng, Obala, Yaounde, Eseka in the Centre Region, Mindourou, Abong-Mbang, Batouri, Ngoyla and Betare Oya in the East Region, and the Guinean high savannah zone (Adamawa Region), notably in the localities of Meiganga, Ngaoundere and Tignere.

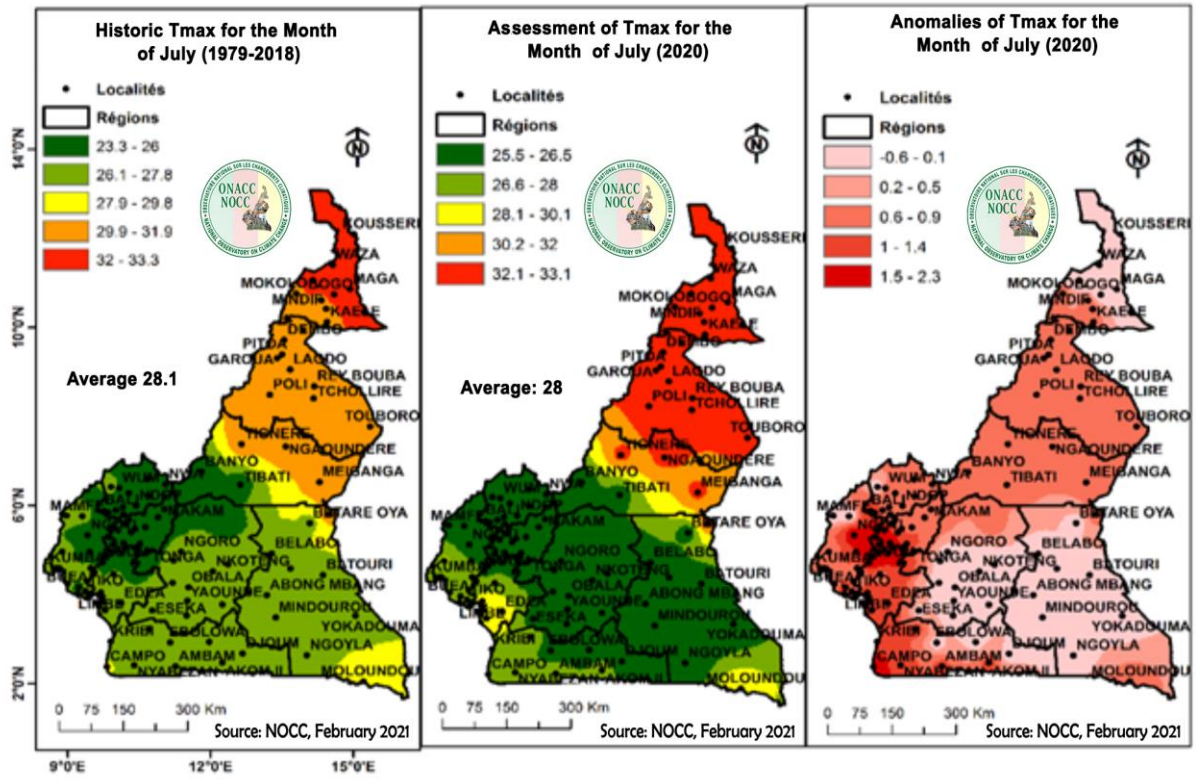


Figure 92: Spatial variation of maximum temperatures in July 2020 compared to historical data

4.2.7 Spatial variation of maximum temperatures in August

The spatial distribution of maximum temperatures in August 2020, as shown in Figure 93, reveals little fluctuation at the national scale compared to historical values from 1979 to 2018.

The comparison of isotherms between the historical period and the year 2020 shows a significant increase in the said temperatures in the Sudano-Sahelian zone, especially in the localities of Kousseri, Waza, Maga, Mokolo and Bogo, where the isotherms range between 30.2ºC and 32.2ºC. However, this increase is still very marked in the southern part of this agro-

ecological zone. Maximum temperatures in the Guinean High Savannah zone also show a similar trend to that of the historical data. With regard to maximum temperatures in the Bimodal Rainforest Zone, the isotherms show a considerable decrease in maximum temperatures throughout the zone, notwithstanding the persistent peak in the locality of Moloundou, where they range between 30.2ºC and 32.2ºC. In the Monomodal Rainforest Zone, despite the apparent stability, slight fluctuations in isotherms can be observed here and there, reflecting a low variability of these temperatures. The isotherms here remain essentially around 25.9 and 26.7°C. Maximum temperatures in the highland zones remain constant during this month compared to historical data.

With regard to the isotherms of anomalies, localities in the Centre and East Regions experienced a considerable drop in thermal differences of around 0.7ºC. Localities in the South, Far North, North, West and South-West regions experienced temperature differences of around 1ºC, which remain close to the historical temperature trend for this month.

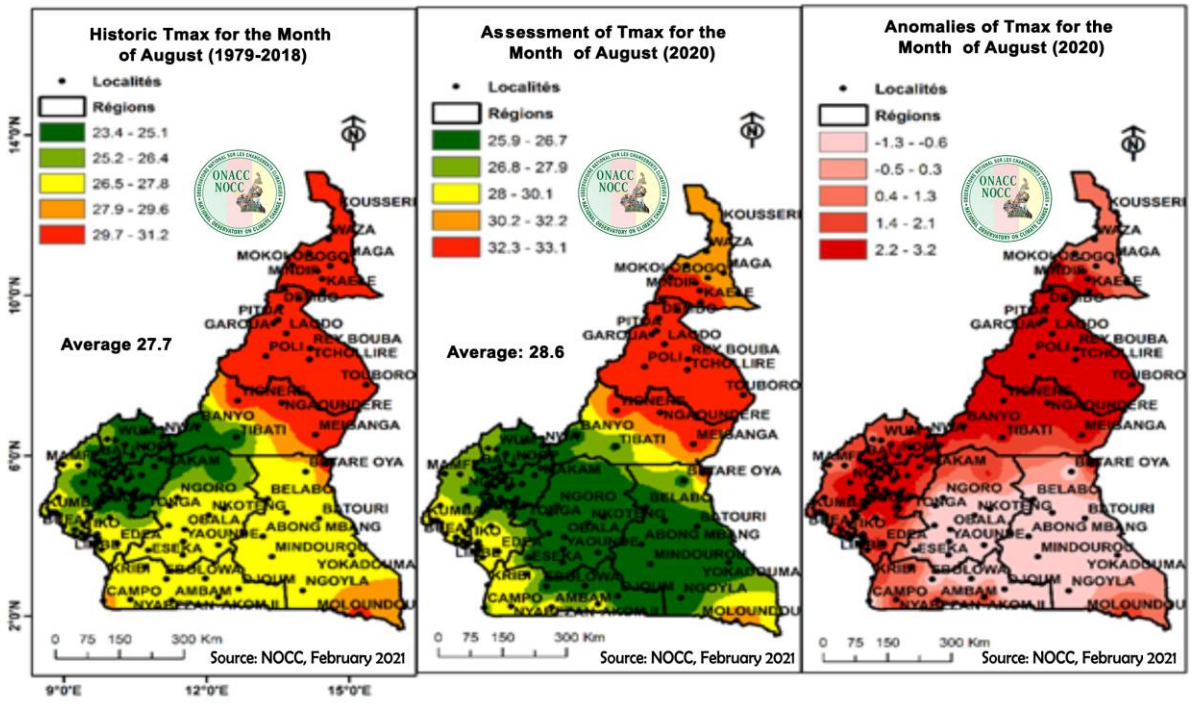


Figure 93: Spatial variation of maximum temperatures in August 2020 compared to historical data.

4.2.8. Spatial variation of maximum temperatures in September

The spatial distribution of maximum temperatures for September 2020 revealed a slight variation in temperatures compared to historical values for September 1979-2018, (Figure 94) below.

Maximum temperatures in the Sudano-Sahelian zone, notably in the localities of Kousseri, Waza, Maga, Mokolo and Bogo, remain constant compared to historical data. On the other hand, localities in the southern part of the Far North Region (Mindif and Kaele) and the whole of the North Region show an increase in maximum temperatures as indicated by the 31.5 ºC and 33.1ºC isotherms, compared to historical data. The Guinean High Savannah zone, on the other hand, presents characteristic facies because the northern part displays a strong thermal atmosphere compared to historical data, especially in the localities of Tignere, Mbe, Ngaoundere and Meiganga where the isotherms range around 31.5 ºC and 33.1ºC. However, in the southern part of this Region, the distribution of isotherms during this month in 2020 compared to the historical period remains relatively constant. Temperatures in the Bimodal Rainforest Zone are constant around the mean compared to the historical period. However, in the south-eastern part of the South Region, and the south-eastern part of the East Region, more precisely in the locality of Moloundou, there is a significant temperature peak compared to historical data. As for the monomodal rainforest zone, the temperatures recorded in this area are relatively stable compared to historical data. However, in the localities of Kumba, Buea, Tiko, Limbe Mamfe and Nguti, there is a slight increase in the said temperatures as the isotherms recorded are around 3ºC and 29.6ºC. The similarity of the isotherms in September 2020 and those of the historical period reflects a real stability of maximum temperatures in the Highland zones during the month.

The map of anomalies shows that the Far North region (Kousseri, Waza, Maga, Mokolo and Bogo) recorded the least significant temperature differences, which were around 1ºC. While the most significant temperature differences (1.1°C) were recorded in Moloundou in the East Region, Nguti and Fontem in the South-West Region and Loum in the Littoral Region.

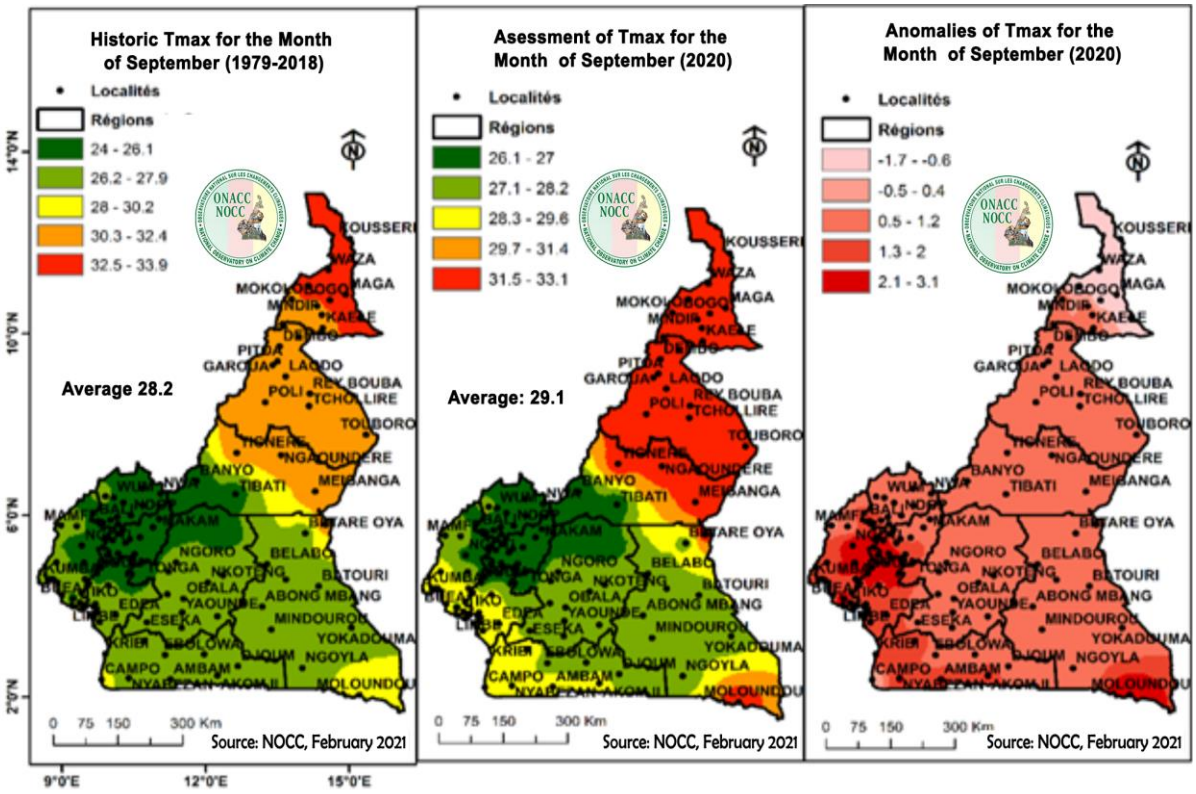


Figure 94: Spatial variation of maximum temperatures in September 2020 compared to historical data

4.2.8. Spatial variation of maximum temperatures in October

The maximum temperature isotherms in October 2020 (Figure 95) below show a strong variation in these temperatures compared to the historical period.

For October 2020, maximum temperatures in the Sudano-Sahelian zone have decreased slightly (Kousseri, Waza, Maga, Mokolo and Bogo) while in the North Region as a whole, they remain slightly above the historical data. In the Guinean High Savannah zone, it is observed that temperatures have generally increased. Regardless of the isolated areas of maximum temperatures, the isotherms are between 27.1ºC and 36.4ºC. For the Bimodal Rainforest Zone, temperatures on the whole show a decreasing trend, except for Betare Oya, Garoua Boulai, and Mouloundou (East Region), Kribi, Campo, Lolodorf, Nyabizan and Ambam (South Region), which shows a relatively stable temperatures during this month. The isotherms remain between (27.1ºC and 30.5ºC). As for the Monomodal Rainforest Zone, the fluctuation of maximum temperatures during this month remains more or less equal to the historical data, as the isotherms remain around 27.1ºC and 30.5ºC. Similarly, the Highland zones shows these facies as the spatial distribution of temperatures indicates isotherms similar to historical data.

The map of anomalies below shows that the lowest temperatures (0.9ºC) were recorded in the localities of Kousseri, Waza, Maga and Bogo (Far North Region). In the Far South-West of the country, on the other hand, more specifically along the coastal zone, significant peaks in temperature variations were observed, i.e., 1.2ºC.

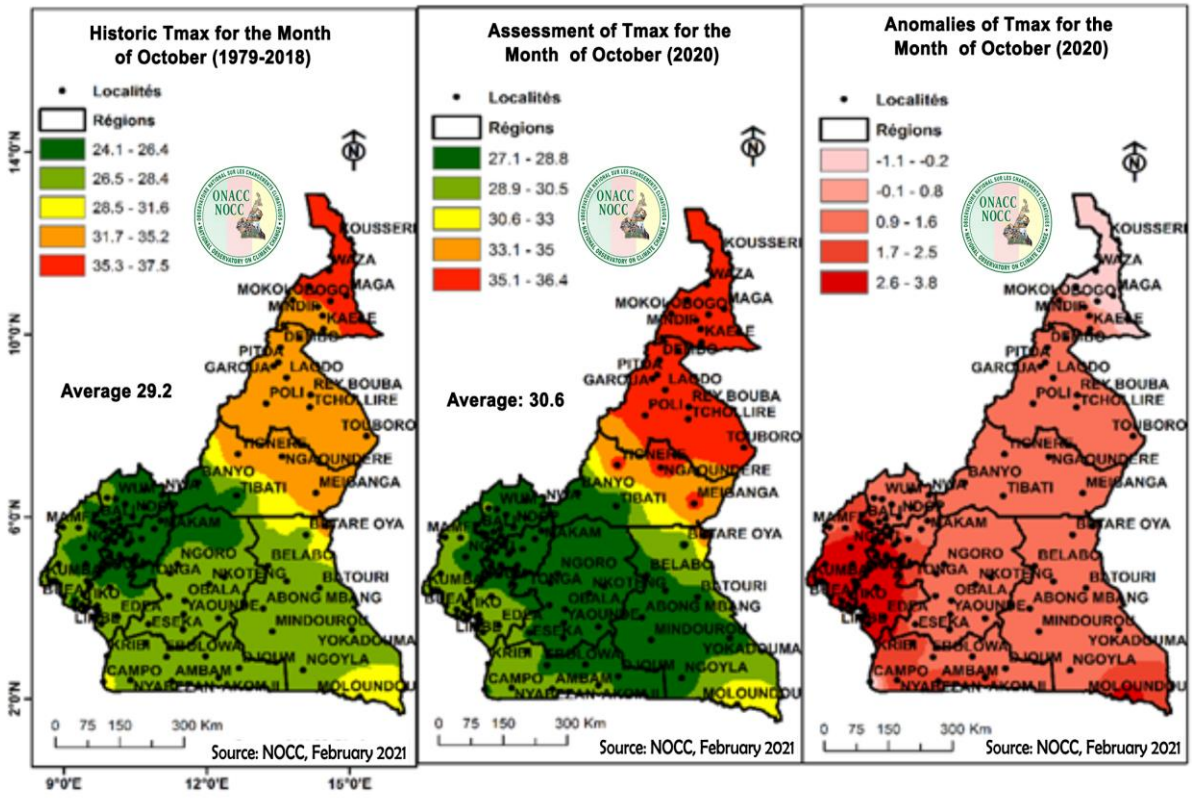


Figure 95: Spatial variation of maximum temperatures in October 2020 compared to historical data

4.2.9. Spatial variation of maximum temperatures in November

Figure 96 below shows the spatial distribution of maximum temperatures for November 2020. Here, the said temperatures show a strong variation compared to historical values (1979 - 2018).

According to this figure, the Sudano-Sahelian zone recorded temperatures in line with historical data; however, the localities of Kousseri, Waza, Maga, Bogo and Mokolo had temperatures between 34.8ºC and 37.1ºC, reflecting a drop in temperature. Also, the Guinean High Savannah zone recorded relatively stable maximum temperatures, compared to historical data, except for the locality of Tibati, which also recorded a drop in maximum temperatures between 28.7ºC and 30.4ºC. In the Bimodal Rainforest Zone, maximum temperatures between 28.7ºC and 30.4ºC showed a slight decrease, while those in Moloundo (32.1ºC and 34.7ºC) remained constant with historical data. In the same order, in the Monomodal Rainforest Zone,

maximum temperatures remained relatively constant during the month, while the localities of Campo and Kribi recorded a decrease ranging from 28.7ºC and 30.4ºC.

The map of anomalies revealed 0.8ºC as the lowest thermal difference in the northern part of the Far North region (Kousseri, Waza, Maga and Bogo), the south-western part of the South region (Campo, Nyabizan and Kribi), and the South-West region (Mamfe). On the other hand, localities such as the southern part of the Far North region (Mindif and Kaele), the North and Adamawa regions, the East region (Moloundou), the Littoral region (Edea) and the South-West region (Buea, Tiko and Limbe) experienced a significant temperature difference of 1.7ºC.

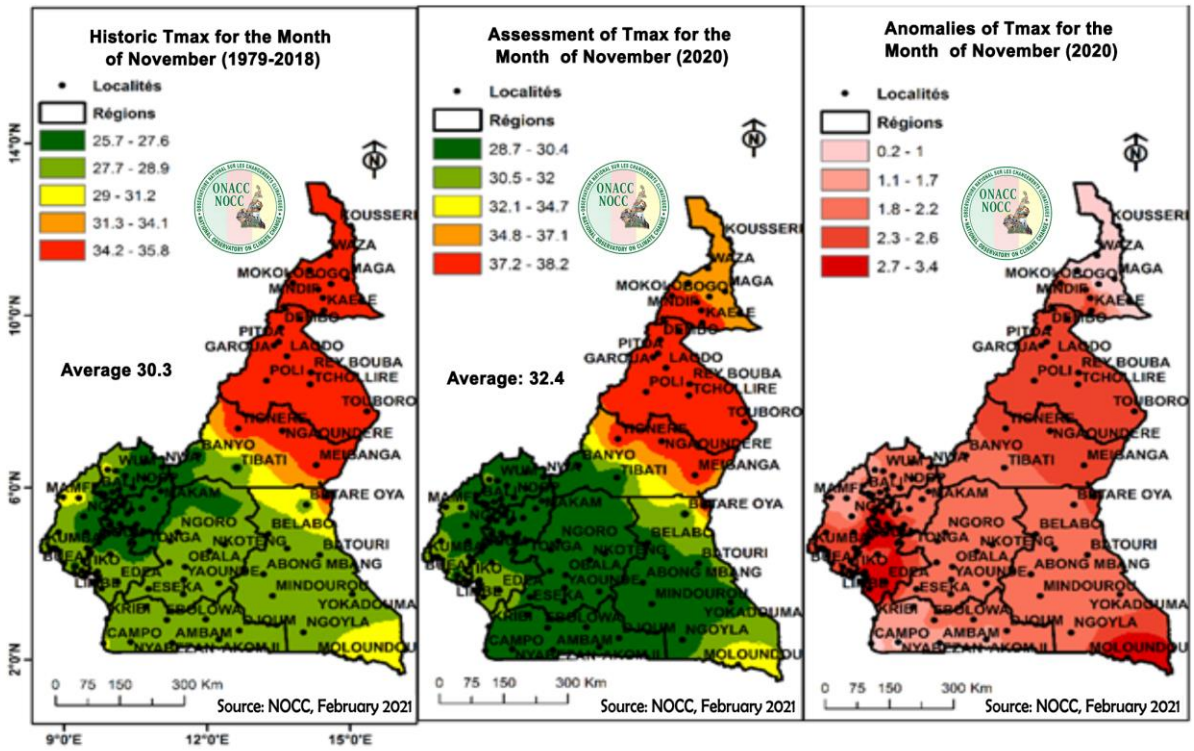


Figure 96: Spatial variation of maximum temperatures in November 2020 compared to historical data

4.2.10. Spatial variation of maximum temperatures in December

The dynamics of the December 2020 maximum temperature, presented in Figure 97 below, showed a variation from the historical values (1979-2018).

In the Sudano-Sahelian zone, the maximum temperatures reveals a relatively stable of the isotherms for this month of December 2020; however, Touboro, having temperatures between 27.2ºC and 31ºC, shows a decrease in these compared to the historical data. The Guinean High Savannah zone showed maximum temperatures more or less similar to historical data; the same applies to the bimodal rainforest zone, where the maximum temperatures recorded during the

month were similar to historical data, but with an increase in Moloundou of between 34.6ºC and 36.4ºC. The Monomodal Rainforest Zone is marked by lower temperatures in Campo, Nyabezan, and Kribi, with temperatures ranging from 29.2ºC to 31ºC. Other localities such as Kumba, Buea, Tiko and Limbe maintained a similar consistency to historical data. Similar consistency to historical values was recorded in the Highland zones.

With regards to the map of irregularities below, a smaller temperature difference of 1.5°C was recorded in the south-eastern part of the South region and the South-West region (Mamfe). Localities such as Touboro (North region) and Moloundou (East region) experienced a more significant temperature difference of 2.7°C.

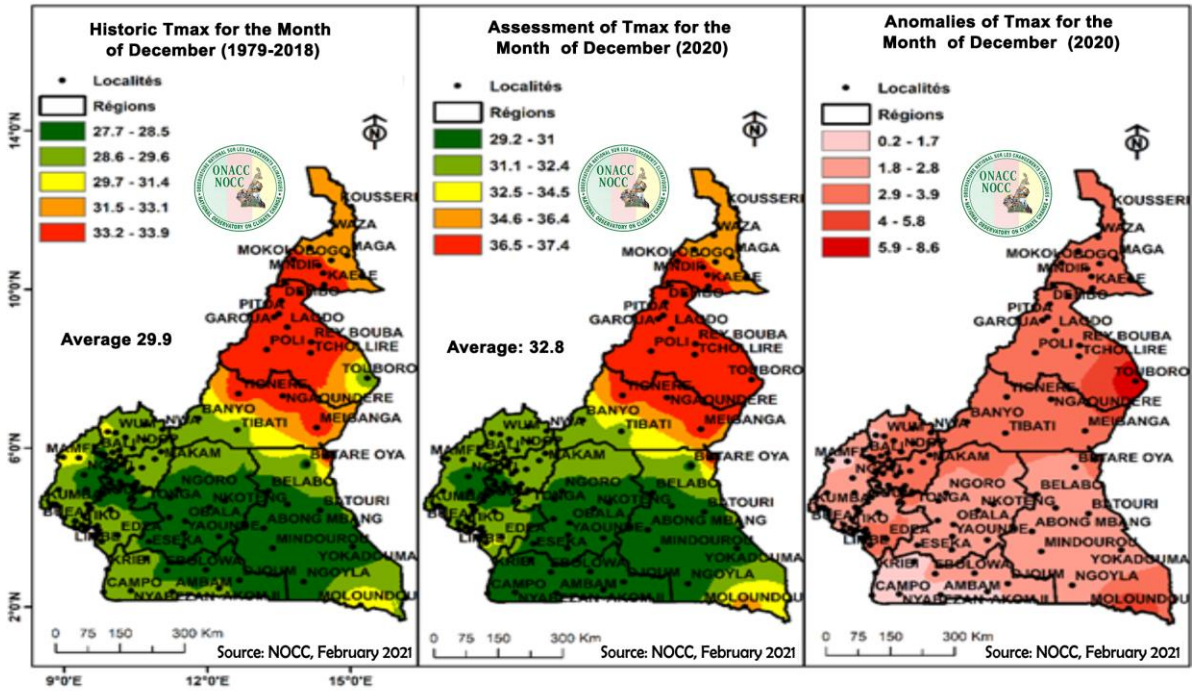


Figure 97: Spatial variation of maximum temperatures in December 2020 compared to historical data

PART 5

ASSESSMENT OF THE IMPACTS OF EXTREME CLIMATE EVENTS IN THE SOCIO-ECONOMIC SECTORS OF CAMEROON RECORDED IN THE YEAR 2020

5. THE IMPACTS OF EXTREME CLIMATE EVENTS ON THE SOCIO-ECONOMIC SECTORS OF CAMEROON IN 2020

The trends in climate parameters recorded in 2020 further support the IPCC's assertion that extreme events, such as floods and droughts, are now occurring more often and with increasing severity. Some parts of Africa are more prone to these events than others. It is likely that the increased frequency of recorded disasters is the result of a combination of climate change and socio-economic and demographic changes.

In Cameroon, the year 2020 was marked by exceptional rainfall (increase in rainfall amounts and intensity) as well as average temperatures. These events have impacted many development sectors, sometimes with irreversible effects on economic and social structures and the environment.

The review of extreme climate events highlights the impacts of climate change on development sectors in 2020. It shows that a number of cities and towns in the country have experienced flooding, resulting in, among other things, significant material damage, loss of life, destruction of houses, degradation of agricultural land, cases of climate-sensitive diseases irrespective of the climatic seasons, and agricultural losses due to flooding.

Thus, the objective of this section is to identify the impacts of extreme climatic events in the five agroecological zones of Cameroon. Although not exhaustive, this identification of impacts is essentially related to risks of hydroclimatic and morphogenic origin. Moreover, the said identification of impacts does not take into account the evaluation of the cost of the impact of extreme climatic events in the various development sectors.

The identification is done a posteriori and pertains to the twelve months of the year 2020. It mainly concerns the agriculture, energy, public works, health, education and housing sectors in the five agro-ecological zones of Cameroon.

5.1. Sudano-Sahelian zone

The Sudano-Sahelian agro-ecological zone was marked in 2020 by exceptional rainfall, which led to flooding in various localities in the Far North and North regions, and by an increase in minimum and maximum temperatures, leading to the occurrence of numerous diseases. As a result of the floods, damage and losses were recorded in the development sectors, notably agriculture, health, public works, energy, housing and education.

5.1.1. Agricultural sector

Agriculture in the Sudano-Sahelian zone usually results in low agricultural yields. The vast majority of producers in this region live below the poverty line. However, in order to improve productivity, good adaptation practices have been developed to combat climate change (ONACC, 2019). Notwithstanding the efforts made, the measures advocated remain highly influenced by strong climate variability. In 2020, the Far North and North regions experienced a late start to the rains, an early end to the rainy season and high temperatures. These diverse effects have greatly impacted this sector. Among the impacts recorded are the following:

- the invasion of locusts and the proliferation of army worms in maize fields in the Benoue and Mayo Rey divisions, resulting in the loss of over 500 hectares of maize;
- the shortening of growth and delayed ripening rates of crops in the locality of Rey Bouba.

Figure 98: Attack of maize fields by army worms in the Mayo-Rey Division and degradation of crop fields due to water stress in the Benoue

- 1,250 hectares of cultivated land submerged in the two regions, resulting in lower yields;
- loss of livestock and displacement of animals.

Figure 99: submersion of crop plantations and grazing areas in the Far North

5.1.2. Health Sector

Climate variability has serious repercussions on the socio-economic development sectors. The health sector is classified as one of the most vulnerable sectors with regard to the various climate risks, which mainly threaten the elderly, children and infants, people living in substandard housing, women and girls. In the Sudano-Sahelian zone, heavy rainfall causes flooding which contaminates drinking water and leads to water-borne diseases. In 2020, several impacts were recorded in this sector, notably:

- loss of life where 50 people died in the Far North region due to floods caused by heavy rains between June and November 2020;
- cases of diseases where 1890 confirmed cases of cholera were recorded in Garoua and Maroua and 73 deaths declared.

In addition, high temperatures led to many cases of illness in 2020. Some towns in the Far North and North regions were affected by cases of disease, epidemics and deaths.

- 514 cases of meningitis were recorded in the two regions with 64 deaths, representing a case-fatality rate of 12%.
- numerous cases of conjunctivitis in the towns of Garoua and Maroua were recorded due to the high temperatures and dust in the air.

Figure 100: Cholera epidemic in Maroua and Garoua due to the contamination of potable water by run-off water.

5.1.3. Public works and energy sectors

The public works and energy sectors are not spared from the adverse effects of climate change. These changes are reflected in the destruction of infrastructure following heavy rains accompanied by violent winds. In 2020, the regions of the Sudano-Sahelian zone experienced heavy rains which led to flooding, which in turn caused damage and loss of infrastructure. In 2020, the following were recorded:

- the collapse of the Palar bridge on the Maroua-Mora axis of the National Highway No. 1 in the Diamaré Division. Heavy torrential rains poured in the town of Maroua on August 31 2020, causing floods that destroyed infrastructures and impeded the movement of people and goods. The reconstruction of the Palar bridge is estimated at 4.195 billion CFA francs;
- the destruction of crossing infrastructures (bridges), lighting and telecommunications due to floods on August 31 2020 in the town of Maroua;
- the difficulty of assess to potable water supply in the towns of Garoua and Maroua and its surroundings due to the destruction of infrastructure and equipment due to floods on 31 August 2020 in the town of Maroua**.**

Figure 101: Collapse of the Palar bridge on the national road N°1 and destruction of the telecommunication infrastructure due to heavy rains on 31/08/2020

The high temperatures recorded during the year severely affected the energy sector from August 2020. The resulting high evapotranspiration led to:

- lower flows in the Benue River, affecting production at the Lagdo power station, which received only 48% of the expected water level. The Lagdo hydropower station ran at less than 28% of its installed capacity in the fourth quarter of 2020. As a palliative solution, Eneo, in agreement with the government, opted to transfer some generators from the Ahala power station (Yaounde), in order to boost energy demand in the North Interconnected Network (NIN). However, the recourse to this palliative solution led to enormous losses due to the financial additional charge caused by the over-consumption of diesel for the operation of the said generators.

Figure 102: Drop in the water level of the Benoue River affecting the production of the Lagdo hydroelectric power station.

5.1.4. Housing sector

Climate change considerably increases the vulnerability of the informal housing sector in the Far North and North regions. This vulnerability is accentuated by the type of construction and the quality of materials generally used (mud bricks, straw, etc.). Due to the relatively high poverty line in these regions, and the lack of alternatives, the inhabitants are forced to build precarious and flood-resistant housing. Due to the geomorphology and mineralogical make-up of the said regions (mostly sandy-clay soils), the heavy rains that fell in both regions in 2020 led to major flooding with considerable damage, leaving many families homeless. To this end, the following salient cases were listed:

- the destruction of houses in the Moulvoudaye-Maroua district due to floods caused by the heavy rains of 29 September 2020, leaving more than 100 families homeless;
- the destruction of about 954 houses due to floods in the two regions;
- the displacement of more than 162,300 people within the five Divisions of the Far North region due to floods between June and November 2020;
- the displacement of more than 1,500 households in the town of Kousseri due to the rise in the level of the Logone River, as the river was unable to contain the amount of water from the torrential rains.

Figure 103: Floods in the town of Maroua

5.1.5. Education sector

Climate variability also influences the education sector. Indeed, school infrastructure and performance are strongly affected by flooding due to heavy rainfall. In the North region, schools suffered severe damages in 2020, such as:

- 104 primary and secondary schools were ravaged by floods from July to October 2020, affecting more than 38,000 pupils.

Figure 104: Flooding of schools (primary and secondary) due to heavy rains in the Far North region

In summary, in 2020, extreme climate events had a major impact on the various socio-economic development sectors in the Sudano-Sahelian zone. In terms of impacts, we can broadly list:

- the death of 50 people and the displacement of 1857 households;
- the destruction of 104 primary and secondary schools affecting more than 38,000 students;

- the destruction of public works infrastructure (bridges, culverts, culverts and roads), electrical transport and telecommunications infrastructure;
- the loss of crops following the submergence of around 1250 hectares of cultivated land;
- loss of livestock and other species due to drowning;
- an occurrence of meningitis cases, i.e. 514 cases recorded with 64 reported deaths;
- an occurrence of cholera cases, i.e. 1890 cases recorded with 73 reported deaths;
- the destruction of nearly 954 houses, leaving many of the local population homeless;
- the collapse of the Palar bridge, which impeded the movement of people and goods, with enormous economic consequences in the Far North region.

Table 1: Summary of extreme climate events in 2020 in the Sudano-Sahelian zone

TYPE OF EVENT	PLACE AND DATE (2020)	SUMMARY DESCRIPTION/ IMPACTS	OUTCOME	SOURCES/ OBSERVATIONS
FLOODS	02/09/2020, Kodek in the Far North	Flooding episode due to heavy rainfall	No casualty	Media
	29/09/2020, Moulvoudaye-Maroua	Heavy rains which caused the destruction of several houses due to heavy rainfall	About 300 houses destroyed	Media
	30/08/2020, in Maroua	Heavy torrential rains that poured and caused the destruction of structures and infrastructure	- Collapse of the Palar bridge due to flooding and hindering the movement of people and goods; - Destruction of crossing structures, electricity and telecommunications	CRTV
	30/08/2020, Waza-Maroua	Flooding due to heavy rains leading to the displacement of many	- No casualty - Migration of populations	CRTV News
	Between July and October 2020 Far North	Heavy rains have led to flooding and destruction of property	- 162.300 people affected in five divisions of the Far North region; - 357 households displaced; - 104 primary and secondary schools devastated; - 38.000 students affected; -50 people dead -1.500 households migrated in the town of Kousseri; - loss of food, crops and livestock	Red Cross
	On 15/12/2020	Torrential rains flooded cultivated land	1250 hectares of cultivated land	Red Cross
EPIDEMICS	In 2020 in the Far North region	Cases of meningitis due to heat waves	Nearly 514 confirmed cases and 64 deaths	MINSANTE
	In 2020 in the Far North and North regions	Cases of Cholera due to the contamination of drinking water	-1890 confirmed cases -73 deaths	WHO
	In 2020 in the Far North and North regions	Cases of conjunctivitis due to high temperatures and the presence of dust in the air	NA	MINSANTE
CROP ATTACK	In 2020 in the Far North and North regions	Shortened crop growth due to the premature end of the rainy season.	Decrease in agricultural yields	On the field
	Between 2020 Benoué division and Ngong district	Locust caterpillar invasion due to premature cessation of rains	500 hectares of maize destroyed	On the field
	Rey Bouba division	Delayed crop growth rates due to high temperatures.	Decrease in agricultural yields	On the field

5.2. Monomodal rain forest zone

The amount of rainfall received in 2020 in the monomodal forest zone was accompanied by significant extreme weather events, particularly flooding. The occurrence of flooding in some localities in this agro-ecological zone caused significant damage in several development sectors, including agriculture, public health, transport, housing and livestock.

5.2.1. Agricultural sector

Agriculture in the monomodal rainforest zone is generally done in the rainy season. Producers use more intensive techniques, adopting new crops to increase yields and other coping strategies such as ridging and bench farming to cope with the zone's relatively high rainfall. However, these innovations face high climate variability. In 2020, the South West and Littoral regions experienced rainfall amounts above the average with a very high rainfall intensity that greatly affected the sector. Among the impacts recorded were:

- the destruction of a dozen agricultural fields in Buea which were due to heavy rains, leading to important floods and mudflows observed on 24 March 2020;
- the submerging of farmland by the floods of 21 August 2020 caused by the overflow of the banks of the Wouri River due to heavy rainfall.

Figure 105: Flooding and mudflows observed on 24/03/2020 in Buea.

Figure 106: Submersion of agricultural land following the overflow of the banks of the Wouri River on 21/08/2020

5.2.2. Health sector

In terms of Cameroon's health system, the Littoral and South West regions were among those most affected.

The localities in these regions had different degrees of vulnerability, all of which depended on their location, the capacity to access drinking water and the facilities provided for wastewater drainage.

In 2020, no material damage was recorded in the health sector. The main impact recorded in this sector was the cholera crisis, which affected the Littoral and South West regions to varying degrees. Loss of human lives was recorded in these regions.

During the year 2020, the health sector faced a severe cholera epidemic which forced the government to mobilise contingency measures to deal with it. Health bulletins on epidemiological surveillance indicate that one of the suspected triggers of this epidemic was the floods of May 2022. Following the heavy rainfall recorded in the area on that date, household drinking was contaminated by runoff. Given the level of promiscuity of the non-natives, the consumption of the said water as well as its use in household activities allowed the proliferation of this epidemic which caused 22 cases of death. (MINSANTE, 2020).

Figure 107: treatment of some cholera patients in Douala

The outbreak of this bacterial disease is the consequence of the poor hygiene conditions (insalubrity) observed in this locality of the Littoral, which has about 154,000 inhabitants. Indeed, the poor hygiene practices and the difficulties related to access to potable water make these localities a permanent health risk zone. In the majority of cases, the populations use shallow and poorly equipped latrines, which are one of the main sources of pollution of the points due to the exchange of water between the water tables. In addition to this situation, there is the contamination of water points by dirty run-off water

5.2.3. Housing sector

The housing sector is also one of the sectors most affected by floods and landslides in both the city of Douala and the South West region. Once prone to morphogenic and hydroclimatic risks, localities in the city of Douala as well as in the cities of Kumba, Buea and Limbe have recorded cases of flooding and landslides affecting several social housing units. Among the cases recorded, we note the following salient events:

- the flooding of nearly 700 households in Douala accompanied by the destruction of important movable assets on Friday 21 August 2020 in the city of Douala;
- cases of loss of human lives following the landslide that occurred on that day;
- the flooding of commercial establishments leading to the cessation of activities and economic losses, including the lay-off of nearly 2,000 commercial establishments, affecting about 30,000 jobs indirectly.

Figure 108: Floods in the Littoral following heavy rainfall on 21 August 2020

Heavy rains poured on the town of Douala on August 21 2020, flooding houses and destroying properties. The material damage caused by the floods was estimated at several billion CFA francs. The informal sector is among the sectors most affected by heavy rainfall. This sector, which constitutes more than 80% of the economic activity of Douala, was virtually on standby. The most affected areas were Makepe and Missoke in Douala V, Bilonge I and Cité Belge in Douala III.

Figure 109 :Flooding in Douala due to heavy rains on 21/08/2020

At the foot of Mount Cameroon, at the end of the day, on Tuesday 24 March 2020, water drainage systems overflowed, turning arteries into rivers after heavy rain. During the night of March 24 to 25 2020, a torrential rain fell in the town of Buea, resulting to floods. Mudflows that followed caused a lot of damage, depriving some inhabitants of electricity and potable water.

The floods submerged part of the town. Residential houses and public buildings, such as the military camp and the Buea regional hospital, were affected by mudflows. No loss of life was recorded, according to the authorities who supervised the rescue operations, but there was significant material damage.

Figure 110: Mudflow at the foot of Mount Cameroon in Buea due to heavy rains on March 24 2020

It is worth noting that one of the areas that suffered most damage from the bad weather was the locality of Nkongho Mbo, in the Koupé-Manengouba Division, in the South West region. The floods left 4 people dead and had an impact on housing.

5.2.4. Transport sector

The transport sector was not spared from flooding in the Littoral. This was mainly due to rainfall amounts above the average in 2020 coupled with unmaintained gutters that are often blocked and filled with residues left by the mismanagement of household waste.

The transport sector was not spared as the heavy rains recorded during the eleven-day period from 10 to 20 May in Douala caused major flooding, paralysing a large part of the urban transport system, such as the Guinness Club New Town area.

Figure 111: Floods in Douala at Guinness Club, New Town, Airport areaon 12/05/2020.

Figure 112: Floods in Douala prevents free movement of vehicles and people.

In the same vein, the populations of the city of Buea experienced mudslides and floods in the dekad from 1 to 10 April 2020. The succession of these two extreme events resulted in loss of life and the obstruction of inter-urban road traffic.

Figure 113: Flooding and mudslides in Buea on Tuesday, March 24 2020 due to heavy rains.

Table 2: Extract of extreme climate events in 2020 in the monomodal rain forest zone

TYPE OF EVENT	PLACE AND DATE (2020)	SUMMARY DESCRIPTIONON/ IMPACTS	OUTCOME	SOURCES/ OBSERVATIONS
EPIDEMICS	16/05/2020 Littoral	Contamination of potable water by flood runoff	- 22 cases of cholera confirmed - 4 deaths recorded	MINSANTE
FLOODS	24/03/2020, Buea	Torrents hit a dozen neighbourhoods in Buea, releasing an ocean of water that washed away property, soil and stones. In addition, "mudflows" caused by unusual rainfall or sudden thaw were observed.	No loss of life, but significant material damage.	Focal points
	4/ 04/ 2020, Buea	An episode of flooding was observed after heavy rains flooded a gutter in Buea, resulting in the drowning of a teenager who was playing in the rain with his friends.	1 young person dead and property destroyed	Journal du Cameroun
	12/ 05/ 2020 Douala	Heavy rains left some residents stranded at Guinness Club New Town Airport.	No casualties	CRTV web
	21/08/2020, Douala ;	Heavy rains in Douala, flooding houses and destroying household materials. Sable, Bonamoussadi, Makepe-Douala, St. Tropez (Rue des Princes). Neighbourhoods such as Bepanda Safari, Akwa, New bell, Nkololoun, Bongo Cité Berge, Makepe Missoke, Carriere de tete, Mabanda Bonaberi, Bepanda Bongo, Bonamoussadi were submerged with many houses completely covered by floods	Houses and home equipment destroyed.	Focal points
	20/ 05/ 2015, Douala	Flooding in Douala, Cameroon, after days of heavy rain	At least four people were killed, and houses were destroyed. Thousands of businesses have been ruined, and at least 2.000 people have been displaced, thus 30.000 people have been directly affected.	The New Humanitarian
	12/05/2020, Douala	Heavy rains in Douala at 4am, leaving some residents stranded at Guinness Club New Town, Airport area.	Destruction of home material	Twitter, CRTVweb
		Floods devastate farmland, overflowing the banks of the Wouri, submerging houses and stopping traffic for several hours.	No casualties	CRTV web
	27/08/2020 South West	Flooding due to heavy rains. Nkongho Mbo, department of Koupé-Manengouba, in the said region	4 dead, houses submerged and a landslide	CRTV

5.3. Highlands zone

The history of extreme weather situations in the highlands zone reveals that the months of June, July and August are periods of high occurrence of landslides and mudslides, as was the case in 2020.

5.3.1. Agricultural sector

The results of agricultural surveys and statistics indicate that the North West region is one of the regions of Cameroon that has experienced a sharp decline in yields over the last four years. Climate change is one of the reasons cited for this. The poor harvest of cereals, especially maize, following the late arrival of rainfall in the localities of Nwa, Sabongan and Mbo Nso in the North West region can be seen in figure (a).

In addition to the case of delayed rainfall observed in the eastern part of the North West Region, the West region, specifically the locality of Foumban, was the scene of landslides following the heavy rains of the dekad from 21st to 30th July 2020. This morphogenic event led to the destruction of several cultivation areas, thus affecting agricultural yields (b).

Figure 114: deterioration of maize fields following the late arrival of rain and landslides in Foumban following heavy rains

5.3.2. Health sector

With regard to the health situation in the zone in 2020, the health map of the highlands shows a high occurrence of waterborne diseases. Cases of typhoid, diarrhoea and amoebiasis epidemics have been detected and reported. The occurrence of these diseases has forced the government to put in place emergency measures to contain these epidemics. The health bulletins indicate that the difficulty of access to drinking water and the dilapidated state of wastewater disposal facilities are among the causes of the proliferation of the above-mentioned epidemics.

In addition, national and cross-border population movements, as well as poor sanitation and access to drinking water, make the West and North West regions a risk area for all the above-mentioned epidemics. During heavy rains, water floods latrines, with contaminated water flowing into household water supply wells, according to UNICEF. Cameroon Baptist Convention Health Services (CBCHS) and CARITAS in Bamenda, jointly provided assistance in basic health provision to IDPs and host communities in hard-to-reach areas following the floods in the North West region (Menchum and Ngo-Ketunjia). Approximately 3,011 children (1,349 boys and 1,662 girls) received basic multi-faceted treatment to reduce the said outbreaks and to combat malaria.

5.3.2. Public-works sector

Cameroon is subject to a variety of geomorphological and hydroclimatic hazards whose occurrence and combination with social, economic, demographic, health and environmental factors make the population very vulnerable. Landslides are very common in the West and North West regions. Although little information is available on economic losses, it is estimated that the damage and losses from these events are often very significant for the populations of these regions.

For example, in August 2020, a landslide on the Lip-Mbokam road, Jakiri district, Bui department, North West region, caused the destruction of the said road section, resulting in the interruption of inter-city transport, leading to the deterioration of foodstuffs and other material goods in several localities.

Figure 115: deterioration of the Lip-Mbokam Road section, Jakiri district, Bui division, North West region, in August 2020.

Heavy rains in Kumbo on 17 July 2020 resulted in a landslide that washed away part of the roadway causing important damage and rehabilitation costs of the roadway, as well as considerable economic losses due to reduced traffic and trade.

Figure 116: Landslide due to heavy rainfall in the Bui division on 17/07/2020

From 20 to 21 August 2020, heavy rains in Santchou in the Menoua department caused flooding. As a result of the flooding, the embankment of a culvert on the Santchou-Melon road section collapsed. This obstruction disrupted the movement of people and goods. The Minister of Territorial Administration, during a visit to the site of the catastrophic flood of Santchou took the opportunity to sensitize the victims to avoid building in areas at risk, to take responsible actions and especially not to block the drainage systems with plastic bottles and other household waste.

Figure 117: deterioration and destruction of the Santchou and Melon Road section due to heavy downpour on 21/08/2020.

5.3.3. Housing sector

The housing sector was not left out of the extreme climate events. Heavy rains on 31 July 2020 led to landslide in the town of Foumban. This led to the loss of the lives of a 35-year-old man and his two children, aged 7 and 13.

Figure 118: Landslide in Foumban due to heavy rains on 31 July 2020

Also, the floods took a heavy toll on the locality of Santchou, a locality located in the Menoua Division, West region, six houses were destroyed and 185 households were flooded on 21 August 2020, leaving 200 families with many material damages (demolition of houses, destruction of crops and many others) and causing the death of two people.

Table 3: Summary of extreme climate events in the development sectors in the highlands zone in 2020

TYPE OF EVENT	PLACE AND DATE (2020)	SUMMARY DESCRIPTIONON/ IMPACTS	OUTCOME	SOURCES/ OBSERVATIONS
FLOODS	21/08/2020, Santchou, Menoua Division, West region	Heavy rains	- Collapse of the culvert on the Santchou-Dschang road - disrupting traffic and socio-economic activities - Six houses destroyed and 185 households flooded - 200 families affected -Numerous material damages (demolition of houses, destruction of crops and many others).	CRTV
	During the year 2020 in the North West region	Flooding caused by heavy rains led to contamination of drinking water	Many cases of diarrhoeal and cold-related diseases	Focal points
	During the year 2020 in the North West and West regions	Flooding caused by heavy rains flooded farmland	Destruction of farmland	Cameroon Red Cross
LANDSLIDES	August 2020 Bui division	Landslide due to heavy rains	- Collapse of part of the road in Lip-Mbokam - Loss of agricultural land - Numerous material damages	Focal points
	31 July 2020, Foumban	Heavy rainfall caused a landslide	A 35-year-old man and his two children, aged 7 and 13, lost their lives	Média

5.4. Bimodal rain forest zone

The summary of extreme climatic situations in the bimodal rainfall forest zone shows a high occurrence of flooding. The combination of risk factors such as topography, high urbanization, land use and development system, plus the high intensity of rainfall events on increasingly shorter time scales, predisposes the cities of Ebolowa, Kribi and Yaounde to a high risk of flooding with considerable impacts on the development sectors.

5.4.1. Agricultural sector

The vulnerability of the agricultural sector to climate change remains an inescapable fact. The heavy rainfall recorded during the 11th and 20th of November 2020, in the localities of Bewondo, Dehane and Di-kobe led to the submergence of areas suitable for market gardening on the banks of the Nyong River, thus causing the degradation of crops and crop failure. Agricultural extension workers estimate the impact area to be over 110 hectares with significant economic losses.

Figure 119: destruction of houses due to heavy rains on 11 and 12 November 2020 in Béwondo

5.4.2. Housing sector

The history of extreme climatic events in the bimodal rainfall forest zone indicates that the occurrence of flooding situations used to be more frequent during the long rainy season. The trends observed over the last five years call for a reconsideration of the facts and a contextualisation of the said extreme climatic events.

The summary of feedback from the field indicates that some towns and cities in the bimodal forest zone are increasingly experiencing catastrophic flooding between the end of March and mid-June, which is the short rainy season in the zone. This is due to the fact that during this period there is an increasing amount of very heavy rainfall.

Thus, with reference to the issues of the weather forecast and warning bulletins of 21st to 30th March, 1st to 10th May and 21st to 30th May 2020, NOCC announced a high risk of flooding situations, cases of destruction of infrastructures in the housing sector following heavy rainfall accompanied by violent winds. The storms experienced during this period resulted not only in flooding, but also in the destruction of several school infrastructures. The most striking experiences are those of the general secondary school of Obala in the Centre region and the general secondary school of Lokoundje, where significant material damage was recorded following the storms.

Figure 120: illustration of cases of flooding in the New-Bell district of Ebolowa and the destruction of school infrastructure in Obala following heavy rains accompanied by violent winds

Furthermore, Kennedy Avenue in the commercial centre of the political capital of Cameroon recorded a lot of material damage on September 2 2020 due to floods caused by heavy rains. The losses resulting from these floods are significant, but difficult to quantify because of the predominance of informal trade.

Figure 121: Significant material damage recorded in Kennedy Avenue on September 02 2020 due to flooding caused by heavy rains.

Table 4: Summary of extreme climate events in the development sectors in the bimodal rain forest zone in 2020

TYPE OF EVENT	PLACE AND DATE (2019)	SUMMARY DESCRIPTIONON/ IMPACTS	OUTCOME	SOURCES/ OBSERVATIONS
FLOODS	11 and 12 November 2020, Béwondo, Déhané and Di-kobé	Almost all houses, appliances, plantations, fishing equipment, poultry and many other valuable items were swallowed by the waters	In Déhané, the river absorbed more than 110 hectares of the Haut-Penja industrial banana plantation. Losses were estimated at 2 billion FCFA, resulting in the temporary suspension of 500 employees.	CRTV Web
	September 2020, Lokoundje subdivision	Flooding in the Ocean division in the South region of Cameroon has left over 5.000 people in distress.	Many houses, schools, health centres and plantations were submerged by floods due to heavy rains in this part of the country. Although no loss of life was recorded, the natural phenomenon caused several material damages. According to reports from these areas, houses, schools, health centres, plantations and many other infrastructures in the region were covered by water.	Cameroun tribune
	23 October 2020	Flooding has affected around 193.000 people in the South region of Cameroon.	Many materials destroyed	Focal points
	02 September 2020	A lot of material damage has been recorded in Kennedy Avenue	This situation caused flooding in the New-Bell district of Douala, resulting in significant material damage in households (chairs, sofas and beds were drowned). The losses are estimated at CFAF 2 billion 500 employees were put on short-time work.	CRTV Web
	28 march 2020	Heavy rains have caused flooding in the New-Bell district of Douala.	Extensive property damage in homes (chairs, sofas and beds were drowned)	Focal points
	11 and 12 November	Heavy rainfall poured on the villages of Béwondo, Déhané and Di-kobé.	Extensive property damage in homes (chairs, sofas and beds were drowned	Focal points

This section highlights the impacts of extreme climate events on the socio-economic development sectors in 2020 by agro-ecological zone. Following the climate forecasts made by the National Observatory on Climate Change in its dekadal and seasonal bulletins, most of the events that occurred were predicted and could have been avoided.

The assessment of damage and losses from extreme climate events, which is not done in this document, will help to sensitize policy makers on the extent of climate disruption in the Cameroonian economy, in order to encourage the implementation of adaptation actions that guarantee climate change resilient development and the achievement of the objectives of the National Development Strategy 2020-2030.