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Statement on the Status of Tanzania Climate in 2025

March, 2026

**TANZANIA METEOROLOGICAL AUTHORITY
(TMA)**



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Table of contents

Table of contents	i
List of figures	iii
Abbreviations.....	v
Foreword	1
1. Introduction.....	2
2. Temperature	3
2.1 Annual mean, maximum and minimum temperature anomalies.....	3
2.2 Monthly average mean, maximum and minimum temperature anomalies	4
2.3 Spatial monthly maximum temperature anomalies.....	5
2.4 Spatial monthly minimum temperature anomalies.....	8
3 Rainfall	10
3.1 Spatial annual rainfall distribution	10
3.2 Spatial seasonal rainfall distribution	11
3.3 Spatial monthly rainfall distribution	13
3.3.2 Monthly spatial rainfall distribution summaries.....	13
3.4 Cumulative rainfall	17
4 Extreme Weather and Climate Events of 2025	21
4.1 Extreme rainfall events	21
4.2 Extreme temperature events	22
5 Major drivers of weather and climate events in 2025.....	23
6 Weather and climate related impacts.....	26

7	Summary	30
8	Appendix	31
8.1	Climate of Tanzania	31
8.1.1	Temperature distribution	31
8.1.2	Rainfall patterns.....	31
8.2	Long-term average (1991-2020).....	31
8.3	Rainfall anomaly (Percent of average)	32
8.4	Temperature anomaly	32
8.5	Cumulative Rainfall Curves and Their Significance	32
8.6	Spatial analysis for temperature and rainfall distribution	33
8.7	Severe weather.....	33
8.8	Calculations of Sea Surface Temperature anomaly for the IOD and ENSO	34

List of figures

Figure 1: Annual temperature anomalies (°C) for Tanzania in 2025 relative to 1991–2020 average, showing maximum temperature (top left), minimum temperature (top right), and mean temperature (bottom).	4
Figure 2: Monthly anomalies (°C) of mean temperature (Tmean), maximum temperature (Tmax), and minimum temperature (Tmin) for Tanzania in 2025, relative to 1991–2020 average.	5
Figure 3a: Monthly maximum temperature anomalies (°C) for January–June 2025 relative to 1991–2020 average.	6
Figure 3b: Monthly maximum temperature anomalies (°C) for July–December 2025 relative to 1991–2020 average.	7
Figure 4a: Monthly minimum temperature anomalies (°C) for January–June 2025 relative to 1991–2020 average.	8
Figure 4b: Monthly minimum temperature anomalies (°C) for July–December 2025 relative to 1991–2020 average.	9
Figure 5: Annual rainfall anomalies for 2025 expressed as percentage of 1991–2020 average.	10
Figure 6: Seasonal rainfall anomalies for NDJFMA 2025 (top left panel); January and February 2025 (top right panel); MAM 2025 (bottom left panel); and OND 2025 (bottom right panel), expressed as percentage of 1991–2020 average.	12
Figure 7a: Monthly rainfall anomalies expressed as percentage of 1991 - 2020 average for January to June 2025.	15
Figure 7b: Monthly rainfall anomalies expressed as percentage of 1991–2020 average for July to December 2025.	16
Figure 8a: Cumulative rainfall for the NDJFMA season for Dodoma, Igeri, Tabora, Songea, Mahenge Iringa, Uyole, Kigoma, Sumbawanga and Mtwara meteorological stations, presented as accumulation of dekadal rainfall totals for each month starting from September 2024 to August 2025.	18
Figure 8b: Cumulative rainfall for MAM 2025, season for Arusha, Tanga, Dar es Salaam (JNIA), Bukoba, Mwanza, Moshi, Zanzibar (Kisauni), Morogoro, Musoma and Shinyanga meteorological stations, presented as accumulation of dekadal rainfall totals for each month starting from January to August 2025.	19
Figure 8c: Cumulative rainfall for OND 2025 season for Arusha, Tanga, Dar es Salaam (JNIA), Bukoba, Mwanza, Moshi, Zanzibar (Kisauni), Morogoro, Musoma and Shinyanga meteorological stations, presented as accumulation of dekadal rainfall totals for each month starting from June to December 2025.	20
Figure 9: Sea Surface Temperature Anomalies for January and April (upper left and right panel), October and December 2025 (bottom left and right panel) showing evolution of Sea Surface Temperatures across Pacific Ocean (red cycled) and Indian Ocean (black cycled). Anomalies are departures from the long-term average (1991–2020).	24
Figure 10: Wind anomaly (vector and its amplitude) at 850 mb for January and April (upper left and right panels) as well as October and December (bottom left and right panels) 2025, showing evolution of low-level winds across the Indian Ocean (black cycled) and East Atlantic Ocean (red cycled). Anomalies are departures from the long-term average (1991–2020).	25
Figure 11: Destruction caused by heavy rain associated with strong winds and hail at Ulanga district in Morogoro region.	26
Figure 12 Some areas affected by floods in Moshi district, Kilimanjaro region.	27

Figure 13: Flooding of Moshi-Arusha-Dar es Salaam highway road. Regional fire and rescue services removing logs on the road in Kiboriloni area, in Kilimanjaro region on 06th May 2025..... 28

Figure 14: Police officer assists Mwanza residents in crossing the flooded Mkuyuni Bridge after heavy rainfall pounded the region on 09th April , 2025 . PHOTO| MGONGO KAITIRA..... 29

Figure 15: Blocks used to calculate the Indian Ocean Dipole (IOD) mode in the Indian Ocean (left) and the El Niño and La Niña indices in the Pacific Ocean (right)..... 34



Abbreviations

CEPO	Central Equatorial Pacific Ocean
CPC	Climate Prediction Center
ENSO	El Niño Southern Oscillation
IDW	Inverse Distance Weighting
IOD	Indian Ocean Dipole
ITCZ	Inter Tropical Convergence Zone
JNIA	Julius Nyerere International Airport
KIA	Kilimanjaro International Airport
MAM	March to May (<i>Masika</i>)
NCEP	National Centers for Environmental Prediction
NDJFMA	November 2024 to April 2025 (<i>Msimu</i>)
OND	October to December (<i>Vuli</i>)
PMO–DMD	Prime Minister’s Office – Disaster Management Department
SSTs	Sea Surface Temperatures
SSTA	Sea Surface Temperature Anomalies
TMA	Tanzania Meteorological Authority
Tmax	Maximum temperature
Tmean	Mean temperature
Tmin	Minimum temperature
WMO	World Meteorological Organization

Foreword

Tanzania, like many other developing countries, experiences the increasing impacts of climate change and variability, affecting key sectors including agriculture, water resources, mining, energy, public health, transport and infrastructure. In response to these challenges, continuous monitoring, documentation and dissemination of weather and climate information are essential for understanding climate patterns and guiding evidence-based adaptation and risk-reduction efforts.

In accordance with the Tanzania Meteorological Authority Act No. 2 of 2019, the Tanzania Meteorological Authority (TMA) annually publishes a climate statement, based on a comprehensive climate analysis to monitor, assess, and document changes in Tanzania's climate over time. The statement provides valuable insights into Tanzania's climate trends, variations, and extremes as compared to past conditions. It serves as an important decision-support tool for diverse stakeholders, including the public, government institutions, policymakers, academia, researchers, and planning agencies, both nationally and internationally. The analysis in this report are based on the most up-to-date observational datasets collected from TMA's extensive network of meteorological observation stations. The reliance on these observations highlights the critical need to maintain and expand these monitoring networks to ensure the accuracy and reliability of climate assessments.

The 2025 Annual Statement on the Status of Tanzania's Climate marks the 15th edition of this important series of publications issued by TMA. I extend my sincere gratitude to all stakeholders for their unwavering support, valuable contributions, and constructive feedback, which have greatly enriched this publication. I would also like to commend all individuals involved in the preparation and review of this statement, particularly the teams of production and experts. Your dedication and expertise are instrumental in advancing climate knowledge and preparedness in Tanzania.



Dr. Ladislaus B. Chang'a

Director General

Tanzania Meteorological Authority



1. Introduction

The 2025 Annual Climate Statement for Tanzania provides a comprehensive overview of the annual climatic conditions of the country. The statement reveals key temperature and rainfall trends, extreme weather events, and their associated impacts. It also offers a historical context for the observed climate patterns and severe weather occurrences. This statement aims to inform decision-makers, researchers, and the general public about the state of the 2025 climate variability and its implications for critical sectors such as agriculture, water resources, mining, transport and transportation, energy, public health, and disaster risk management.

The information presented in this statement is based on data collected from TMA observation networks. Additionally, weather-related impact data were sourced from the Prime Minister's Office – Department of Disaster Management (PMO–DMD), Second Vice Presidents Office (VPO2) through the Zanzibar Disaster Management Commission (ZDMC), as well as from media reports.

This statement is structured to present monthly, seasonal, and annual perspectives on temperature and rainfall patterns, extreme weather events and their impacts, as well as key climate drivers in 2025. For the purposes of this report, the period 1991–2020 is designated as the climatological reference period. Climate analyses were assessed against this reference period, while comparisons and rankings were made using historical observations of similar weather events. Throughout the document, the terms “above/below average refer specifically to the climatological reference period.

Generally, the year 2025 was marked by significant climatic variations, with record-breaking temperatures and rainfall episodes across the country. Moreover, exceptional rainfall during June was observed over the northern coast and its hinterlands, a month that is relatively dry. The observed variation in climate trends and patterns was highly influenced by variations of major climate drivers, including El-Niño Southern Oscillations (ENSO), Indian Ocean Dipole (IOD), and the tracking of tropical storms.

2. Temperature

In 2025, Tanzania experienced warmer-than-average temperatures, making it the 4th warmest year on record since 1970, with the country's mean temperature (T_{mean}) anomaly of 0.5°C above average. Generally, temperature anomalies in the country showed notable temporal variation. The country recorded significantly higher mean air temperature (T_{mean}) anomalies in February (0.8°C) and March, November, and December (0.6°C). The highest warming in minimum temperature was observed during the cooler months of May, June, and July, with T_{min} anomalies of 1.1°C , 1.0°C and 1.1°C , respectively, indicating relatively warmer nights during this period. In contrast, the highest positive anomalies in maximum temperature of 1.0°C and 0.7°C were recorded in February and November, reflecting unusually warmer daytime conditions during these months.

Overall, both average minimum and maximum temperatures were above average in most months, except for the maximum temperature anomalies from May to August which were slightly below average. Notably, in 2025 the country recorded two exceptionally high maximum temperatures. Daily maximum temperatures of 38.6°C and 38.0°C were observed at Ilonga and Mlingano Meteorological Stations (Tanga Region) on 19 and 24 February 2025, respectively. The 38.6°C recorded at Ilonga equals the station's historical maximum temperature previously observed on 19 March 1981, and remains the highest temperature recorded at the station since observations began in 1961, while the 38.0°C recorded at Mlingano represents a new February record for the station, since 1938.

2.1 Annual mean, maximum and minimum temperature anomalies

The country's annual mean temperature (T_{mean}) for 2025 was 23.9°C , which is 0.5°C above average, making 2025 the 4th warmest year on record since 1970. Across the country, annual mean temperature anomalies (Figure 1, bottom) were predominantly between 0°C and 1°C above average except for a few areas of the Rukwa region whose T_{mean} anomalies ranged between 1.0°C to 2.0°C above average.

The country's average annual maximum temperature (T_{max}) for 2025 was 28.8°C , which is 0.3°C warmer than the average. Across the country, T_{max} anomalies (Figure 1, top left) ranged from 0°C to 1°C above average in most areas of the country including Pemba and Mafia Islands, exception of few parts of Mara and Arusha regions, eastern part of Mtwara region as well as central regions of Unguja Island where temperature anomalies ranged between 0°C to -1°C .

On the other hand, the country's average annual minimum temperature (T_{min}) for 2025 was 18.9°C , which is 0.7°C higher than average. The annual T_{min} anomalies (Figure 1, top right) across the country were between 0°C and 1°C above average for most areas of the country, with highest temperature anomalies, ranging between 1°C and 2°C above average, observed in areas of Lake zone (Mara and Kagera) few areas of northern coast (Tanga areas), southern Morogoro areas, southern to southwestern regions (Ruvuma and Rukwa). In contrast, low minimum temperature anomalies below average were observed in few areas of Katavi region.

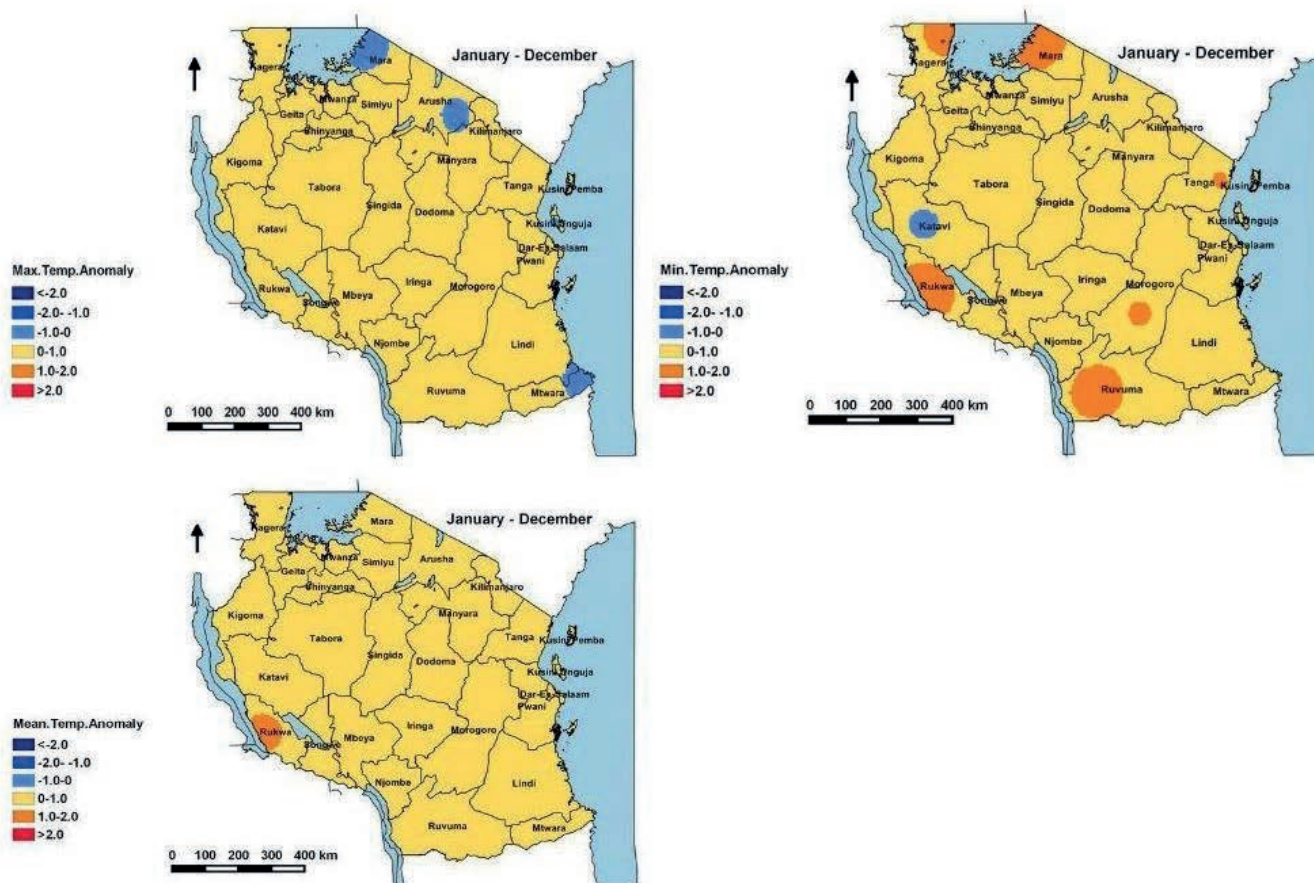


Figure 1: Annual temperature anomalies ($^{\circ}\text{C}$) for Tanzania in 2025 relative to 1991–2020 average, showing maximum temperature (top left), minimum temperature (top right), and mean temperature (bottom).

2.2 Monthly average mean, maximum and minimum temperature anomalies

The country recorded significantly higher mean air temperature (T_{mean}) anomalies in February (0.8°C) and March, November, and December (0.6°C) and slightly warmer-than-average mean temperatures over the rest of the country in 2025 (Figure 2). On the other hand, the country minimum temperature anomalies were warmer than average throughout the year 2025, with the observed highest T_{min} anomalies ranging from 0.7°C to 1.1°C in February, March, April, May, June, July and December, and with lowest anomalies of 0.3°C in August and September.

The elevated warmth (in T_{mean}) during these months was primarily associated with the observed warmer-than-average minimum temperatures as compared to maximum temperatures especially in May, June and July, the period was dominated by high positive minimum temperature anomalies of 1.1°C , 1.0°C , and 1.1°C , respectively (Figure 2).

September, November and December were the only months in 2025 which had higher comparable values of both T_{mean} , T_{max} and T_{min} ranging from 0.5°C to 0.7°C (Figure 2).

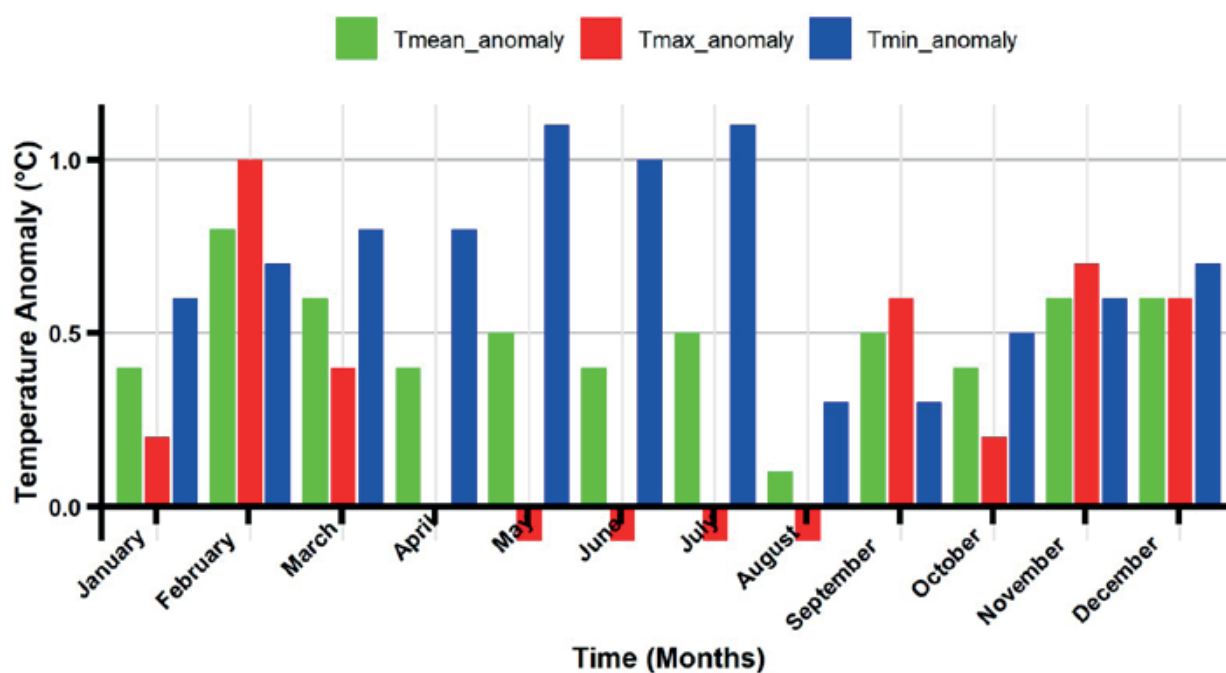


Figure 2: Monthly anomalies (°C) of mean temperature (Tmean), maximum temperature (Tmax), and minimum temperature (Tmin) for Tanzania in 2025, relative to (1991–2020) average.

Notably, higher maximum temperature (Tmax) anomalies were most pronounced in February, September, November, and December, with anomalies of 1.0°C, 0.6 °C, 0.7 °C, and 0.6°C, respectively. In contrast, slightly cooler-than-average maximum temperatures were observed from May to August, with a modest negative anomaly of -0.1 °C (Figure 2).

2.3 Spatial monthly maximum temperature anomalies

The country's monthly maximum temperature (Tmax) anomalies for January, March and April, September, October and December were generally warmer-than-average ranging from 0°C to 1°C across most areas (Figure 3a and 3b). However, maximum temperature anomalies were cooler than average in the range between -1°C and 0°C, over the northeastern highlands, the eastern Lake Victoria basin, central regions, and the northern coast (Tanga, Zanzibar, and Dar es Salaam) in January, March, April and October. Most parts of the country observed warmer than average Tmax with anomalies ranging between 1°C and 2°C during February and November. In May through August, most areas of the country experienced cooler-than-average conditions. Maximum temperature anomalies of 0°C to -1°C dominated over the western regions in May and August and over the eastern regions in June and July, while the rest of the country recorded anomalies between 0°C to 1°C (Figures 3a and 3b).

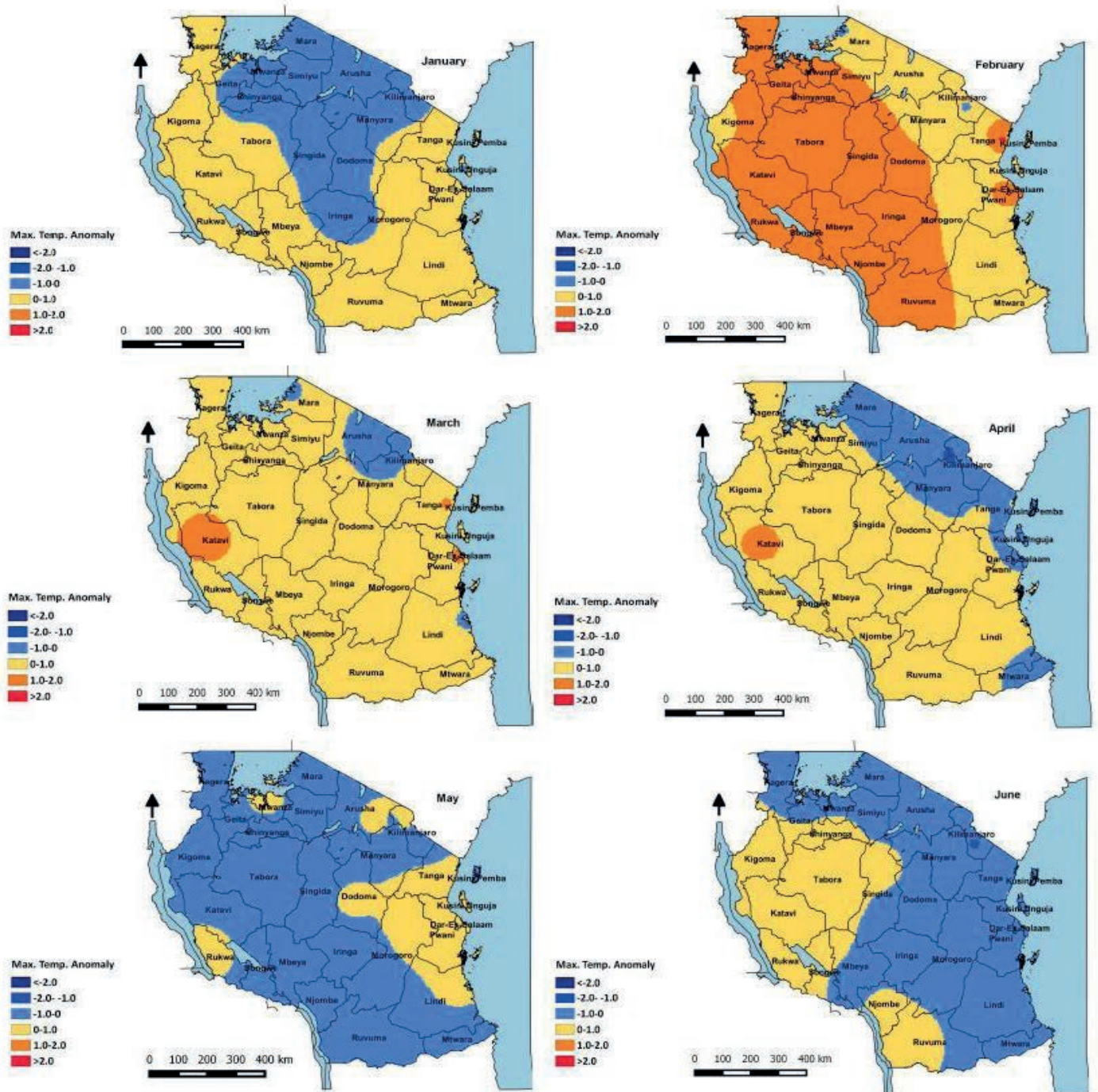


Figure 3a: Monthly maximum temperature anomalies ($^{\circ}\text{C}$) for January–June 2025 relative to 1991–2020 average.

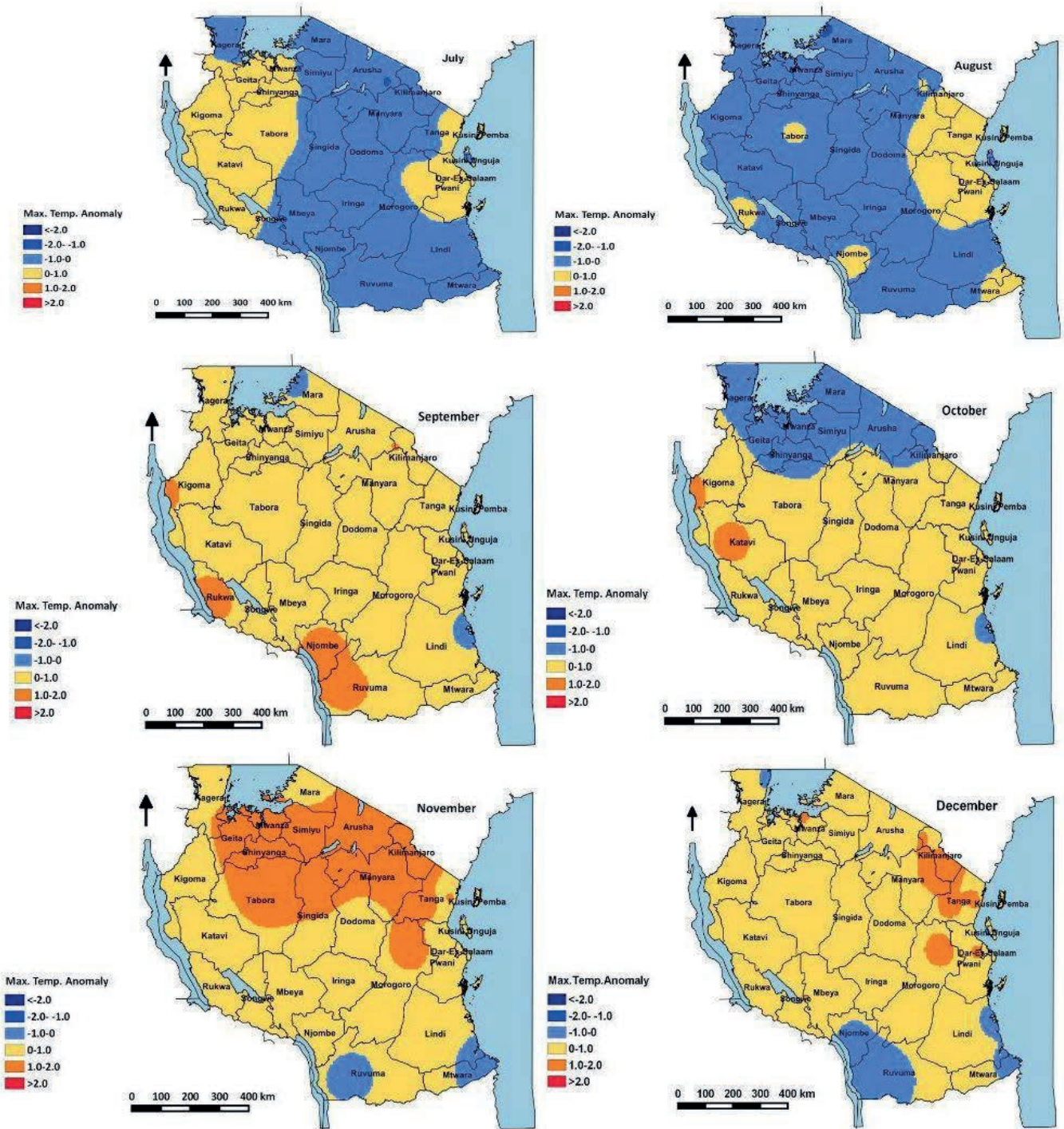


Figure 3b: Monthly maximum temperature anomalies (°C) for July–December 2025 relative to 1991–2020 average.

2.4 Spatial monthly minimum temperature anomalies

Minimum temperature (T_{min}) anomalies were above average across much of the country during several months of 2025, generally ranging from 0°C to 1°C . However, during May through July, elevated warmer than average minimum temperature with anomalies ranging between 1°C and 2°C were most pronounced over many parts of the country. Additionally, maximum temperature anomalies exceeding 2°C were observed in a few areas of Ruvuma and Rukwa in May and June, and Mara in July (Figure 4a and 4b). In contrast, pockets of cooler than average minimum temperature anomalies were observed in few areas of the country in almost all months except May, June and July. Overall, the observed T_{min} conditions indicate that warmer-than-average nighttime temperatures persisted across various parts of the country throughout the year.

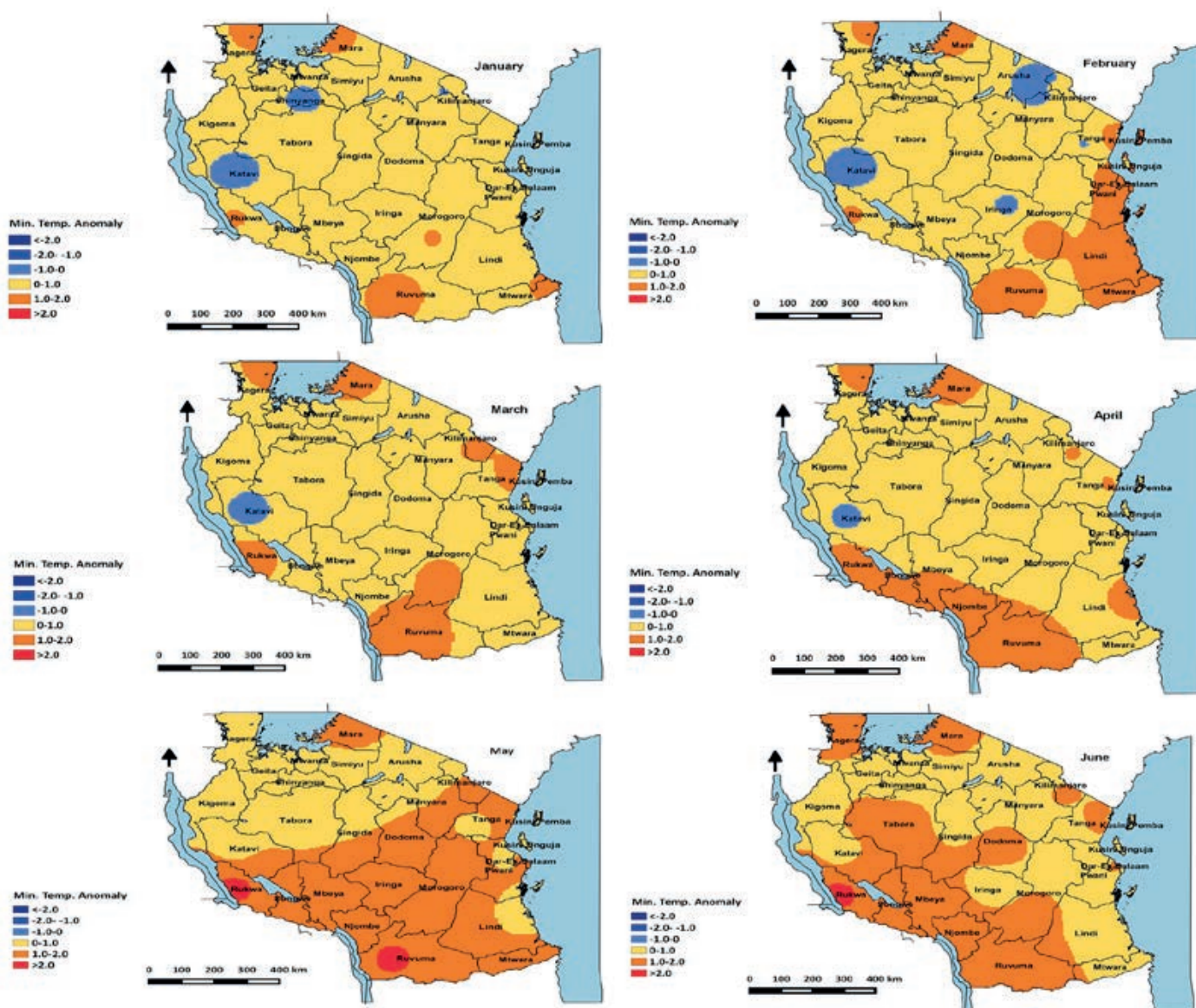


Figure 4a: Monthly minimum temperature anomalies ($^{\circ}\text{C}$) for January–June 2025 relative to 1991–2020 average.

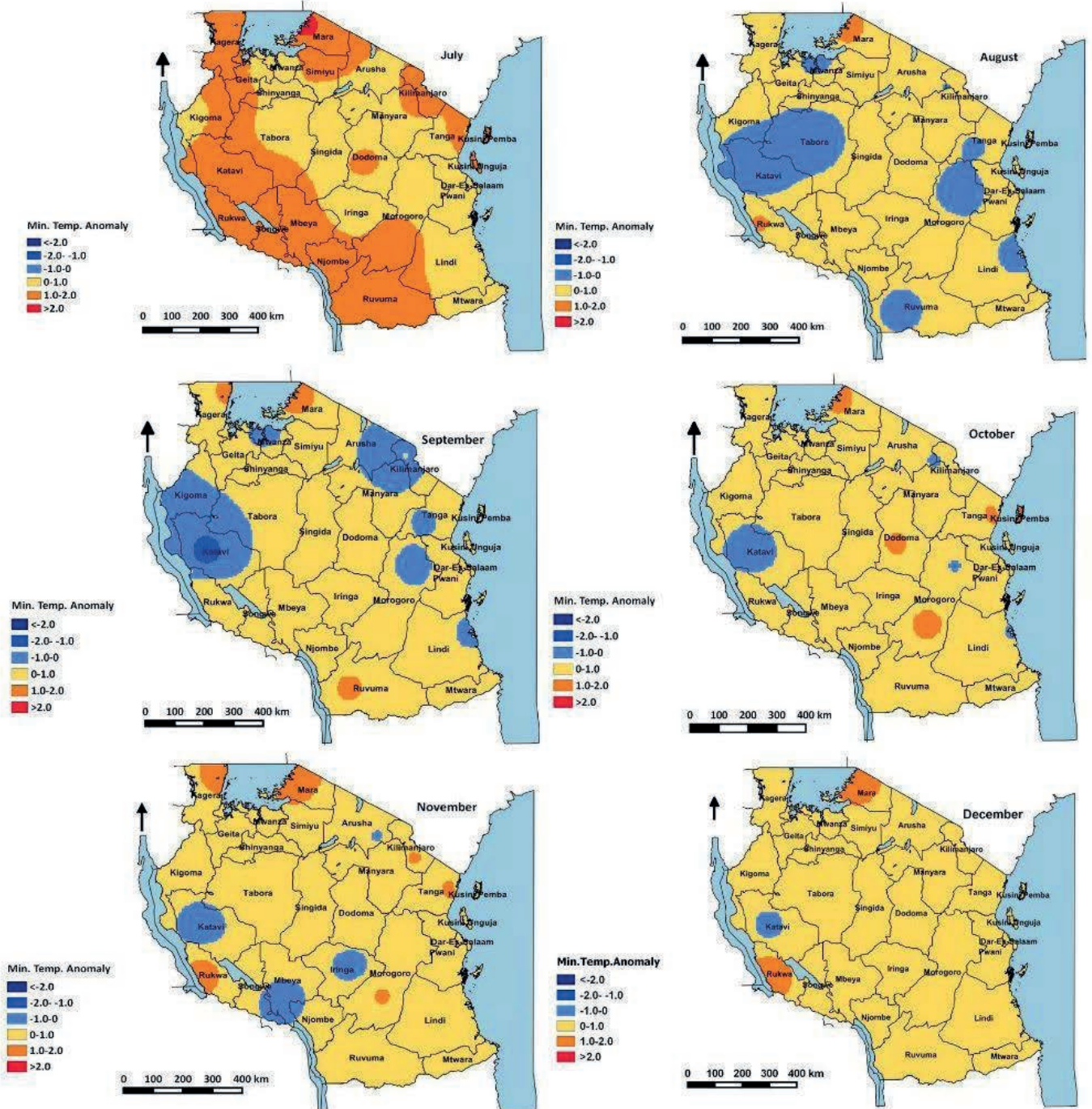


Figure 4b: Monthly minimum temperature anomalies ($^{\circ}\text{C}$) for July–December 2025 relative to 1991–2020 average.

3 Rainfall

In 2025, most parts of the country experienced wet conditions, particularly in March, April, May, June and December. However, a significant rainfall deficit was observed across a large part of the country in October and November, especially over the eastern parts of the country. Predominantly, normal rainfall conditions were observed during the November 2024–April 2025 (NDJFMA) and October–November (OND) 2025, and March–May (MAM) rainy seasons. In addition, five significant rainfall extremes were observed across the country.

3.1 Spatial distribution of annual rainfall

The country's total rainfall for 2025 (January–December) was 1,079.8 mm, which is 60.7 mm above the long-term average, equivalent to 106.0% of the average. The country's total rainfall this year is ranked as 21st wettest in record since 1970. As for the annual rainfall spatial distribution Figure 5 shows that most areas of the country experienced normal annual rainfall (75–125% of average). However, pockets of above-normal rainfall (125–150% of the average) were observed over Pemba, Kigoma, Kilimanjaro, and parts of Lindi.

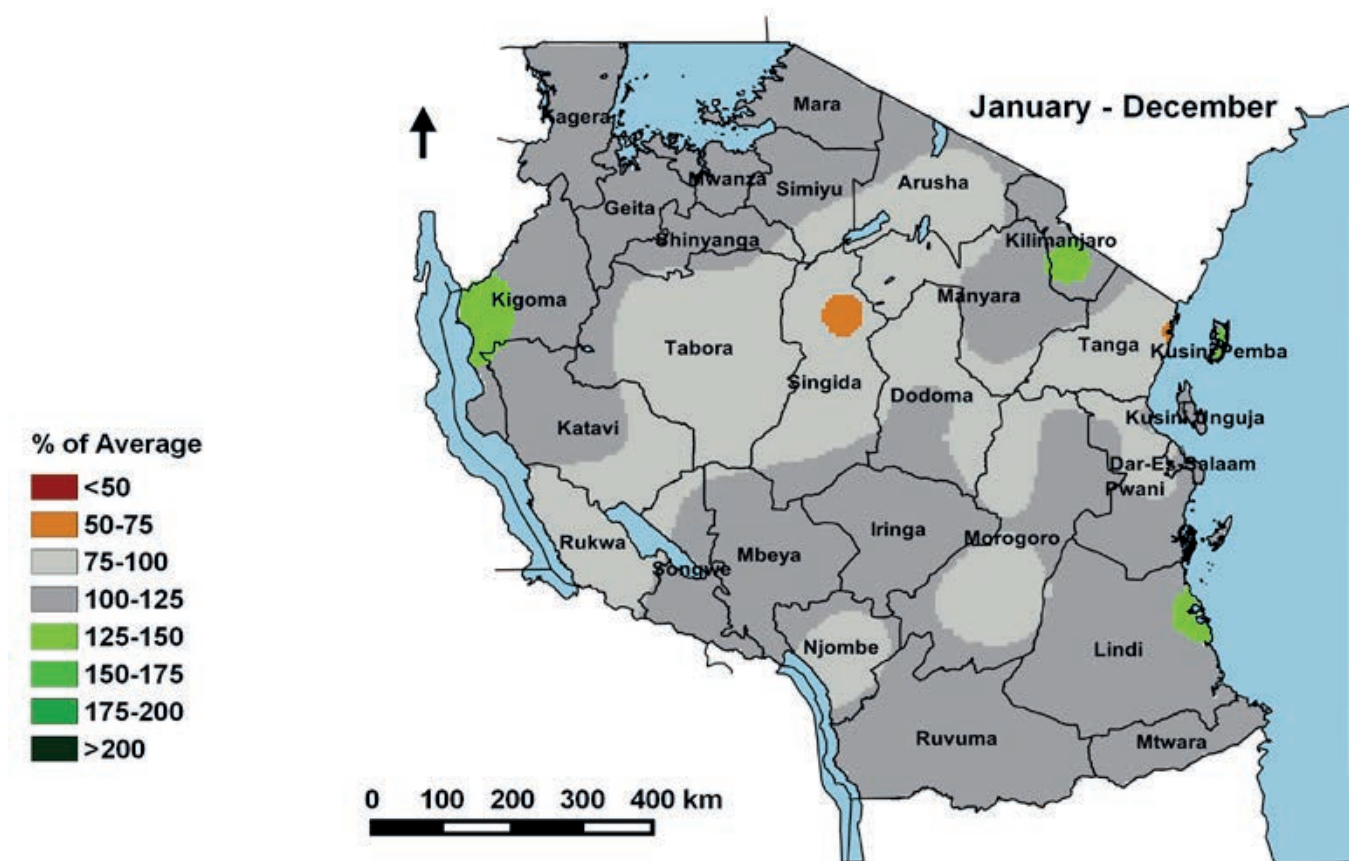


Figure 5: Annual rainfall anomalies for 2025 expressed as percentage of 1991–2020 average.

3.2 Spatial distribution of seasonal rainfall

The country's total rainfall during NDJFMA rainy season was 884.8 mm, equivalent to 110.2% of average. During this season, most of the country experienced normal rainfall ranging from 100%-125% of average (Figure 6 top left). Some parts of northeastern highlands (Kilimanjaro, Arusha and Manyara regions) and few areas in northern Morogoro and Kigoma received above normal rainfall, ranging from 125% - 150% of average. Likewise, normal rainfall of 75%-100% of average was observed during the January-February transition period (Figure 6, top right), especially over the southern, southwestern, central, and western parts of the country. However, below - normal rainfall ranging from 50% -75% of average was observed over the northern parts northeastern highland and the Lake zone.

On the other hand, the country's total rainfall during the MAM and OND 2025 rainy seasons were 560.0 mm and 249.2mm, corresponding to 125.6% and 88.9% of average respectively. The MAM 2025 was ranked as the 6th wettest MAM on record since - 1970, while OND 2025 was recorded as the 24th driest OND since 1970, but the 8th driest OND on record in the past 2 decades (2006-2025).

The spatial distribution of the MAM 2025 rainfall (Figure 6 bottom left), most of the country's including Unguja and Mafia islands observed normal rainfall, ranging from 100% - 125% of average. However, areas including Pemba Island, Kigoma, Ruvuma, Mtwara and Lindi regions, some parts of southwestern highlands, Western part extending to western and southern Lake Victoria basin, northeastern highlands and few parts of Morogoro region, received above normal rainfall between 125 - 150% of the average.

During the OND rainy season, normal rainfall (75% –100% of average) was observed across nearly all parts of the country. In contrast, below-normal rainfall (50%–75% of average) was observed in parts of Arusha, Kilimanjaro Tanga, southern Morogoro, and Rukwa region.

In Tanzania, regions that experience a bimodal rainfall regime are characterized by the MAM and OND rainy seasons. These regions include the northern coast, the northeastern highlands (Kilimanjaro, Arusha, and Manyara Regions), and areas surrounding Lake Victoria (Mara, Kagera, Simiyu, Shinyanga, Geita, and Mwanza Regions). In contrast, the southern, western, and central parts of the country, including southern Morogoro, are predominantly influenced by a unimodal rainfall regime. The OND and MAM rainy seasons partially overlap with the longer November–April rainy season, particularly during November and December, and again in March and April.

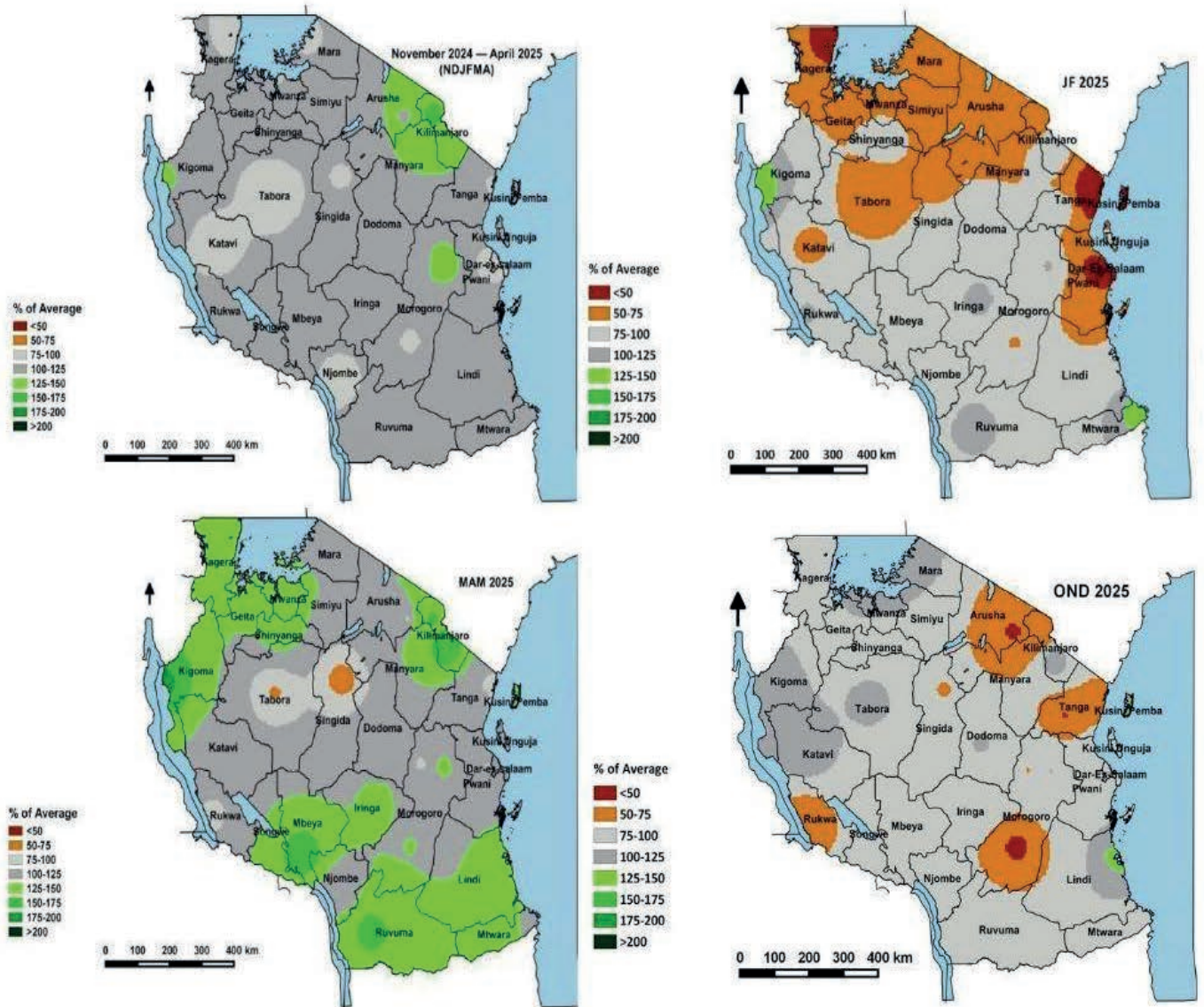


Figure 6: Seasonal rainfall anomalies for NDJFMA 2025 (top left panel); January and February 2025 (top right panel); MAM 2025 (bottom left panel); and OND 2025 (bottom right panel), expressed as percentage of 1991–2020 average.

3.3 Spatial distribution of monthly rainfall

3.3.1 Summary of the monthly spatial rainfall distribution for 2025

The year 2025 was characterized by fluctuating rainfall patterns with several months deviating from averages. Notably rainfall extremes were observed in February, March, April, and December. Despite being a dry month, June also recorded exceptionally high rainfall of more than twice the 1991-2020 average of June rainfall and is ranked as the 10th wettest June in record since 1970.

3.3.2 Monthly spatial rainfall distribution summaries

In January 2025 the country recorded an average rainfall of 109.4 mm, which is 15.8 mm lower than January average, equivalent to 87.4% of the average. Mainly normal rainfall (75% – 125% of average) was observed across the country. However, few patches of above normal and below normal rainfall were observed in few parts of the country (Figure 7a).

As for February, the average rainfall was 86.7 mm, which is 18.5 mm lower than the average, for February and equivalent to 82.4%. Much of the country, including the Islands, experienced below-normal rainfall (less than 75% of average). Normal rainfall (75–100%) was observed over the southern and western parts of the country (Figure 7a). However few patches of above-normal rainfall (125% and above) were observed in Kigoma, Rukwa, and Mtwara regions. In March the country was slightly wet with average rainfall reaching 212.3 mm, exceeding the average by 34.8 mm (131.8%). Above-normal rainfall (125%–150% of average) was observed in the West, large part of Lake Victoria basin, the entire coastal strip (including Unguja and Mafia), parts of the central zone, and Iringa, while rainfall exceeding 150% of average was observed in northeastern highlands. The remaining parts of the country observed normal rainfall ranging between 100% and 125% (Figure 7a).

Most parts of the country, including the islands, experienced normal rainfall ranging between 75% and 125% of average (Figure 7a), during April. The country received an average rainfall of 213.1 mm, which was 28.3 mm (115.3%) above average. Below-normal rainfall was observed in parts of the Central Region and in isolated areas of Iringa, Rukwa, Kagera, and Mara regions. In contrast, above-normal rainfall (125% to 175% of the average) was recorded on the southern coast, the southern Lake Victoria basin, the southwestern Highlands, as well as in Kilimanjaro, Tanga, and Manyara regions.

May was particularly wet over southern regions, southwestern highlands, western regions and Lake Victoria basin, with rainfall ranging from 125% to over 200% of average over some areas. The remaining parts of the country were mainly characterized by normal rains ranging from 75% to 125% of the average. Nevertheless, few areas of Singida, Iringa, Rukwa and coastal strips observed below normal rains less than 75% of average.

The average rainfall for June was 42.5 mm, which was 23.1 mm above average, equivalent to 218.8% of average. Despite being a dry month, above-normal rainfall (exceeding 200% of the average) was observed along the entire coast, as well as in southern part of the country and Tabora region. These areas recorded exceptionally high rainfall amounts almost two to three times higher than their averages, especially over the northern coast, due to off-seasonal rains.

Normally, July, August, and September months are climatologically dry over most of the country. However, some areas of Lake Victoria basin during July and August, and southern coast in September, observed normal to above normal rainfall (Figure 7b).

October was relatively dry across most parts of the country. The average rainfall amount was 53.3 mm, which was 0.4 mm below the average (99.3% of average), ranking as the 7th driest October in the recent decade (2016–2025). Nevertheless, normal to above normal rainfall was observed over Lake Victoria basin, Pemba and Unguja island, and parts of Kilimanjaro, Tanga, and Mtwara regions (Figure 7b).

During November, the eastern part of the country was relatively dry, while the western part was relatively wet. The country's average rainfall in November was 65.3 mm, which is 28.8 mm below the November average, representing 69.4% of the average, and is ranked as the 10th driest November over the past three decades (1996–2025). The spatial distribution of rainfall across the country (Figure 7b) indicates that below-normal rainfall (below 75% of average) was observed over the coast, northeastern highland, central, and parts of Kagera, Mara and Simiyu. On the other hand, normal (75% - 125% of average) to above-normal (125% - above 200% of average) rainfall was observed in the remaining part of the country.

During December 2025 (Figure 7b), normal rainfall (75%–125% of average) was observed across most areas of the country including Pemba island. Few pockets of below-normal rainfall were observed in Unguja island, Ruvuma, southern Morogoro, Tanga, Kilimanjaro, and Rukwa regions. However, few areas of Lindi, northern Morogoro, and Kigoma recorded above-normal rainfall (125% – 175% of the average). December 2025 is ranked the 9th driest December in the past 20 years 2006-2025.

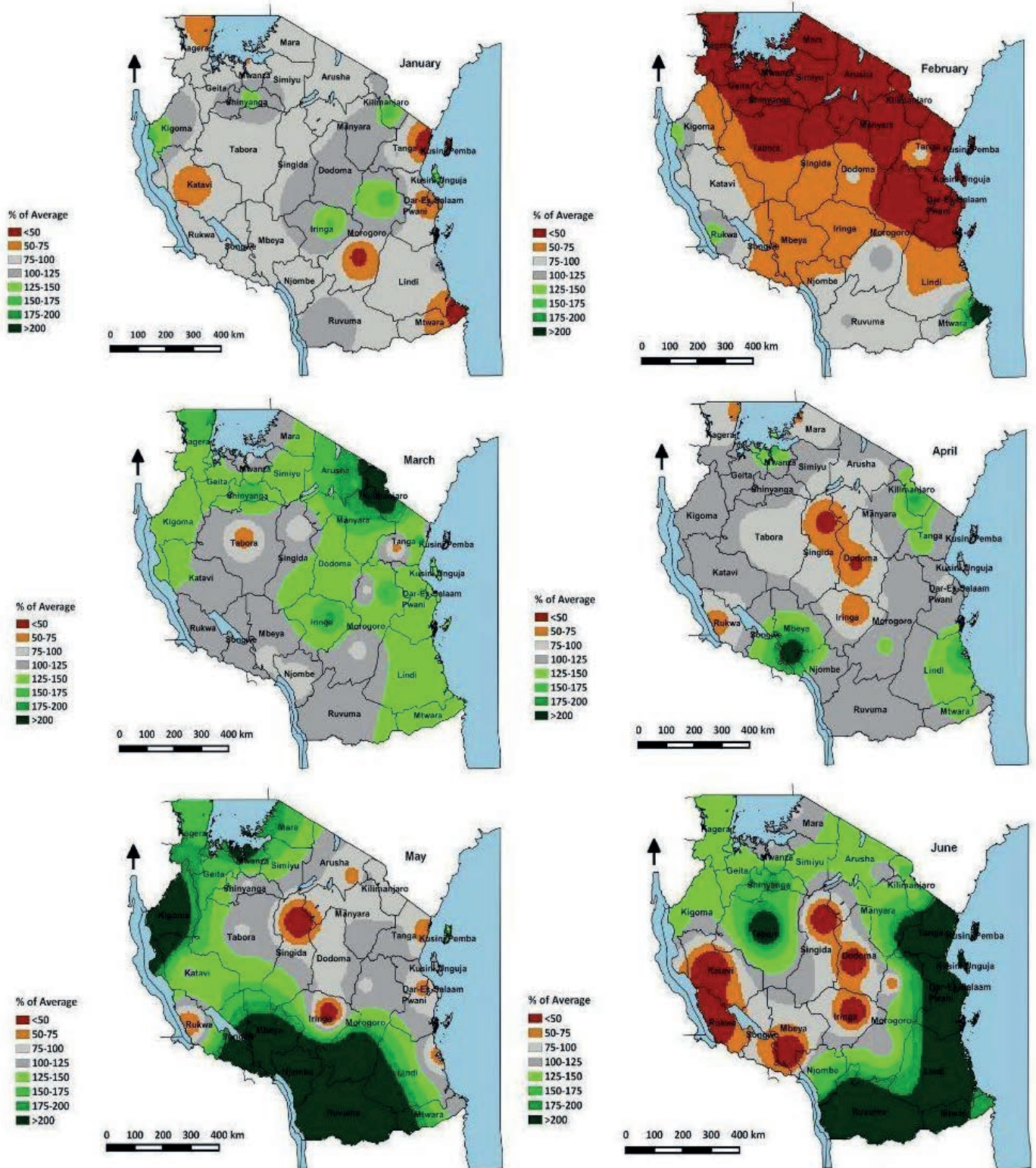


Figure 7a: Monthly rainfall anomalies expressed as percentage of 1991-2020 average for January to June 2025.

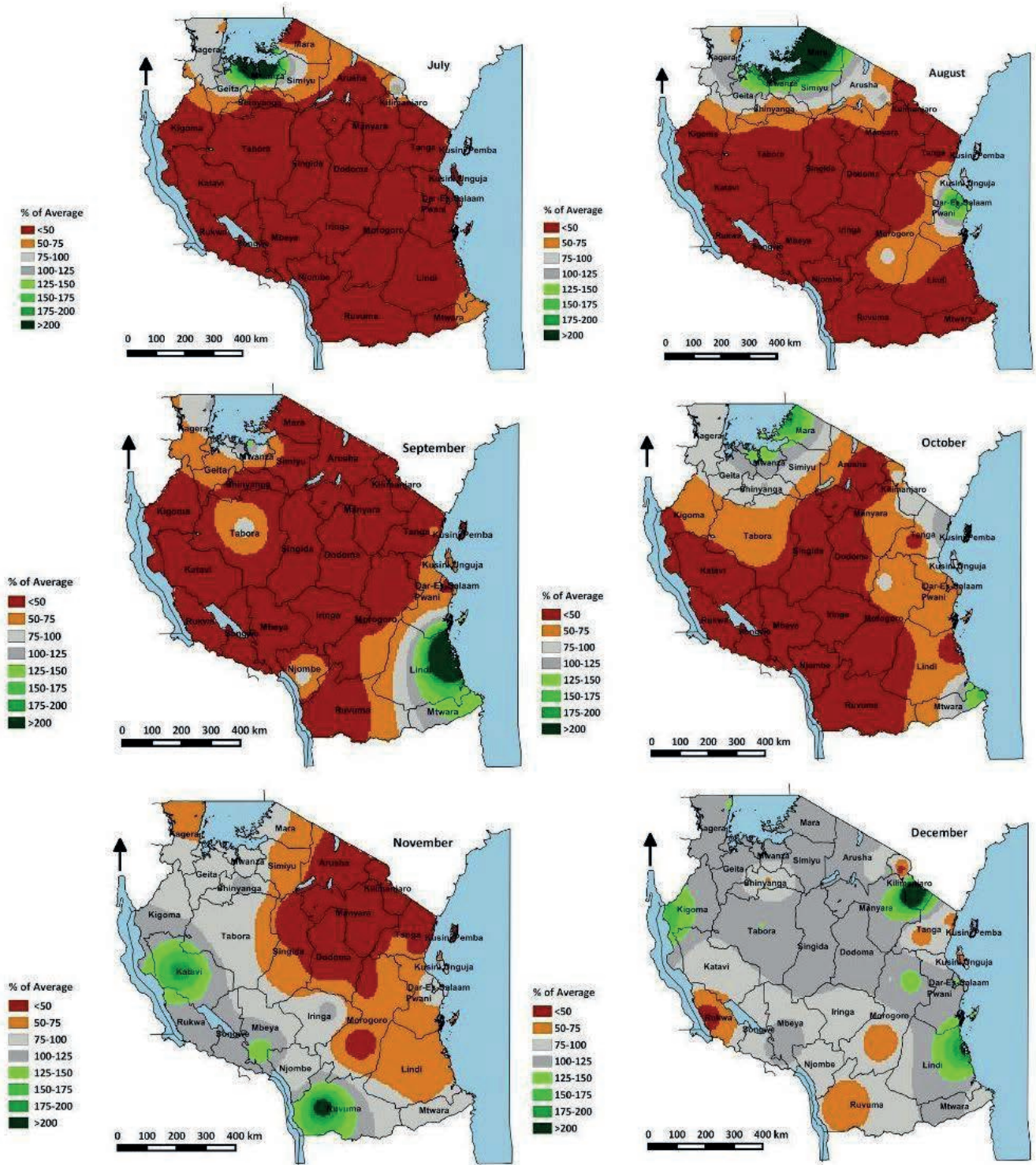


Figure 7b: Monthly rainfall anomalies expressed as percentage of 1991–2020 average for July to December 2025.

3.4 Cumulative rainfall

In this statement, cumulative rainfall curves are used to describe the performance and trends of observed rainfall for different areas in the country. Observed deficit or surplus of rainfall for a particular season and station is determined from deviation between observed and long-term average cumulative curves. Thus, when the observed cumulative rainfall is lower than the average cumulative rainfall, then a deficit of rainfall was observed in a respective season and vice versa.

During November 2024 to April 2025 (NDJFMA) rainy season the observed cumulative rainfall across most stations over the area receiving one rainfall season (Unimodal) was nearly equal to the long-term NDJFMA average, except for few stations including Songea and Kigoma which had higher cumulative rainfall by 214.4 mm and 219.2 mm, respectively compared to long-term cumulative average. Overall, cumulative rainfall curves for most stations indicated that rainfall was fairly distributed throughout the season. Comparatively, the NDJFMA (2023-2024) rainfall season was wetter compared to that of NDJFMA (2024-2025) for most stations (Figure 8a).

In the MAM rainy season, meteorological stations, including Zanzibar, Moshi and Pemba (a figure not shown for Pemba) observed higher cumulative rainfall of 164.5 mm, 272.7 mm, and 385.1 mm, respectively compared to the MAM long-term average. However, nearly average cumulative rainfall was observed in remaining stations (Figure 8b).

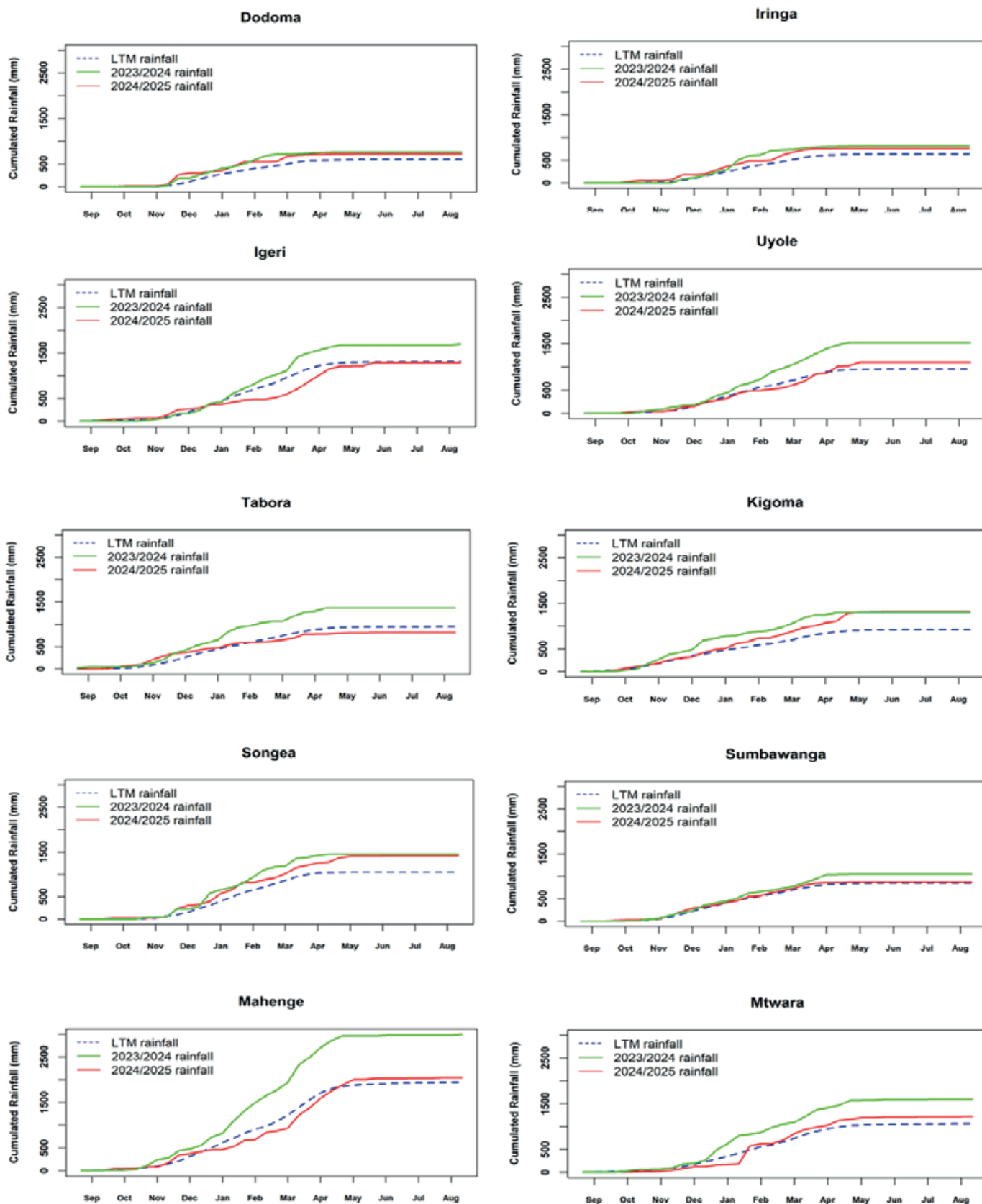


Figure 8a: Cumulative rainfall for the NDJFMA season for Dodoma, Igeri, Tabora, Songea, Mahenge, Iringa, Uyoie, Kigoma, Sumbawanga and Mtwara meteorological stations, presented as accumulation of dekadal rainfall totals for each month starting from September 2024 to August 2025.

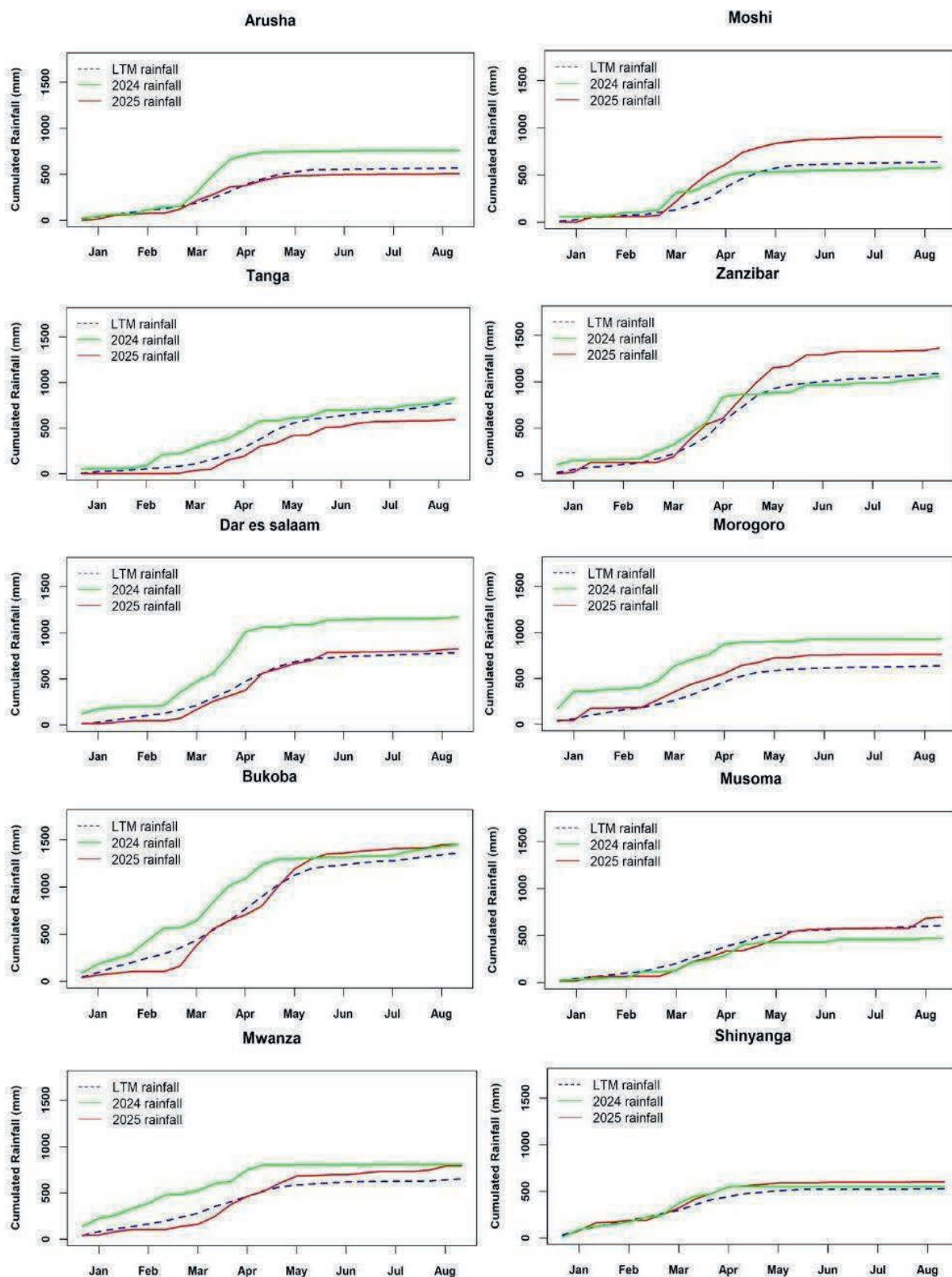


Figure 8b: Cumulative rainfall for MAM 2025, season for Arusha, Tanga, Dar es Salaam (JNIA), Bukoba, Mwanza, Moshi, Zanzibar (Kisauni), Morogoro, Musoma and Shinyanga meteorological stations, presented as accumulation of dekadal rainfall totals for each month starting from January to August 2025.

As for the OND 2025 rainy season, meteorological stations including Musoma, and Mwanza recorded higher than-average OND cumulative rainfall, while Zanzibar, Morogoro, Moshi, Shinyanga, Bukoba, and Dar es Salaam observed near average OND cumulative rainfall. Besides, other stations including Arusha and Tanga observed below-average OND cumulative rainfall (Figure 8c). Overall, in most stations except for Dar es Salaam, the cumulative rainfall in OND 2024 was higher than that of OND 2025 (Figure 8c).

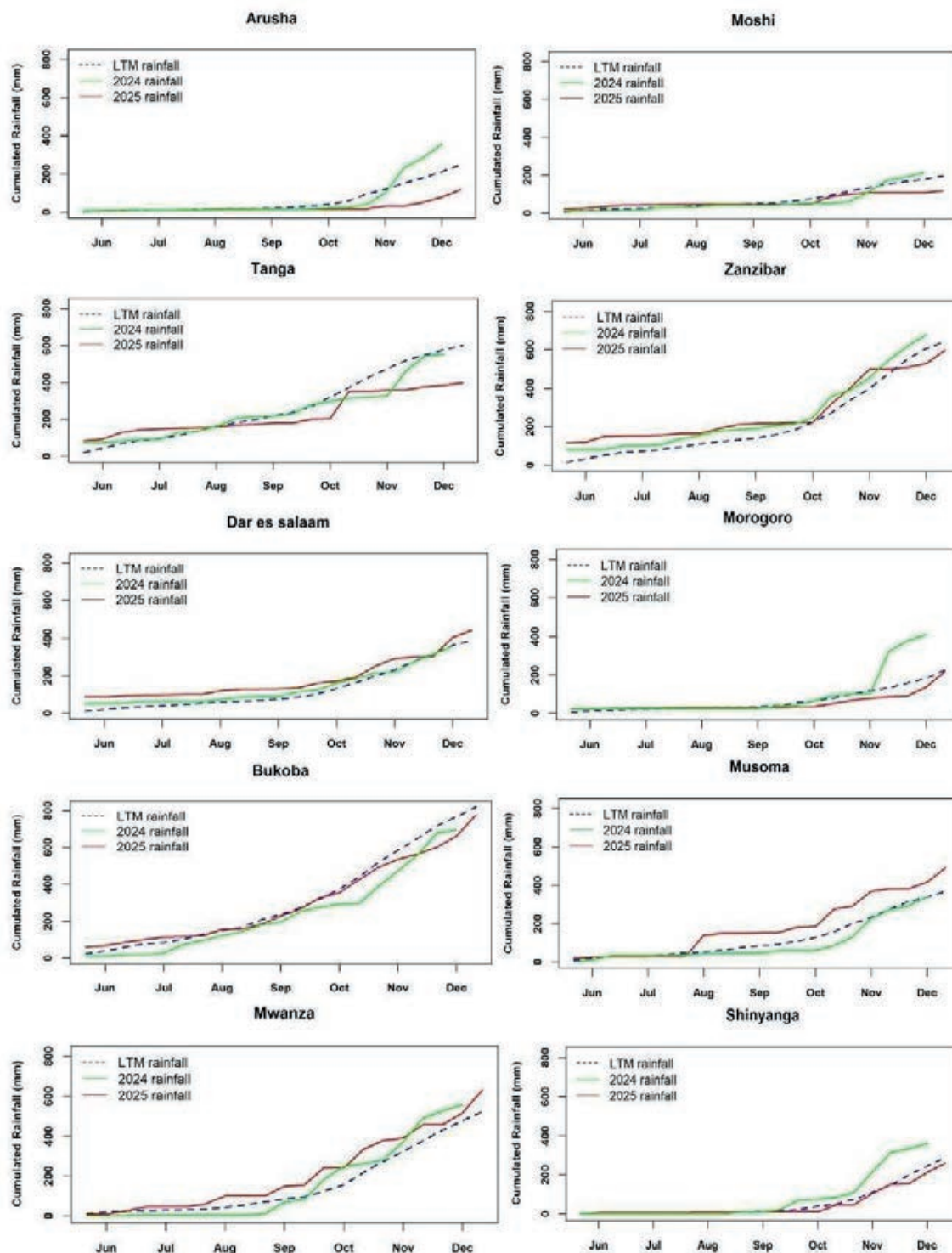


Figure 8c: Cumulative rainfall for OND 2025 season for Arusha, Tanga, Dar es Salaam (JNIA), Bukoba, Mwanza, Moshi, Zanzibar (Kisauni), Morogoro, Musoma and Shinyanga meteorological stations, presented as accumulation of dekadal rainfall totals for each month starting from June to December 2025.

4 Extreme Weather and Climate Events of 2025

In 2025, various weather and climate-related extreme events were reported across the country. However, poor spatial coverage of meteorological observation network hindered comprehensive documentation of extreme weather and climatic events, and their associated impacts, including loss of lives and properties, disruption of social services, and damage of infrastructure.

4.1 Extreme rainfall events

Based on the available data, the year 2025 experienced 119 extreme rainfall events exceeding 50 mm, of which 20 rainfall events exceeded 100 mm. The month of April recorded the highest number (33) of extreme events, while March followed closely with 32 events, including eight events that exceeded 100 mm. The highest daily rainfall in 2025 was 193.2 mm, which was recorded at Matangatuani meteorological station (Pemba) on 28th October, and ranked as the highest daily rainfall ever recorded at the station since 1936. Furthermore, Karume Airport (Pemba) station recorded 173.8 mm on the same day (28th October), the second highest daily rainfall in 2025, and ranked as the highest October daily rainfall at that station since 1974. Other records of extreme rainfall events in 2025 include 155.0 mm, 141.4 mm, 137.3 mm, 136.1 mm and 135.8 mm recorded on 21st February, 03rd February, 06th February 27th April, and 19th March at Mahenge, Naliendele, Mtwara, Karume Airport (Pemba), and Karema (Katavi region) meteorological stations, respectively. Moreover, June and August (which are normally dry) received unusual rainfall of 97.2 mm and 59.4mm at Matangatuani and Musoma on 08th June and 17th August 2025, respectively.

As for monthly perspectives, January 2025 recorded nine events of extreme rainfall with the highest values of 110 mm and 105.9 mm at Songea and Zanzibar Meteorological stations, on 15th and 29th January, respectively. February 2025 recorded 12 events of extreme rainfall, of which five events exceeded 100 mm. These events include 155 mm at Mahenge (ranked as the record breaking rainfall on February since 1993), 141.4 mm at Mtwara (ranked as the 3rd highest rainfall on record for February since 1950), 137.3 mm and 120.6mm at Naliendele (ranked as the 2nd and 4th highest rainfalls on record for February since 1980) and 115.6mm at Mahenge (ranked as the 5th highest on record on February since 1993). These rainfall amounts were recorded on 21st, 03rd, 06th and 03rd February 2025, respectively.

During March 2025, 32 events of extreme rainfall above 50 mm were recorded, of which eight exceeded 100 mm, including 135.8 mm and 101mm at Karema on 19th and 14th March, respectively. Moreover, other events include 129.4 mm, 117 mm, 113.7mm, 111mm, 108.2mm, 103.3mm, and, observed at Mtwara, Zanzibar, Mlingano Moshi, Tumbi, and Naliendele meteorological stations on 11th, 28th, 29th, 26th, and 10th March, respectively.

In April 2025, 33 events of extreme rainfall were observed, with the highest amount of 136.1 mm at Pemba meteorological station on 27th April. Moreover, May 2025 recorded 20 events of extreme rainfall, with the highest daily rainfall of 101 mm recorded at Kisauni meteorological station (in Zanzibar) on 01st May.

Indeed, June 2025 recorded 4 events of extreme rainfall, with the highest daily rainfall of 97.2 mm at Matangatuani meteorological station on 8th June. During August, there was only one event of extreme rainfall, which was recorded at Musoma meteorological station on 17th August 2025, with rainfall amount of 59.4 mm.

On the other hand, October and November were relatively dry with few instances of extreme rainfall. During these months, the country experienced 10 events of extreme rainfall. The highest daily rainfall records of 193.2 mm, 173.8 mm and 101.3 mm were observed on 28th October, at Matangatuani, Karume airport (Pemba), and Tanga meteorological stations, respectively. These events at Matangatuani and Karume Airport (Pemba) were the record break rainfall for these stations for October since the stations were established in 1936 and 1974, respectively. November recorded 5 extreme rainfall events, with the highest daily rainfall of 78.4 mm at Kisauni meteorological station (in Zanzibar), on 04th November. Furthermore, December recorded 15 incidences of extreme rainfall, with the highest daily rainfall of 94.5 mm and 94.4 mm at Same and Kilwa meteorological stations on 27th and 16th December, respectively.

4.2 Extreme temperature events

Based on the available data, the year 2025 had 223 events of extreme maximum temperature exceeding 35°C, and 280 events of extreme minimum temperature reaching or exceeding 26°C (warm nights). 283 events of extreme minimum temperature of less than or equal to 10°C (cold nights), and 4 events of extreme minimum temperature of less than or equal to 5°C were recorded.

The highest daily maximum temperature for 2025 was 38.6°C, recorded at Ilonga meteorological station (Morogoro region) on 19th February 2025, followed by 38.0°C, recorded at Mlingano meteorological station (Tanga region) on 24th February 2025. The 38.6°C recorded at Ilonga equals the station's historical maximum temperature previously observed on 19th March 1981, and remains the highest temperature recorded at the station since observations began in 1961, while the 38.0°C recorded at Mlingano represents a new February record since 1938, when the station was established. Notably, in February 2025, Mlingano station recorded 27 extreme hot days (maximum temperature), followed by Kilimanjaro and Moshi, with 11 events each, and Kibaha meteorological station with 9 events.

The period of January to December 2025 was characterized by both warm and cold nights. The country's highest daily minimum temperature record in 2025 was 28.5°C, recorded at Kilwa meteorological station on 3rd January, and is ranked as the 5th highest ever recorded in the station, but the 1st highest minimum temperature for January, since the station was established in 2005. This was followed by 28.4°C, recorded at Kisauni meteorological station in Zanzibar on 11th March. Generally, the occurrence of warm nights reaching or exceeding 26°C during the year were 51 events for March, 17 events for April, and 4 events in May, and 2 events for June.

The lowest daily minimum temperature record in 2025 was 4.2°C, recorded at Igeri meteorological station on 5th August 2025. Other significant lower minimum temperature records include 5.0°C recorded at Uyole meteorological station on 1st and 31st August, and 5.2°C recorded at Igeri meteorological station in Mbeya region on 3rd August 2025. The distribution of cold night incidences for 2025 were 20 events in May, 61 events in June, 76 events in July, and 71 events in August. Generally, minimum temperatures of 10°C or lower were predominantly observed during June, July, and August across southwestern highlands.

5 Major drivers of weather and climate events in 2025

The observed seasonal rainfall and extreme events in 2025 were influenced by multiple factors, including variations in Sea Surface Temperatures (SSTs) across the Atlantic, Indian, and Pacific Oceans. Additional contributing factors included the position and migration of the Inter tropical Convergence Zone (ITCZ), neutral ENSO, the occurrence of tropical depressions and severe tropical storms over the southwestern Indian Ocean (SWIO), meso-scale atmospheric processes and the variation of phases of the Indian Ocean Dipole (IOD). Moreover, the Tropical Storm Chenge (17–25 October) further enhanced rainfall to few areas over the extreme northern coast of the country.

The tropical Indian Ocean experienced slightly negative Sea Surface Temperature Anomalies (SSTAs) from January to March, with more pronounced cooling in the western region compared to the eastern region (Figure 9), indicating a negative phase of the IOD. The dipole mode transitioned to a strong negative phase during January and February, then weakened to near-neutral conditions from March to May. Between May and July 2025, the IOD shifted into a moderate positive phase, before reversing into a strong negative phase that persisted from August through December 2025.

The shift of the IOD to a positive phase contributed to the unexpected rainfall observed in June 2025 across much of the country. Meanwhile, although ENSO condition remained largely neutral with a tendency toward weak La Niña, warmer SSTs in the tropical Indian Ocean, particularly over the southwestern Indian Ocean (SWIO), contributed to enhanced rainfall in Tanzania during late December 2025.

Overall, ENSO conditions remained predominantly neutral from January to November, with slightly negative indices, which contributed to the below-normal rainfall observed during both MAM and OND seasons. However, intra-seasonal variability particularly shifts in the IOD between positive and neutral phases played a key role in modulating rainfall patterns. These variations contributed to periods of above-normal rainfall and isolated flooding events experienced in early (January), *masika* season (March to May), and late (December) 2025 across different parts of the country.

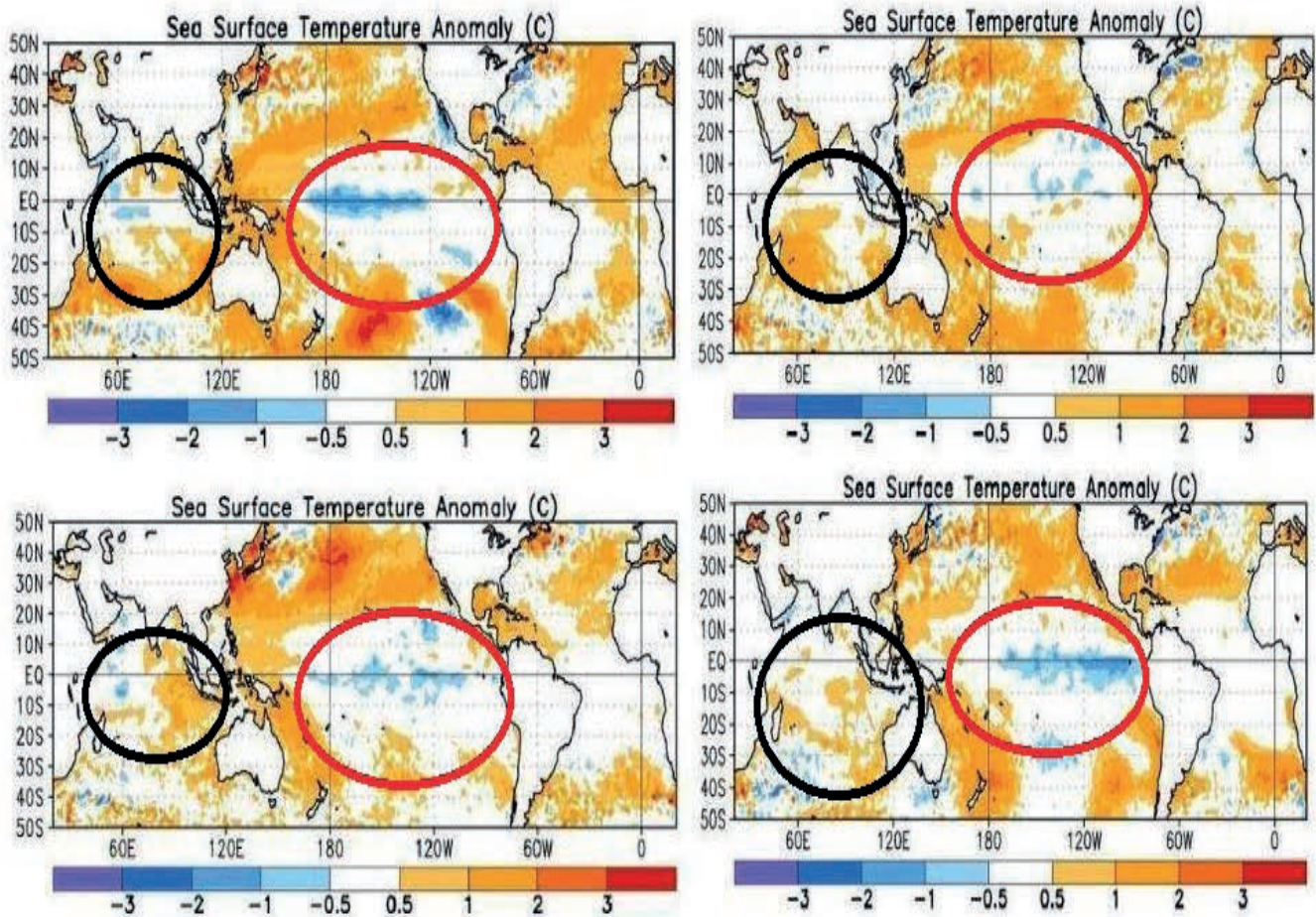


Figure 9: Sea Surface Temperature Anomalies for January and April (upper left and right panel), October and December 2025 (bottom left and right panel) showing evolution of Sea Surface Temperatures across Pacific Ocean (red cycled) and Indian Ocean (black cycled). Anomalies are departures from 1991–2020 average.

Source: https://www.cpc.ncep.noaa.gov/products/CDB/CDB_Archive_pdf/pdf_CDB_archive.shtml.

Additionally, wind patterns (Figure 10) also significantly contributed in modulating the intensity and spatial distribution of rainfall. During January and February, enhanced southeasterly wind anomalies prevailed along much of coastal Tanzania, promoting moisture transport into the country. This resulted in moderate to heavy rainfall in some areas.

From March to May, the persistence of neutral ENSO conditions, coupled with a weak neutral IOD phase, supported moderate easterly to southeasterly wind anomalies over the tropical Indian Ocean. These winds penetrated inland, enhancing moisture advection into the hinterlands of Tanzania and contributing to generally normal to above-normal rainfall across inland areas (Figure 10).

The persisted neutral ENSO conditions and weak neutral phase of IOD influenced moderate easterly and southeasterly wind anomalies over the tropical Indian Ocean. These winds penetrated to the hinterlands of Tanzania, which enhanced moisture inflow and led to normal, and above-normal rainfall across inland areas (Figure 10).

Later in the year, during December, southeasterly to easterly wind anomalies dominated the central Indian Ocean (Figure 10), further enhancing moisture transport into the country and supporting rainfall over both coastal and inland regions. In contrast, October and November 2025 observed a notable reduction in rainfall, due to strong offshore wind anomalies that suppressed moisture availability over the coastal and northeastern highlands.

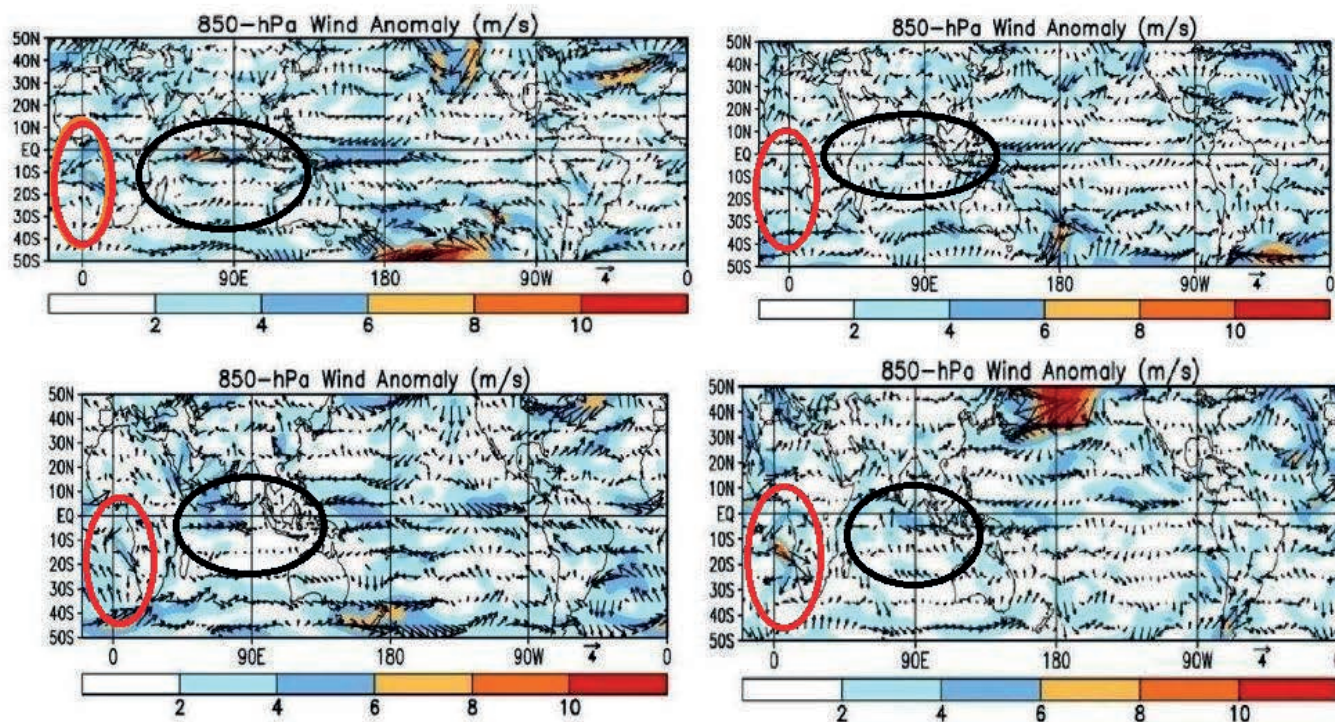


Figure 10: Wind anomaly (vector and its amplitude) at 850 mb for January and April (upper left and right panels) as well as October and December (bottom left and right panels) 2025, showing evolution of low-level winds across the Indian Ocean (black cycled) and East Atlantic Ocean (red cycled). Anomalies are departures from 1991–2020 average.

Source: https://www.cpc.ncep.noaa.gov/products/CDB/CDB_Archive_pdf/pdf_CDB_archive.shtml.

The SSTAs over the eastern Atlantic Ocean had varying intensities and polarities (positive/ negative/ neutral) particularly off the coasts of Angola and Congo. For instance, from January through May, weak positive SSTA induce weak easterly wind anomalies. These wind anomalies contributed to the reduction of moisture influx and hence, reducing the transport of moisture from the Congo Basin into the country and further decline the rainfall particularly in February 2025. In contrast, during June and December the eastern Atlantic Ocean experienced strong to moderate SSTAs, generating stronger easterly winds that enhanced moisture transport which contributed to increased rainfall in the country.

6. Weather and climate related impacts

This section highlights the significant impacts of extreme weather events that affected Tanzania in 2025. Events were selected based on their spatial extent, severity, duration, and associated impacts, with information primarily sourced from the Prime Minister’s Office–Department of Disaster Management (PMO–DMD) and media reports.

Although January 2025 was generally wet, isolated heavy rainfall events caused localized flooding and fatalities. On 5th January, three people in Mtowisa Village, Sumbawanga DC, Rukwa Region, lost their lives due to flooding. In the same region, Kalambo DC reported 10 additional fatalities from floodwaters (PMO–DMD).

During February 2025, isolated cases of extreme heavy rainfall over southern Morogoro caused in housing and infrastructure damages. For instance, on 6th February 2025, more than 100 households at Mavimba village in Ulanga district were destroyed following the continuous heavy rain associated with strong winds and hail, which caused destruction of houses (Source: https://www.instagram.com/millardayo/p/DFuiqO4iuoJ/?img_index=1 millardayo and ayo tv).



Figure 11: Destruction caused by heavy rain associated with strong winds and hail at Ulanga district in Morogoro region (Source: https://www.instagram.com/millardayo/p/DFuiqO4iuoJ/?img_index=1).

During the 2025 masika season, heavy rainfall caused extensive damage to roads and bridges, including the Somanga Bridge, disrupting transport, social services, and communities. Floods in Morogoro and Mara regions were particularly severe: in Ulanga District, rains from 21st–24th March collapsed 433 houses, displacing over 2,165 people and destroying food stocks, while in Musoma, storms damaged 524 households, including 165 homes, and required temporary shelter for 65 people. In Dar es Salaam, heavy rains led to urban flooding, submerging streets, disrupting transport, and affecting key social services, while displacing residents in low-lying neighborhoods.

The downpours also affected the northeastern highlands, coastal, and southern regions, including Moshi (Kilimanjaro), Babati (Manyara), Lindi, and Mtwara. On 14th March, floods in Itumundu village (Iringa Vijijini) claimed three lives, and on 27th March, heavy rains damaged the Mto Kiongozi Bridge in Babati, disrupting transport links. In Moshi District, continuous rains on 5th April flooded over 300 houses and 2,000 acres of farmland, displacing 62 families, and by 6th April, bridge collapses including the Somanga–Mtama and Matandu River bridges further disrupted travel. Persistent rainfall on 6th May caused flooding in Mbokomu Ward (Moshi), resulting in three deaths, damage to the Kisangiro River, and 17 people narrowly surviving being swept away (PMO-DMD). Continuous rains also caused flooding along the Moshi–Arusha–Dar es Salaam Road due to accumulation of debris. These events underscore the vulnerability of Tanzania’s infrastructure, agriculture, and communities, highlighting the urgent need for improved flood management and disaster preparedness.

Also, the continuous rains have caused flooding of Moshi-Arusha-Dar es Salaam Road due to accumulation of debris on the roads (Figure 13).



Figure 12 Some areas affected by floods in Moshi district, Kilimanjaro region.

(Source: <https://www.mwananchi.co.tz/mw/habari/kitaifa/kaya-62-zakosa-makazi-300-zazingirwa-na-maji-moshi--4991712>).



Figure 13: Flooding of Moshi-Arusha-Dar es Salaam highway road. Regional fire and rescue services removing logs on the road in Kiboriloni area, in Kilimanjaro region on 06th May 2025 (Source: <https://www.mwananchi.co.tz/mw/habari/kitaifa/watu-17-wamenusurika-kusombwa-na-maji-mkoani-kilimanjaro-5030182>).

Furthermore, heavy rainfall between March and May significantly affected transport infrastructure across Tanzania. Several bridges were damaged, including those along the Dar es Salaam–Mtwara road, particularly in the Somanga area, and the Mukuyuni bridges in Mwanza, leaving vehicles and travelers stranded for hours or even days (Figure 14). Additional widespread impacts were reported following intense rainfall on 28th, 29th and 30th December 2025, as forecast by the Tanzania Meteorological Authority (TMA). Flooding affected approximately 20 regions, including Arusha, Kilimanjaro, Manyara, Dodoma, Morogoro, Dar es Salaam, Mbeya, Iringa, and Mtwara. Beyond flooding, key transport and energy infrastructure suffered damage. For instance, sections of the old Meter Gauge Railway (MGR), including bridges at Kidete (Morogoro) and Gulwe (Dodoma), were damaged; power faults disrupted both the TANESCO grid and the Standard Gauge Railway (SGR), interrupting rail services; and landslides and mud accumulation affected major roads such as the Morogoro–Iringa highway. In several areas, roads were rendered impassable or posed high risk due to flash flooding. In addition, the MAM 2025 rains in various areas of Kilosa wards have caused disasters in various areas and wards including Tindiga and Malangali wards. These disasters have caused various harms to the community including destruction of homes, farms



Figure 14: Police officer assists Mwanza residents in crossing the flooded Mkuyuni Bridge after heavy rainfall pounded the region on 09th April , 2025 . PHOTO| MGONGO KAITIRA.

(Source: Citizen; <https://www.thecitizen.co.tz/tanzania/news/national/rainfall-disrupts-transport-services-across-tanzania-4995846>).

On 26th December 2025, heavy rain accompanied by strong winds affected two villages (Magole A and Magole B) in Magole Ward and two villages (Matongolo and Dumila) in Dumila Ward. A total of 261 houses were damaged, including 54 houses in Dumila Ward and 207 in Magole Ward, with roofs torn off and structural damage reported. Overall, 301 families comprising 1,056 people were affected, and 261 houses were heavily destroyed. The storms also disrupted local infrastructure and livelihoods, including electricity, water supply, and road access.

On 28th December 2025, heavy rain and strong winds affected Tindiga Ward, where villages including Mateteni Tindiga, Tutani, Legeza, Mwendo, and Mateteni Malangali were flooded due to the overflowing Mkondoa River, impacting 457 families and 1,133 people. Floodwaters damaged farmland, crops, and essential community facilities, increasing socioeconomic hardship.

Adverse weather conditions also affected the aviation sector during 2025. On 10th March 2025, heavy rainfall and reduced visibility significantly disrupted operations at Bukoba Airport, limiting safe aircraft movement and leading to delays and temporary suspension of some flight activities. Such conditions highlight the sensitivity of aviation operations to extreme weather, particularly in areas prone to intense rainfall, where visibility, runway conditions, and overall flight safety can be compromised. This event underscores the importance of timely weather forecasting and early warnings in supporting aviation safety and operational planning.

The Tanzania Meteorological Authority (TMA) provided crucial monitoring and early warnings throughout these events, which were essential for enhancing national preparedness and supporting timely response efforts across affected sectors, including transport, infrastructure, water, agriculture, coastal and marine, mining, tourism, energy, and aviation. Despite these efforts, the impacts observed highlight the continued vulnerability of communities, particularly in flood-prone and coastal areas, and underscore the need to further strengthen early warning systems, disaster preparedness, and community resilience to extreme weather events.

7 Summary

Rainfall patterns in Tanzania during 2025 were characterized by spatial and temporal variability, with episodes of both suppressed rainfall and intense precipitation leading to significant socioeconomic and infrastructure impacts. Localized extreme rainfall events led to widespread flooding across several regions, including Morogoro, Mara, Kilimanjaro, and parts of the coastal and southern zones. These events resulted in loss of lives, collapse of houses, displacement of communities, and extensive damage to crops, farmland, and food stocks. Key infrastructure was severely damaged, including roads, bridges, railways, and power systems, disrupting transport and essential services across multiple regions.

Adverse weather conditions also affected aviation operations, with heavy rainfall and reduced visibility causing disruptions to flight schedules and airport operations, as evidenced by reported impacts at Bukoba Airport (On 10th May 2025), where weather conditions limited safe operations. Additional impacts were recorded in December in Kilosa District, where strong winds and flooding damaged property and livelihoods. Tropical Storm Chenge further intensified flooding and coastal impacts. Despite timely early warnings issued by the Tanzania Meteorological Authority (TMA), the events highlight the increasing vulnerability of communities and infrastructure to extreme weather, underscoring the urgent need to strengthen early warning systems, disaster preparedness, and climate-resilient infrastructure.

In December 2025, heavy rainfall events, accompanied by strong winds and flooding, caused further impacts in Kilosa District (Morogoro Region), particularly in Magole, Dumila, and Tindiga Wards. These events resulted in damage to houses, displacement of communities, and disruption of livelihoods. Additionally, Tropical Storm Chenge contributed to intensified flooding, coastal erosion, and infrastructure damage in coastal areas. Despite the issuance of timely early warnings by the Tanzania Meteorological Authority (TMA), the observed impacts highlight the high vulnerability of communities, infrastructure, and key sectors to extreme weather events. Overall, the 2025 rainfall season underscores the need to strengthen early warning systems, climate-resilient infrastructure, and disaster preparedness and response mechanisms in Tanzania.

8 Appendix

These appendices provide information about the underlying datasets and methodologies used in this statement. Much of the content is repeated from previous statements, with only minor updates, but they are included here in full for reference.

8.1 Climate of Tanzania

8.1.1 Temperature distribution

Temperatures across the country are normally characterized by relatively less fluctuation throughout the year. The annual long-term average temperature over different stations in the country ranges from 14.7 °C to 27.5 °C. Regions with the highest temperatures are along the coast and in the western parts of the country. The season with high temperatures starts in October and continues through February or March, while the cool season is from May to August. The annual minimum air temperature (Tmin) and maximum air temperature (Tmax) across the stations range from 9.9 °C to 24 °C and 19.5 °C to 31.2 °C, respectively.

8.1.2 Rainfall patterns

Rainfall in Tanzania is influenced by the migration of the Inter-Tropical Convergence Zone (ITCZ) north and south of the equator. The ITCZ moves to the southern regions of Tanzania from October to December, reaching the southernmost part of the country in January and February, before reversing northward in March, April, and May. This migration results in areas experiencing either single or double passages of the ITCZ. Regions that experience a single passage follow a unimodal rainfall regime, receiving rainfall from November to April or May in the subsequent year (also known as Msimu). These regions include the southern (Ruvuma, Mtwara, Lindi), southwestern highlands (Mbeya, Songwe, Njombe, Iringa, Rukwa), central (Dodoma, Singida), and western (Katavi, Kigoma, Tabora) parts of the country. Areas with double passages experience a bimodal rainfall regime, with two distinct rainy seasons: the long rains (Masika), which typically begin in March and continue through May (MAM), and the short rains (Vuli), which start in October and last through December (OND). These regions include the northern coast (Dar es Salaam, Pwani, Tanga, northern Morogoro, and Zanzibar Islands (Unguja and Pemba)), northeastern highlands (Kilimanjaro, Arusha, Manyara), Lake Victoria basin (Mwanza, Shinyanga, Simiyu, Kagera, Mara). However, January and February are relatively dry for areas with a bimodal rainfall regime, while June through September are dry months for the entire country. The spatial and temporal variability of rainfall patterns in Tanzania is driven by multiple factors, including the ITCZ, the East African Monsoon, ENSO, westerlies from Congo, and tropical cyclones.

8.2 Long-term average (1991-2020)

The long-term averages for the WMO standard 30-year climatological reference period, 1991–2020 presented in this statement have been calculated from long term average monthly station data as a simple average spanning for 30-year period. The long-term averages for the country were calculated as the average of individual station monthly averages.

8.3 Rainfall anomaly (Percent of average)

The rainfall anomaly, expressed as a percentage of the long-term average, is calculated at three levels:

1. Station-Level Calculation:

The anomaly at each station is determined by taking the ratio of the observed monthly rainfall to the station's long-term monthly average (1991–2020) and multiplying by 100.

2. National-Level Monthly Calculation:

The national rainfall anomaly for a given month is calculated as the ratio of the observed national average monthly rainfall (computed from all stations) to the long-term national average monthly rainfall (computed from all stations), multiplied by 100.

3. Seasonal and Annual Calculation:

Seasonal and annual rainfall anomalies are computed by taking the ratio of the total observed country monthly average rainfall over a given period (e.g., January–December for annual or March–May for seasonal) to the total long-term national average rainfall for the same period, then multiplying by 100.

The percentage value greater than 125 is regarded as above normal rainfall and that between 75 and 125 is normal rainfall, while a percentage value of less than 75 is below normal.

8.4 Temperature anomaly

The temperature anomaly is calculated at three levels as follows:

1. Station-Level Calculation:

The temperature anomaly at each station is determined by calculating the difference between the observed monthly temperature and the station's long-term monthly average temperature (1991–2020).

2. National-Level Monthly Calculation:

The national average temperature anomaly is computed by averaging the monthly temperature anomalies from all stations across the country for that specific month.

3. Seasonal and Annual Calculation:

Seasonal and annual temperature anomalies are derived by averaging the national monthly temperature anomalies over the respective period (e.g., January–December for annual or March–May for seasonal).

8.5 Cumulative Rainfall Curves and Their Significance

Cumulative rainfall curves provide insights into seasonal rainfall distribution, intensity, and trends. They help identify rainfall patterns, such as steady precipitation, intense bursts, or prolonged dry spells. A steep incline indicates heavy rainfall over a short period, while a gradual slope suggests consistent, lighter rainfall. Sharp rises followed by plateaus highlight intense, short-duration rainfall, whereas a steady rise reflects prolonged, moderate rainfall. These curves are also valuable for detecting extreme weather events, including heavy rainfall and droughts.

In this statement, cumulative rainfall curves are plotted alongside long-term cumulative rainfall to assess rainfall performance across different regions. Deviations from the long-term average indicate rainfall deficits or surpluses for a given season, below-average cumulative rainfall signals a deficit, while above-average values indicate excess rainfall.

In this statement, cumulative rainfall refers to the total observed dekadal rainfall accumulated from a selected reference point for a specific season. The dekadal rainfall for 2025 was calculated as follows:

1. Unimodal Rainfall Regions:

The unimodal rainfall regime is characterized by a single rainy season, known as *Msimu*. For this analysis, rainfall was accumulated from September 2024 to August 2025 to align with the seasonal cycle, which typically spans from November of the previous year to April of the following year (NDJFMA).

2. Bimodal Rainfall Regions:

The bimodal rainfall regime is characterized by two rainfall seasons namely *Masika* (March- May) and *Vuli* (October - December).

- i. To characterize **March–May (MAM) season**, rainfall was accumulated from January to August 2025
- ii. To characterize **October – December (OND) season**, rainfall was accumulated from June to December 2025

The dekadal baseline climatology (1991–2020) was computed using the same methodology to allow for comparisons with the observed dekadal values for each season.

8.6 Spatial analysis for temperature and rainfall distribution

Temperature and rainfall data were analyzed as point data for selected stations across the country. A total of 29 meteorological stations were used for rainfall analysis, and 28 stations for temperature analysis. To generate spatial maps of temperature and rainfall anomalies, the Inverse Distance Weighting (IDW) interpolation method was applied using Quantum Geographic Information System (QGIS). The IDW method assumes that each input point exerts a local influence that diminishes with distance. Points closer to the processing cell are given more weight than those farther away. This moving average algorithm is particularly useful for interpolating highly variable data.

8.7 Severe weather

Severe weather is defined as any weather or climate event that poses a risk to life, property, or requires the intervention of authorities. The types of severe weather phenomena vary depending on factors such as latitude, altitude, topography, and atmospheric conditions. These include strong winds, hail, excessive precipitation, and wildfires. According to the World Meteorological Organization (WMO), severe weather is categorized into two groups: general severe weather (e.g., windstorms and associated phenomena) and localized severe weather (e.g., downbursts and tornadoes). Extreme weather refers to unusual events that fall at the extremes of historical distribution for a given area.

In this statement, severe weather is defined by rainfall events that reach or exceed 50 mm in 24 hours. However, extreme weather and climatic events may also be described using other statistical terms, such as percentiles, or based on the magnitude of their impact, even if they do not meet the prescribed thresholds.

Temperature thresholds for extreme weather events are set at 35°C or higher for maximum temperatures, and 5°C or lower for minimum temperatures.

8.8 Calculations of Sea Surface Temperature anomaly for the IOD and ENSO

The IOD is calculated by taking the difference between the area-averaged monthly mean Sea Surface Temperature Anomaly (SSTA) for the South East Tropical Indian Ocean (SETIO) [90°E-110°E, 10°S-0] and West Tropical Indian Ocean (WTIO) [50°E-70°E, 10°S-10°N], while the Niño 3.4 index (ENSO), is calculated as the area-averaged monthly mean SSTAs (°C) for the region (5°N-5°S, 170°W-120°W) over Central Equatorial Pacific Ocean (CEPO). Anomalies are departures of observed SSTs from the long-term average (1991-2020).

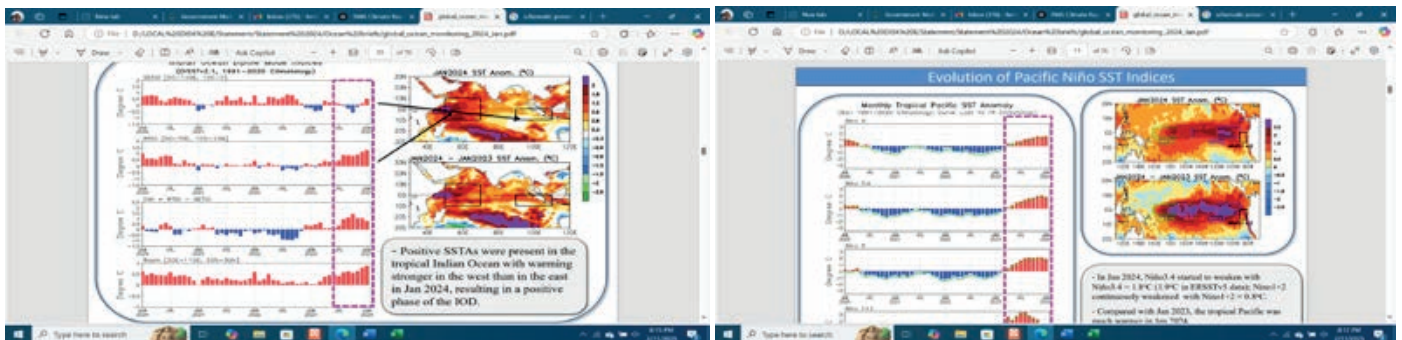


Figure 15: Blocks used to calculate the Indian Ocean Dipole (IOD) mode in the Indian Ocean (left) and the El Niño and La Niña indices in the Pacific Ocean (right).

