Ghana
Meteorological
Agency

2025
STATE OF THE CLIMATE

State of the Climate Report Ghana

2025

Closing the Early Warning Gap Together

A publication of Ghana Meteorological Agency

Contents

LIST OF FIGURES AND MAPS

ABBREVIATIONS

GMet	Ghana Meteorological Agency
LTM	Long Term Mean
MAM	March April May
AMJ	April May June
MJJ	May June July
JJA	June July August
JAS	July August September
SON	September October November
ENSO	El Nino Southern Oscillation
ITCZ	Intertropical Tropical Convergence Zone
ITD	Intertropical Discontinuity
SST	Sea Surface Temperature
TSRA	Thunderstorm with Rain
LOS	Length of Season
SPI	Standardized Precipitation Index

PREFACE

The weather and climate since the beginning of time have consistently been dynamic in their variabilities as the Earth rotates and revolves around the sun. Adverse conditions arising from changes in temperature, pressure systems, jet streams, and other weather phenomena have had significant impacts on lives and property across the globe.

In Ghana, anomalies in weather and climate conditions have greatly affected food security and other socio-economic activities. Several parts of the country have experienced severe droughts and floods in recent times. Notable flash floods occurred on October 1st in Kasoa and on October 7th in areas such as Mallam, Circle, and Weija in the Greater Accra Region, as well as in Kumasi, following hours of torrential rainfall. Similar devastating impacts on lives and property have also been recorded in parts of northern Ghana.

The State of the Climate Report 2025 presents a comprehensive analysis of climate conditions, observed trends, and their impact across the country. It highlights the interactions between climate change and key socio-economic factors affecting national development. The report seeks to support collaboration among policymakers, scientific institutions, stakeholders, and the general public. Providing accurate, timely, and reliable climate information strengthens decision-making, raises awareness of climate challenges, and informs adaptation and mitigation strategies. Particular emphasis is placed on the socio-economic consequences for vulnerable populations and the need for timely and appropriate interventions.

The 2025 State of the Climate Report is organized to present a systematic overview of Ghana's climate and weather conditions based on the Ghana Meteorological Agency's monitoring and analysis. It begins with a description of the general characteristics of the country's climate and prevailing weather patterns and their impacts. Subsequent sections focus on key climatic parameters, particularly rainfall and temperature, including their long-term trends and major climate drivers. The report then examines seasonal characteristics such as onset, cessation, and dry spells for the major and minor rainy seasons in southern Ghana and the single rainy season in northern Ghana. It concludes with analyses of standardized precipitation indices and documented extreme weather and climate events observed during the year.

The authors hope that the information presented in this report will not only inform policy and guide research but also promote climate-resilient practices across various sectors. Understanding the complexities of Ghana's changing climate, stakeholders can develop and implement effective adaptation and mitigation strategies to safeguard the nation's future.

This report would not have been possible without the contributions of numerous individuals and the organization. The lead author, Mrs. Francisca Martey (Deputy Director, Research and Applied Meteorology Department), for her expertise and dedication in compiling and analyzing the data, as well as to the contributing authors, Jeremiah Zusika Lazia (Head, Climatology unit), Nana Kofi Opoku (Head, Agrometeorology unit), Samuel Owusu Ansah (Head, Hydrometeorology unit), and the entire Research and Applied Meteorology Department of the Ghana Meteorological Agency (GMet). Their collective efforts have resulted in a comprehensive and insightful assessment of the State of the Climate of Ghana for the year 2025. We are also grateful to the various stakeholders who provided valuable feedback and support throughout the development of this report. The insights and perspectives shared by these individuals have enhanced the quality and relevance of this assessment. Finally, we acknowledge the support of (GMet) for providing the resources and infrastructure necessary to conduct this important work. Their commitment to advancing climate science and informing policy is essential for ensuring a sustainable and resilient future for Ghana.

FOREWORD

The State of the Climate Report for Ghana, 2025 provides a comprehensive assessment of the country's climate conditions for the year, with emphasis on observed weather patterns, extreme events, and their socio-economic impacts across key sectors. As the official national reference on annual climate performance, the report provides decision-ready information to support government agencies, disaster managers, researchers, farmers, local authorities, and the private sector. The effort aligns with Ghana's broader climate policy priorities, including disaster risk reduction, climate-smart agriculture, water resource management, and long-term resilience planning.

This report uses climate observations collected from the national network of synoptic and climatological stations. In total, 47 stations were considered for rainfall analysis and 21 for temperature. The datasets include daily rainfall totals, maximum and minimum temperatures, and reports from all climatological zones.

Consistent with previous editions, observed conditions in 2025 were compared against the 1991–2020 climatological baseline to assess anomalies in rainfall distribution, temperature patterns, onset and cessation of seasons. The report also evaluates dominant atmospheric and oceanic drivers, including the Inter-Tropical Convergence Zone (ITCZ) migration, strength of the West African Monsoon, Saharan Air Layer intrusions, variations in Gulf of Guinea sea surface temperatures, and the evolution of ENSO conditions in the Pacific Ocean. These climate drivers played a role in shaping Ghana's seasonal rainfall patterns, dry spells, heat episodes, and coastal hazards throughout the year.

The findings underscore the increasing exposure of communities and economic systems to climate variability and extremes. They reinforce the need for strengthened early-warning systems, improved drainage and urban planning, climate-smart agriculture, investment in observing networks, and enhanced public communication strategies. By providing scientifically grounded evidence, the 2025 State of the Climate Report supports national efforts toward climate adaptation, disaster preparedness, and sustainable development in a changing climate environment.

EXECUTIVE SUMMARY

The State of the Climate Report provides a thorough assessment of Ghana's climatic conditions, focusing on rainfall performance, seasonal characteristics (onset, dry spells, cessation, and length of growing season), temperature patterns, and variability trends. The report evaluates observed climate conditions within the context of long-term climatology (1991–2020 baseline). The analysis reflects Ghana's increasing exposure to climate variability and the growing need for adaptive and resilience-building strategies.

In 2025, Ghana experienced increasing spatial and temporal variability in its rainfall patterns, characterized by increasing temperatures, shifts in rainy seasons, shifts in onset, prolonged dry spells, earlier cessations in some regions, and shortened growing seasons in others. Trend analyses indicate a gradual delay in onset dates in several locations, particularly in parts of the southern and transition zones, alongside an increase in dry spell days in key agricultural regions. Presented below are the key highlights of the 2025 State of Climate Report.

Temperature

Temperatures across **Ghana** in **2025** were persistently above the **1991–2020 climatological average of 27.5 °C**, reinforcing the long-term warming signal observed over recent decades. The national average temperature for the year was approximately **28.2 °C**, representing a positive anomaly of about **0.7 °C** and ranking **2025 as the second warmest year on record**. Both daytime (maximum) and night-time (minimum) temperatures remained elevated throughout the year, with the average maximum temperature reaching about **32.6 °C** and the average minimum about **23.8 °C**, indicating increased heat intensity and reduced nocturnal cooling. Extreme heat conditions were also recorded, with a **maximum temperature of 43.2 °C** observed at **Navrongo in April**, highlighting the growing occurrence of heat extremes, particularly in northern Ghana.

Rainfall

In 2025, total annual rainfall over Ghana was estimated at approximately **1,166 mm**, which was slightly below the 1991–2020 long-term mean of about **1,191** mm. Overall, rainfall distribution across the country was marked by strong spatial and seasonal variability. In the southern sector, rainfall during the major rainy season was largely near normal, with only a few localized areas experiencing below-normal conditions.

In contrast, pronounced below-normal rainfall was observed over parts of the northern sector, particularly around Bole, Damongo, Tamale, Salaga, and surrounding areas, during the June-July-August (JJA) and July-August-September (JAS) seasons. During the September-October-November (SON) season, parts of the northern belt recorded near-normal to above-normal rainfall, while conditions in the south remained generally normal. This uneven rainfall distribution highlights the continued dominance of intra-seasonal variability in shaping Ghana's rainfall patterns and underscores the sensitivity of rainfall-dependent sectors to localized rainfall deficits.

Onset

The major rainy season for the south exhibited mixed onset patterns, with early onset recorded in Ho in the forest zone and delayed onset in Dunkwa, Axim, Takoradi, and their environs. The northern zone experienced a delayed onset of rainfall, with a very late onset in areas such as Salaga and Wa.

Early Dry Spell

From the beginning of the 2025 season, most parts of the southern sector experienced between 5 and 10 dry spell days. The longest dry spells were observed in Dormaa Ahenkro and Kade, which recorded 13 consecutive dry days. In the transition zone, areas such as Bui, Kintampo, Wenchi, and their environs experienced shorter dry spells of 7–8 days. In the Northern sector, Tamale recorded the longest dry spell days with a maximum of 13 consecutive dry days following the onset of the season. Navrongo and its surrounding areas experienced the shortest dry spell in the sector, with 6 dry days.

Late Dry Spell

Most parts of southern Ghana recorded between 8 and 12 dry spell days, from the 51st day to the end of the season. The longest dry spells, 15–18 days, were observed in Akatsi and Akuse. Shorter dry spell days of 6-8 days were recorded in Wenchi, Kintampo, Half Assini, and Takoradi.

In the northern sector, Babile recorded the longest dry spell of 14 days without rain, and Wa recorded the shortest dry spell of 7 days.

Cessation

Cessation generally occurred within the climatology in the southern sector; however, Kintampo and Prang experienced very early cessation, whereas Sefwi Bekwai, Dormaa Ahenkro, Cape Coast, Accra, and their surrounding areas recorded a normal to late cessation. The cessation anomalies for northern Ghana indicated largely near-normal to slightly late cessation across most areas. However, early cessation anomalies were evident in Tamale, and late cessation anomalies were in Yendi, Navrongo, Wenchi, and Atebubu in the transition.

Length Of Growing Season

The major rainy season in southern Ghana was characterized by considerable variability in its duration from 153 to 71 days across different areas. Ho, Kumasi, Abetifi, and Dormaa experienced the longest season of 153 day, and the shortest season of 71 days was recorded in Dunkwa. Northern Ghana experienced noticeable variations in the length of the 2025 growing season across different zones. Wenchi, Kintampo, and Prang experienced the longest durations at 223, 218, and 215 days, respectively. In contrast, Kete-Krachi recorded a shorter season length of 151 days.

1 INTRODUCTION

1.1 General Weather and Climate Features of the Country

The climate of Ghana exhibits considerable temporal and spatial variability, influenced by both local and large-scale atmospheric processes. Similar to other parts of West Africa and the tropics, Ghana is increasingly exposed to climate extremes, including floods, prolonged dry spells, droughts, heatwaves, and severe storms. Over the past decade, there has been a marked increase in the frequency and intensity of extreme weather events, a trend widely attributed to global warming and climate change (IPCC, 2021; Lott et al., 2013).

Ghana is located along the southern coast of West Africa and is bordered by Togo to the east, Côte d'Ivoire to the west, Burkina Faso to the north, and the Atlantic Ocean (Gulf of Guinea) to the south. The country lies approximately between latitudes 4°N and 12°N and longitudes 1.5°E and 3.5°W. Weather phenomena commonly experienced across the country include rainfall, fog, mist, haze, thunderstorms, lightning, gusty winds, and occasional hail, contributing to Ghana's diverse climate characteristics (Ampofo et al., 2023).

The primary driver of weather and climate conditions in Ghana is the seasonal migration of the overhead sun across the equator, which governs the latitudinal movement of the Inter-Tropical Discontinuity (ITD). The north-south oscillation of the ITD modulates the West African Monsoon (WAM) system and largely determines the spatial and temporal distribution of rainfall across the country (Baidu et al., 2017). Variations in sea surface temperatures over the Gulf of Guinea and large-scale atmospheric circulation patterns further influence rainfall onset, intensity, and duration.

Ghana is broadly divided into four climatic zones: the Northern (Savannah), Transition, Forest, and Coastal zones. These zones differ in rainfall regimes, temperature characteristics, seasonal onset and cessation, and length of the growing season. Overall, Ghana experiences a humid tropical climate, with rainfall displaying a bimodal distribution in the southern sector and a

1.2 Rainy Season

The rainfall regime in Ghana varies between the southern and northern sectors. In the southern part of the country (south of approximately 8°N), the climate is characterized by two rainy seasons: a major rainy season from March to June and a minor rainy season from September to November. These two seasons are separated by a brief reduction in rainfall activity during August, commonly referred to as the “little dry season.”

In contrast, the northern sector (north of 8°N) experiences a single unimodal rainy season, which typically begins in April or May and extends through October. The unimodal pattern reflects the shorter residence time of the ITD over northern Ghana compared to the southern sector. Rainfall during the rainy season supports agriculture, replenishes surface and groundwater resources, and sustains ecosystems, but also poses risks of flooding when rainfall is intense or prolonged.

1.3 Dry Season

The dry season, known as the Harmattan, generally occurs between December and February. This season is dominated by dry north-easterly winds originating from the Sahara Desert, transporting dust particles across the country. Harmattan conditions significantly reduce visibility and air quality, particularly in northern and transitional zones, and can disrupt aviation, transportation, and public health.

Temperatures in this season are normally cold due to the region’s proximity to the Sahara and the dominance of dry continental air masses.

1.4 Temperature

Temperature conditions in Ghana are generally high throughout the year, reflecting the country’s tropical location within the West African sub-region. Average temperatures typically range between **26°C** and **28°C**, with relatively small seasonal variability but noticeable spatial contrasts across the country. Higher temperatures are commonly observed in the northern parts of Ghana, while comparatively lower values occur along the coast and within the forest belt due to maritime influence and higher cloud cover. Seasonal temperature variations are influenced by solar radiation, cloudiness, rainfall, and the prevailing wind regimes, particularly during the Harmattan period and the peak rainy season. State of the climate for Ghana 2025 indicates a gradual warming tendency consistent with broader regional and global climate change signals.

1.5 Relative Humidity

Relative humidity in Ghana shows seasonal and spatial variability, intricately linked to rainfall patterns, prevailing wind, and proximity to the Atlantic Ocean. Generally, humidity levels are highest during the rainy season, particularly in the southern and coastal zones where moist south-westerly monsoon winds dominate. During this period, average relative humidity values often range between **78-89%,** especially in the morning hours. In contrast, the dry Harmattan season from December to February is characterized by significantly reduced humidity, particularly in the northern regions, as dry north-easterly winds from the Sahara prevail. The average relative humidity during this period ranges from **27-41%**. These seasonal fluctuations in relative humidity play a significant role in influencing thermal comfort, cloud formation, and precipitation processes across the country. Detailed analyses of humidity levels are provided in the dekadal climate bulletins.

1.6 Winds

Surface wind patterns in Ghana are characterized by a seasonal reversal linked to the West African Monsoon system. During the wet season (March-November), south-westerly winds from the Atlantic Ocean prevail, transporting moisture inland and supporting rainfall development, with stronger winds along the coast and weaker flow inland.

During the dry season (December-February), north-easterly Harmattan winds dominate, particularly over northern Ghana. These dry, dust-laden winds reduce humidity and visibility and may extend into southern Ghana during peak Harmattan periods, temporarily suppressing rainfall activity.

1.7 Climate Change Impacts

Climate change poses significant risks to human wellbeing, infrastructure, ecosystems, and economic development in Ghana. The country’s growing population is increasingly vulnerable to floods, droughts, land degradation, deforestation, declining water quality, rising heat stress, and coastal erosion. Between 1968 and 2021, Ghana recorded 32 major natural disasters, with the majority occurring in the past two decades, predominantly due to flooding, followed by droughts (World Bank Group, 2022).

Recent climate extremes have further highlighted Ghana's vulnerability. Prolonged dry spells experienced in parts of the country during 2024 adversely affected agricultural production, water availability, and hydropower generation, particularly in rain-fed farming communities. These dry conditions intensified soil moisture deficits, reduced crop yields, and heightened food insecurity, especially across the northern and transition zones (Ghana Meteorological Agency, 2024).

Conversely, intense rainfall events and associated flooding continue to pose serious challenges. Flooding affects an estimated 45,000 people annually, while nearly half of Ghana's 550 km coastline is vulnerable to erosion and inundation driven by sea-level rise (World Bank Group, 2022). A clear example was the controlled spillage of the Akosombo and Kpong Dams, which led to widespread flooding in downstream communities along the Lower Volta Basin. The spillage resulted in the displacement of thousands of people, destruction of homes and farmlands, and damage to critical infrastructure, highlighting the compounding risks of extreme rainfall, reservoir management pressures, and climate variability (Volta River Authority, 2023; National Disaster Management Organization, 2024).

Climate change also threatens transport infrastructure, especially road networks that are critical for rural-urban connectivity. Flooding and landslides damage an estimated 117 km of roads annually, increasing economic isolation and vulnerability, particularly within the Volta Basin and northern regions (World Bank Group, 2022).

Rising temperatures pose growing public health risks, including heat stress, exacerbation of chronic illnesses, reduced labour productivity, and increased occupational hazards. A 3°C increase above 1990 temperature levels is projected to reduce manual labour capacity in Ghana by approximately 11% (The Climate Reality Project, 2023). In addition, climate-induced shifts in pastoral migration and intensified competition for land and water resources have contributed to increased farmer-herder conflicts, heightening social tensions and localized insecurity in several parts of the country (IPCC, 2021).

For the assessment of the State of the Climate for 2025, rainfall data from forty-seven (47) meteorological stations and maximum and minimum temperature data from twenty-one (21) meteorological stations across Ghana were analyzed.

2.0 CLIMATE DRIVERS

The climate conditions experienced across Ghana in 2025 were shaped by a combination of global, regional, and local-scale atmospheric, oceanic, and land conditions. These factors influenced rainfall distribution, temperature patterns, seasonal timing, and the occurrence of extreme events such as severe thunderstorms accompanied by floods. The major climate drivers that affected Ghana during the year are described below.

2.1 Inter-Tropical Discontinuity (ITD)

The seasonal migration of the ITD, expressed as the mean dekadal position along 0° longitude, strongly influenced rainfall patterns over Ghana in 2025. In January, the ITD was located south of the country (7.6°- 8.2°N), producing limited rainfall and widespread dry conditions. Between February and April, it migrated steadily northward, crossing central Ghana in March and exceeding 11°N by April, marking the onset of the major rainy season in southern Ghana. By May-June, the ITD reached 14°-16°N, coinciding with the peak of the West African Monsoon and widespread rainfall in southern and transitional zones. Its northernmost position occurred in July-August (>20°N), consistent with the August dry spell in southern Ghana and concentrated rainfall in the north.

A comparison with 2024 indicates that in late November-December 2025, the ITD remained farther north along 0° longitude than in the same period of 2024. In 2024, a faster southward retreat led to drier late-season conditions, whereas in 2025, the delayed withdrawal maintained moisture over southern and central Ghana, explaining the observed late-season rainfall.

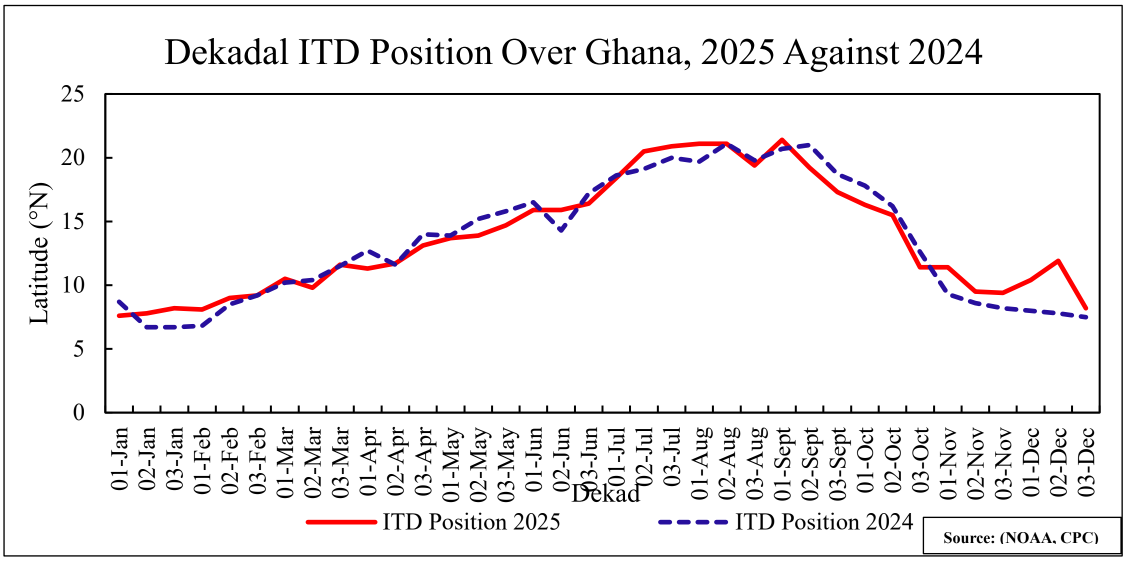


Figure 2.1 Dekadal ITD Position over Ghana, 2025 against 2024

2.2 El Niño Southern Oscillation (ENSO Indices)

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2020	0.6	0.6	0.5	0.3	0.0	-0.2	-0.4	-0.5	-0.8	-1.1	-1.2	-1.1
2021	-0.9	-0.8	-0.7	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.8	-0.9	-0.9
2022	-0.8	-0.8	-0.9	-1.0	-0.9	-0.8	-0.8	-0.9	-1.0	-0.9	-0.8	-0.7
2023	-0.5	-0.3	0.0	0.3	0.6	0.8	1.1	1.4	1.6	1.8	2.0	2.1
2024	1.9	1.6	1.3	0.8	0.5	0.2	0.1	-0.1	-0.2	-0.2	-0.3	-0.4
2025	-0.4	-0.2	-0.1	0.0	0.0	0.0	-0.1	-0.3	-0.4	-0.5	-0.6	-0.5

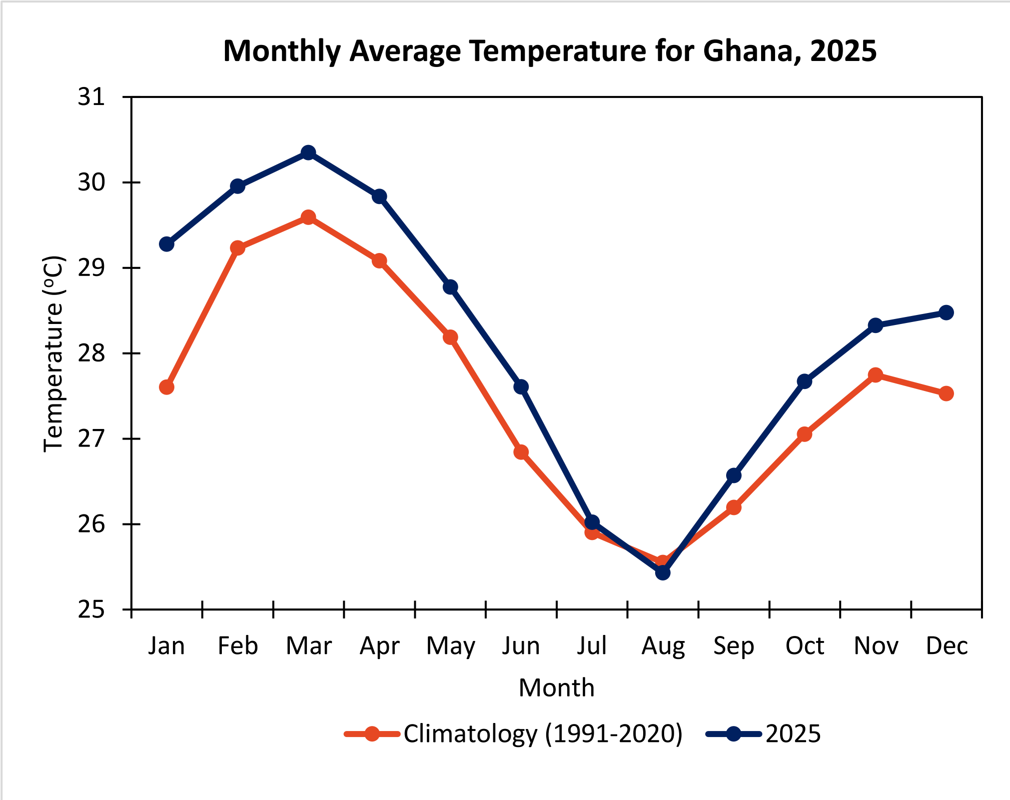
Figure 1.2 Seasonal ENSO Indices 2020 to 2025

In 2025, ENSO conditions over the tropical Pacific were generally neutral, with only minor fluctuations. The year began under ENSO-neutral conditions, with slightly negative indices in the early months. During the MAM (March-May), AMJ (April-June), and MJJ (May-July) periods, the indices reached zero, maintaining a neutral state that supported the typical onset and progression of the major rainy season across southern Ghana. In JJA (June-August), ENSO indices declined slightly, reflecting weak negative anomalies, before trending downward toward the end of the year. These neutral to weak negative ENSO conditions likely contributed to the near-normal rainfall during the main monsoon season and, in combination with the delayed southward retreat of the ITCZ, the observed late-season rains in November-December. Red color represents the El Niño phase, blue color represents the La Niña phase, and black represents the neutral phase

3.0 TEMPERATURE ANALYSIS

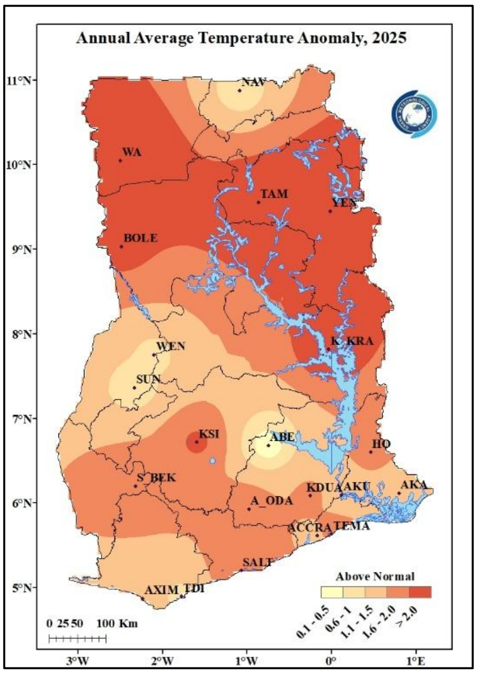
This section presents an overview of average temperature variability and changes across Ghana, including the ranking of average, maximum, and minimum temperatures, highlighting observed trends over time and the spatial distribution of temperatures across the country.

3.1 2025 Monthly Average Temperature



Climatologically, the highest monthly average temperature is mostly recorded in March. Temperatures in 2025 increased from about 29.2 °C in January to a peak of approximately 30.3 °C in March, making March the warmest month of the year with its value higher than its LTM mean of 29.6 °C by 0.7 °C. Average temperatures declined steadily from March to August, where the lowest average temperature was usually recorded and marked as the coolest month of the year. 2025 recorded the lowest temperature of 25.4ºC, a value lower than the usual temperature of 25.6 °C. Temperatures gradually increased, rising from approximately 26.6 °C in September to about 28.5 °C in December, which was also higher than its LTM.

3.2 Average Annual Temperature Anomaly



Map 3.2 Annual Average Temperature Anomaly,2025

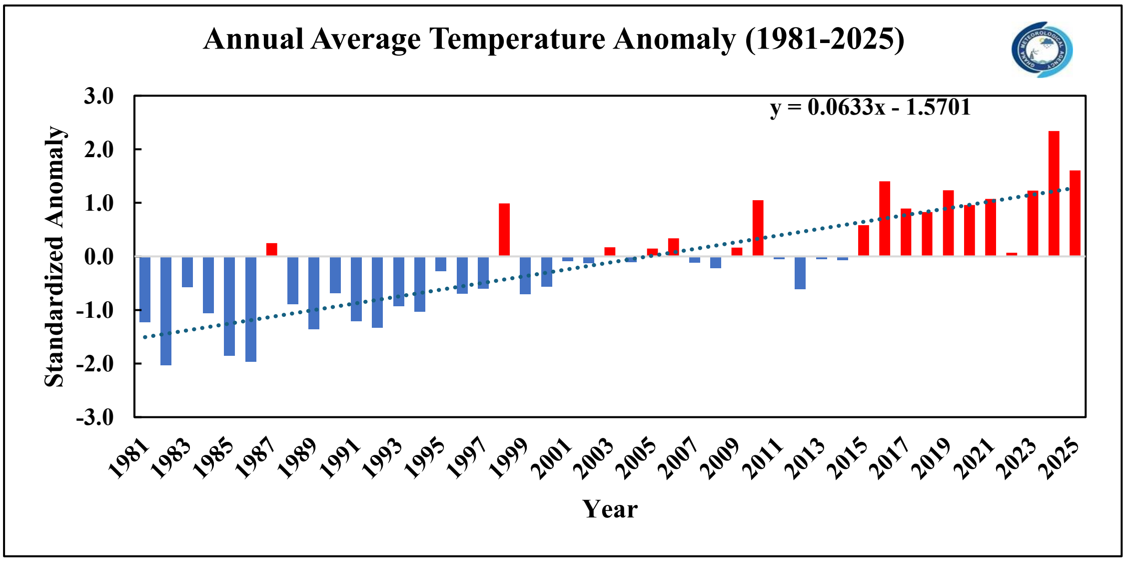


Figure 3.1 Annual Average Temperature Anomaly (1981-2025)

The annual average temperature anomaly series for 1981-2025 indicates a clear long-term warming trend over Ghana. Earlier decades were dominated by negative anomalies, reflecting cooler-than-average temperatures relative to the 1991-2020 climatological reference mean of **27.5 °C**, whereas recent years have been characterized by predominantly positive anomalies.

From the mid-2000s onward, both the frequency and magnitude of warm anomalies increased significantly.

In 2025, Ghana recorded an average temperature of approximately **28.2 °C**, corresponding to an anomaly of about **0.7** and a standardized anomaly of **1.6**. This placed 2025 as the **second warmest** year in the historical record. The elevated anomaly is consistent with the persistence of above-average temperatures observed in recent years and further underscores the ongoing warming of the national climate system.

3.3 Temperature Trends and Rankings

This section presents an overview of temperature variability and changes across Ghana, highlighting observed trends over time and the spatial distribution of temperatures across the country.

3.3.1 Average Annual Temperature Trend.

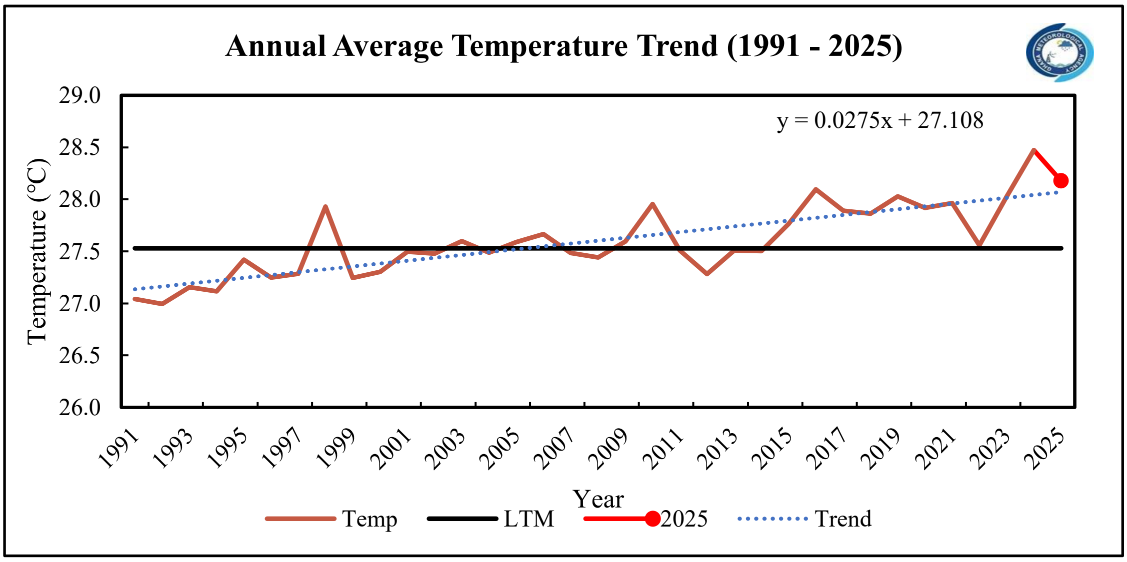


Figure 3.2 Annual Average Temperature Trend (1991-2025)

Ghana's annual average temperature has shown a steady upward progression over the period 1991-2025, pointing to a clear warming of the national climate. Although year-to-year fluctuations are evident, the overall pattern indicates that temperatures have been gradually increasing over a period of time. The long-term trend suggests a rise of about 0.03°C per year, reflecting a consistent accumulation of heat across decades. Since the mid-2000s, annual temperatures have increasingly remained above the long-term mean of 27.5°C, with fewer cooler years observed. In 2025, the average temperature reached approximately 28.2°C, making it the second warmest year on record since 1991.

3.3.2 Average Temperature Rankings

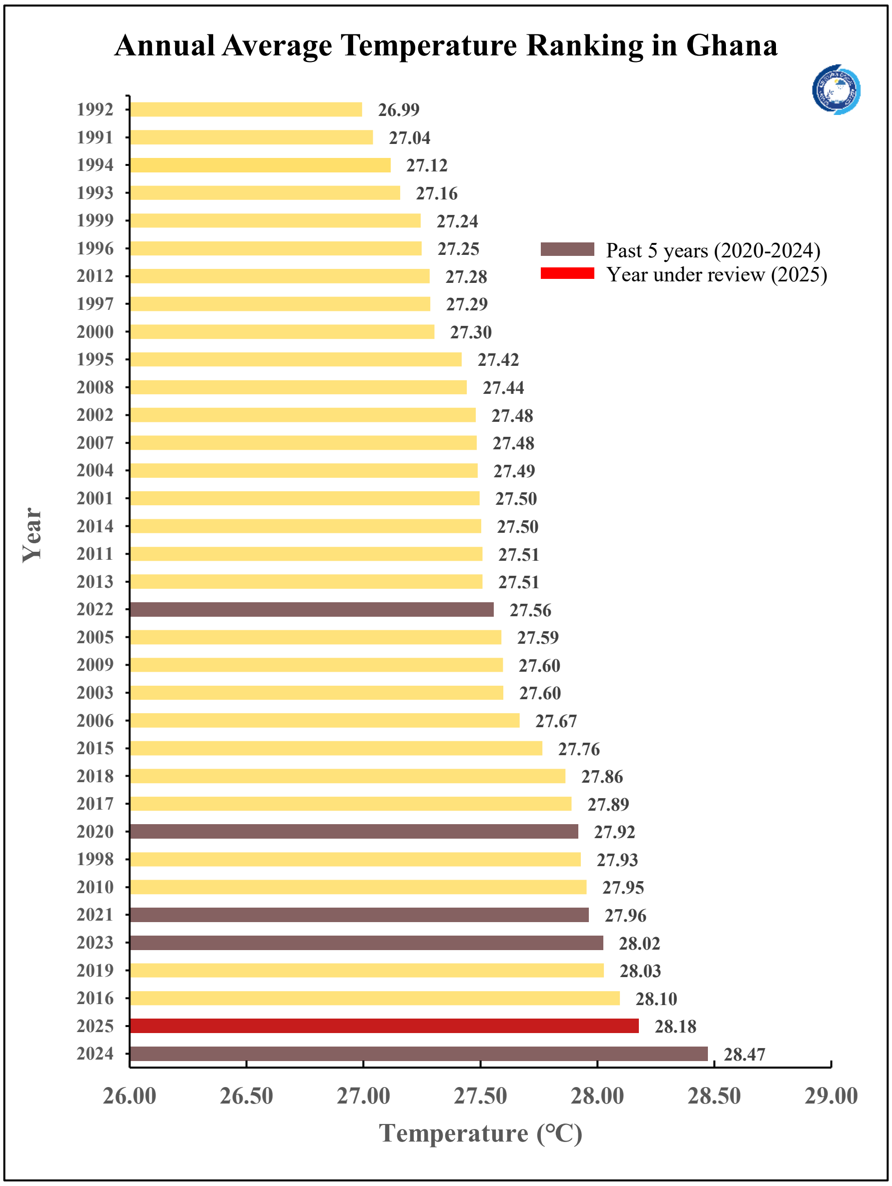


Figure 3.3 Annual Average Temperature Ranking in Ghana

The ranking of annual average temperatures over Ghana further reinforces the observed warming signal. 2025 ranks as the second warmest year on record since 1991, with an average temperature of approximately 28.2°C. The past 5 years also showed a gradual increase in temperatures over the period.

3.3.4 Maximum Temperature Rankings

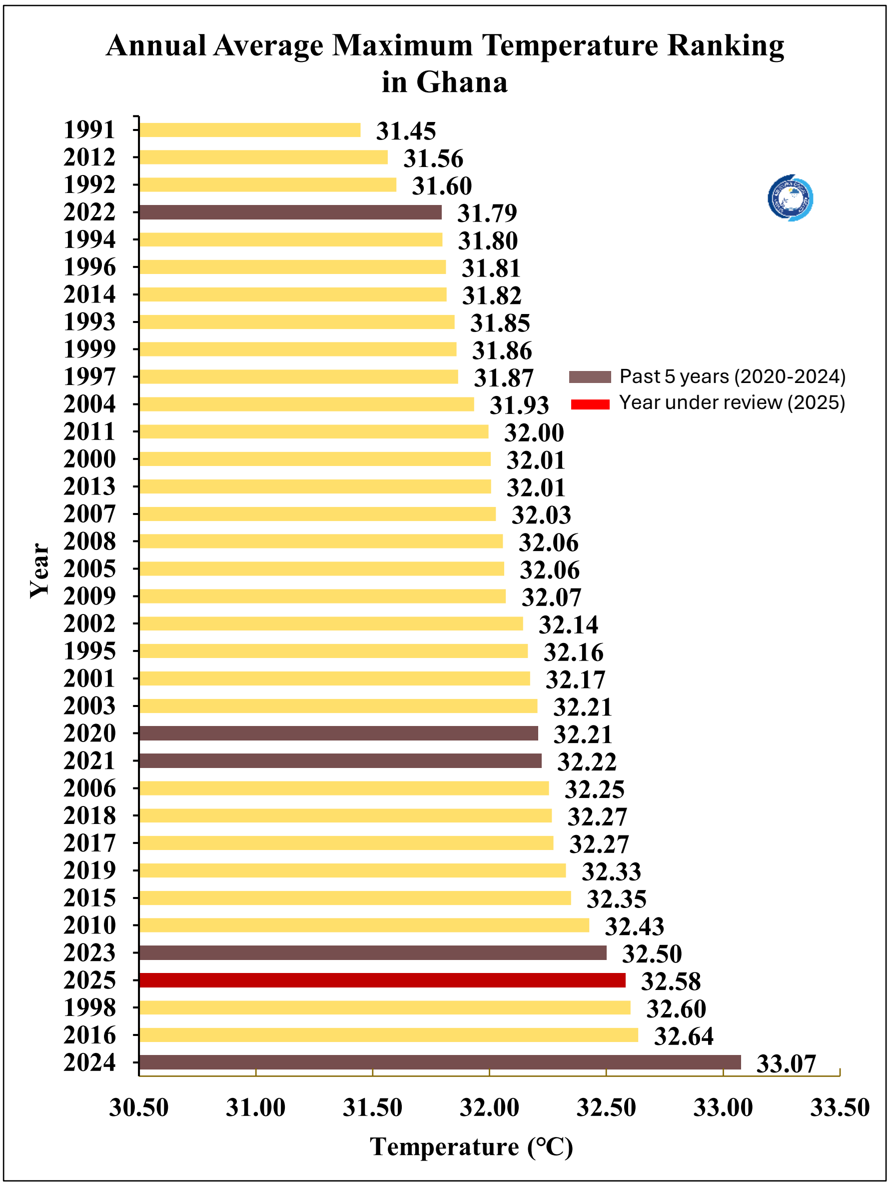


Figure 3.4 Annual Maximum Temperature Ranking in Ghana

The ranking of annual maximum temperatures in Ghana indicates a strong concentration of the warmest years in the recent period. 2025 ranks 4th highest in 35 years, with an average maximum temperature of approximately **32.6°C**. The highest annual maximum temperature was 2024, at about 33.1°C.

At the station level, the extreme maximum temperature in 2025 reached **43.2°C**, recorded at **Navrongo** on 25 April 2025, underscoring the increasing intensity of heat extremes. The lowest maximum recorded was 21.0ºC at Wenchi on the 9th October 2025.

3.3.5 Minimum Temperature Rankings

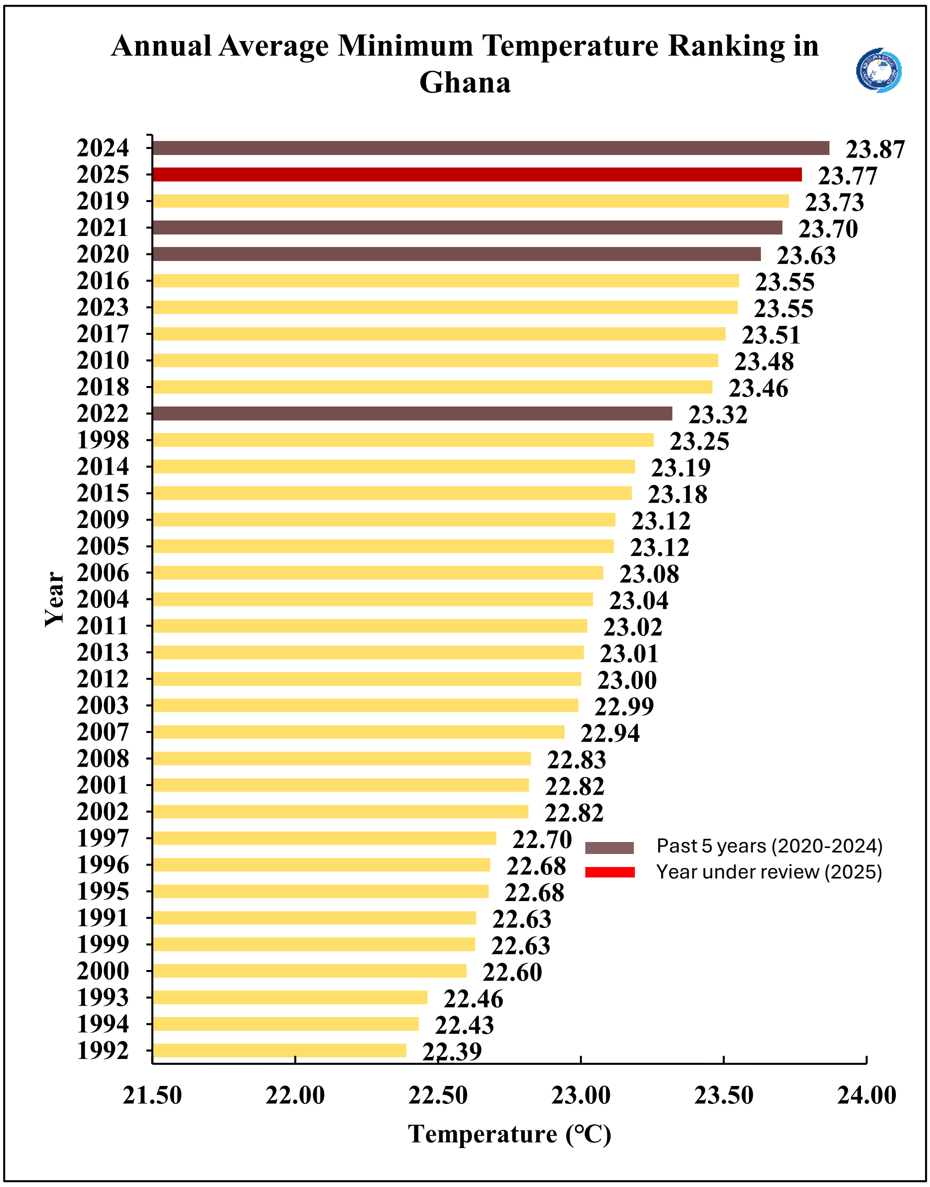


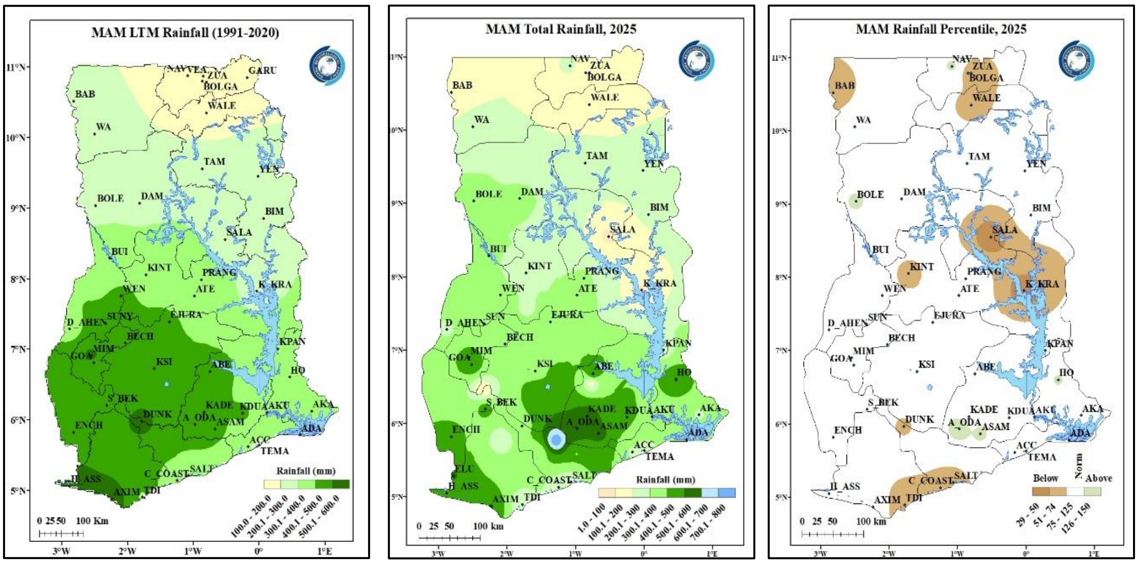
Figure 3.5 Annual Minimum Temperature Rankings in Ghana

The ranking of annual minimum temperatures in Ghana shows a clear upward shift toward warmer nights in recent years, consistent with the broader warming signal observed across the country. In 2025, the average annual minimum temperature was approximately 23.8°C, which was the 2nd warmest year on record since 1991 and reflected a sustained increase in overnight warmth across most parts of Ghana. The highest minimum temperature was recorded over Tamale of about 30.5°C on 30th March 2025. Despite the overall warming tendency, cooler conditions were observed during the year. The lowest minimum temperature of about **15.0°C**, was recorded in Wa in the upper west region on **23 February 2025,** likely associated with enhanced Harmattan influence. Overall, the ranking underscores a persistent rise in minimum temperatures, indicating fewer cool nights and increasing thermal stress, particularly during prolonged warm periods.

4.0 RAINFALL ANALYSIS

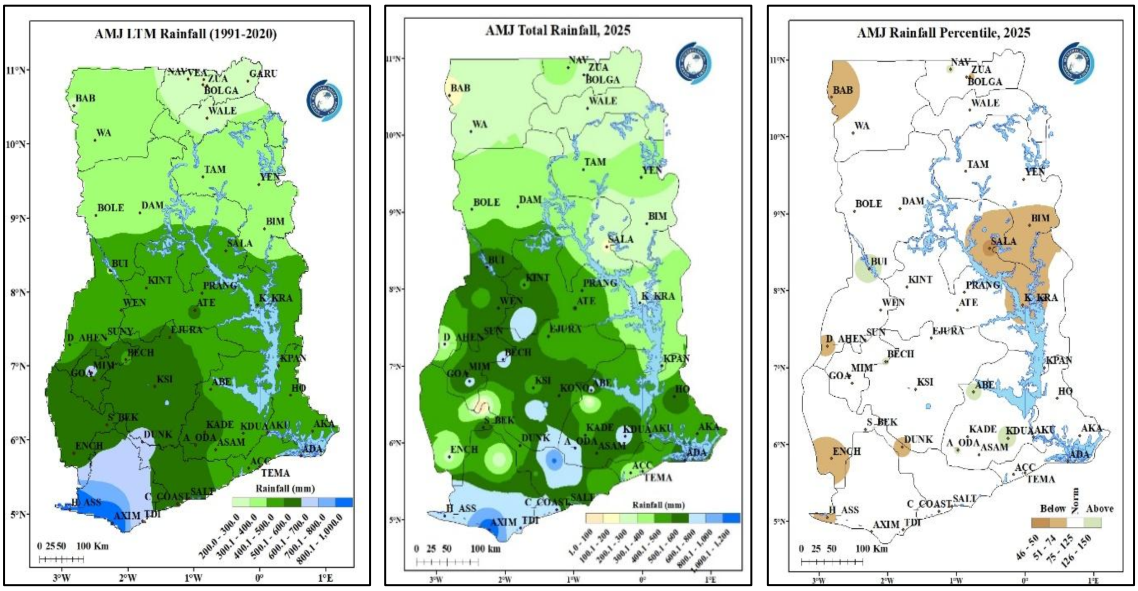
This section presents an assessment of rainfall variability and characteristics over Ghana, focusing on rankings, temporal trends and spatial distribution. Using long-term observations and recent data, the analysis examines how annual and seasonal rainfall amounts compare with historical averages, highlights notable departures from normal conditions and places recent rainfall performance within a broader climatological context.

4.1 Review of the Major Rainy Season in Southern Ghana, 2025 (March-June)



Map 4.1 Spatial distribution of LTM, Total rainfall and Percentiles for MAM 2025

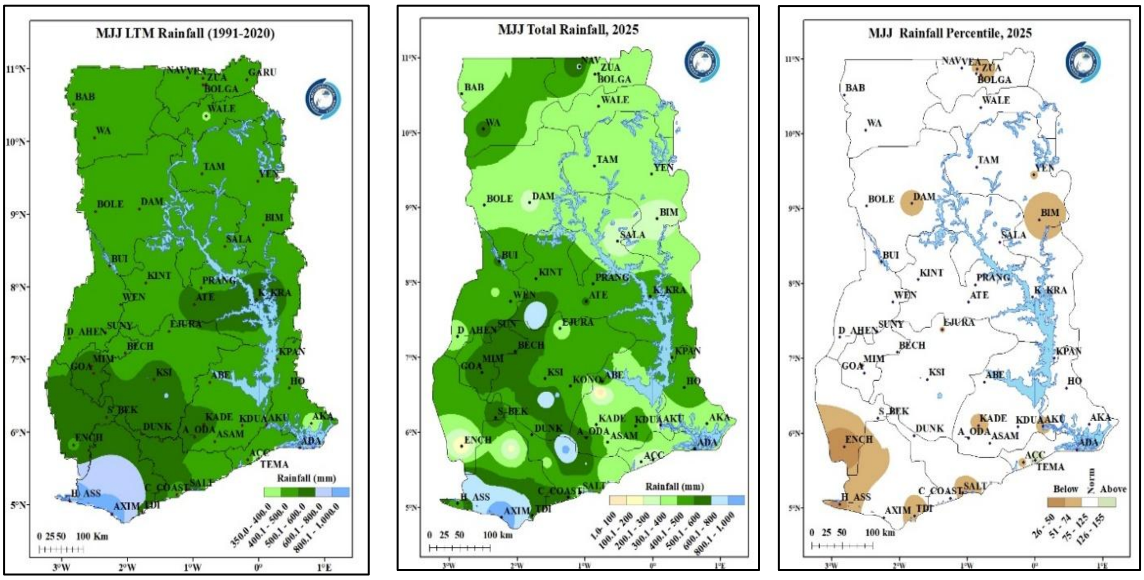
The LTM of MAM shows considerable rainfall over most part of the southern sector with less rainfall ove the northern. The 2025 March-April-May season recorded less rainfall over the extreme portions of the northern sector whereas the most areas within the southern areas witness significant amount of rainfall since it was the beginning of their major rainy season. The highest rainfall was recorded over Akim Oda with a total amount of about 572 mm whilst the lowest amount of rainfall was 83mm over Salaga. Comparing 2025 to its climatology, most areas had a normal rainfall except few areas such as Babile, Zuarungu, Bolga, Walewale and Salaga in the north, as well as Kete Krachi and Kintampo in the transition and areas within the south such as Dunkwa, Cape coast, Takoradi and Saltpond which experienced below normal rainfall. Areas such as Navrongo, Bole, Akim Oda and Asamankese experienced above normal rainfall.



Map 4.2 Spatial distribution of LTM, Total rainfall and Percentiles for AMJ 2025

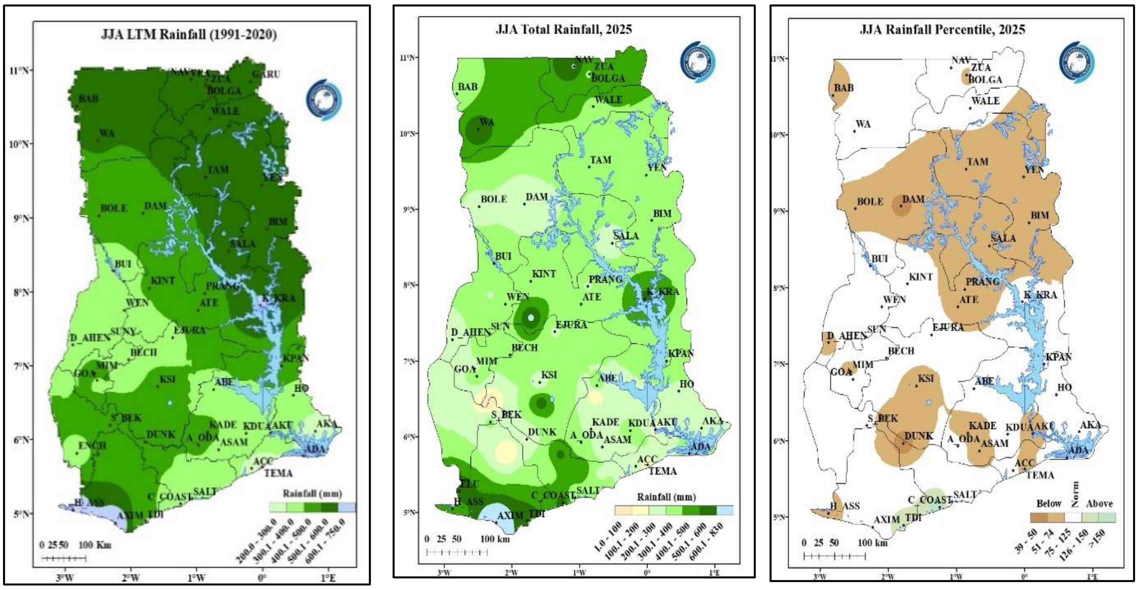
The LTM of April-May-June season shows significant rainfall mostly within the southern sector especially the south western portion of the country. The highest total rainfall amount recorded in 2025 was about 1,144 mm over Axim. Comparing 2025 season to its climatology (199-2020), most areas experienced normal rainfall with exceptions of few areas which include Babile, Zuarungu, Salga and Bimbila in the north, as well as Kete Krachi in the transition zone and areas like Dormaa Ahenkro, Dunkwa, Enchi and Half Assini in the southern zector which recorded a below normal rainfall. Areas such as Navrongo, Bui, Bechem, Abetifi, Koforidua and Akim Oda witnessed an above normal rainfall during the period. The least amount of rainfall was 172 mm which was recorded over Babile.

4.2 Review of the Major Rainy Season in Northern Ghana 2025 (May-September)



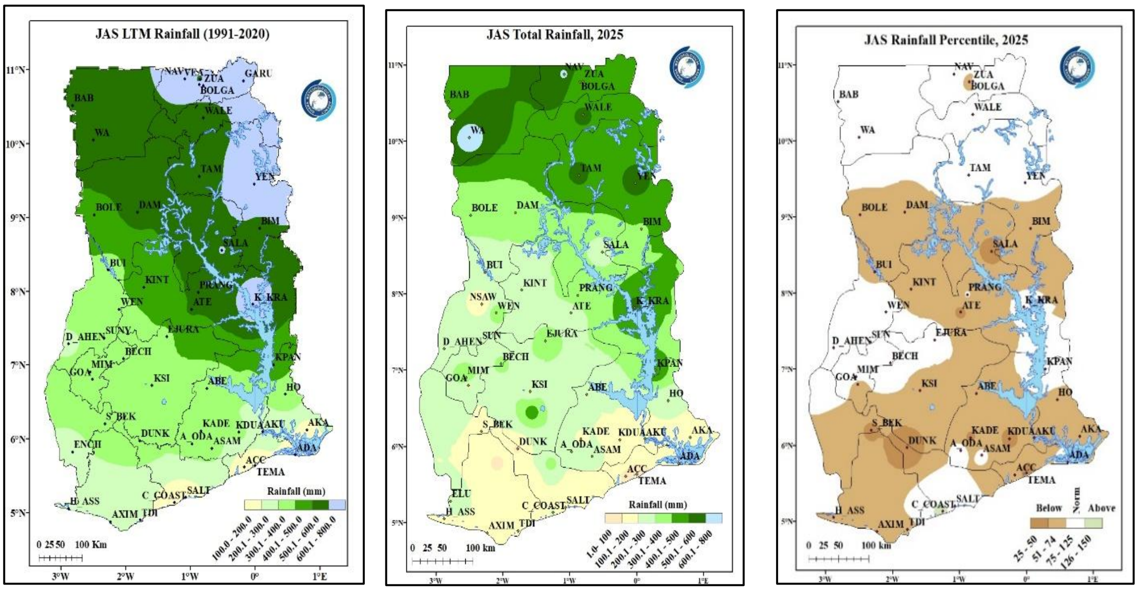
Map 4.3 Spatial distribution of LTM, Total rainfall and Percentiles for MJJ 2025

May-June-July normally shows the peak of rainfall throughout the country with more rains mostly within the south western portion. 2025 MJJ season shows significant amount of rainfall distributed throughout the country with areas within the south, especially the south western parts having higher rainfall. The country mostly experienced a normal rainfall season with quite few areas such as Zuarungu, Damongo, Yendi, Bimbila, Enchi, Half Assini, Kade, Takoradi, Saltpond, Akuse and Accra which experienced below normal rainfall. Tema experienced an above Rainfall. The highest amount of rainfall was 1049 mm over Axim whilst the lowest amount of rainfall was 127 mm over Enchi.



Map 4.4 Spatial distribution of LTM, Total rainfall and Percentiles for JJA 2025

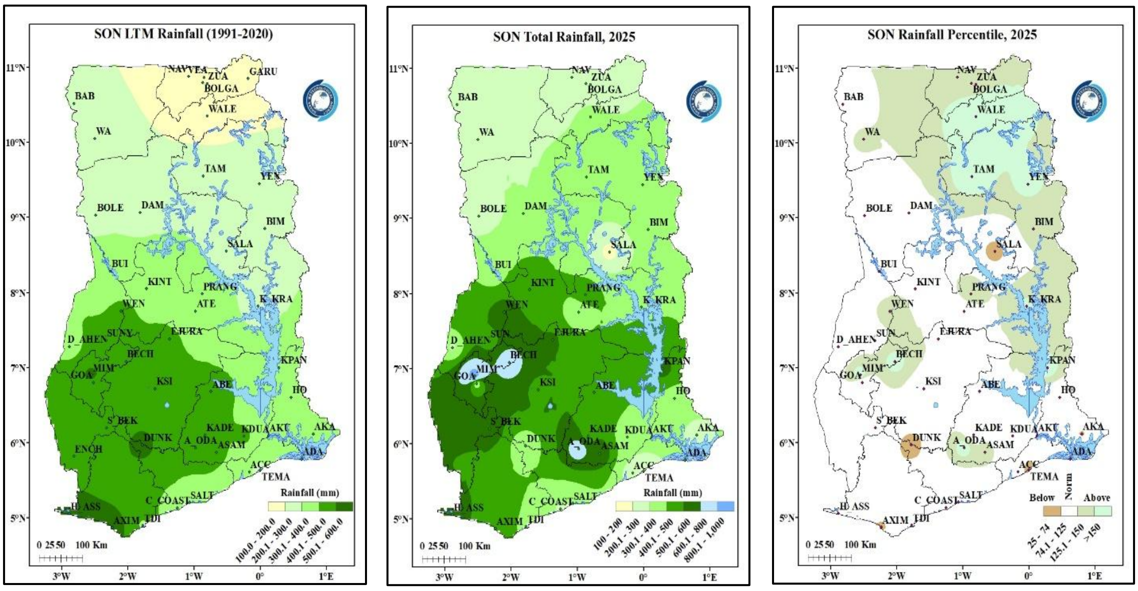
The extreme northern sector received higher rainfall amounts in June July August of 2025, as well as the south western portions of the country with the highest amount of 830mm recorded over Axim and the lowest amount of 161 mm over Akuse. The 2025 experienced more deficit rainfall over most areas within the country whereas other areas also had a normal rainfall with exceptions of Takoradi and Cape Coast which experienced an above normal rainfall.



Map 4.5 Spatial distribution of LTM, Total rainfall and Percentiles for JAS 2025

During the JAS season of 2025, the northernmost parts of the country received the highest rainfall, which is typical since it marks their major rainy season. The southern portions, however, recorded minimal rainfall. A comparison of 2025 rainfall to the LTM reveals that rainfall in the northern sector was mostly normal, while the transitional and southern regions experienced rainfall deficits with some areas recording normal rainfall, except Cape Coast, which recorded surplus rainfall.

4.3 Review of the Minor Rainy Season in Southern Ghana 2025 (September -November)



Map 4.6 Spatial distribution of LTM, Total rainfall and Percentiles for SON 2025

4.4 Rainfall Trends and Rankings

This section presents an overview of rainfall variability and changes across Ghana, highlighting observed trends over time and of rainfall across the country.

4.4.1 Annual Trend

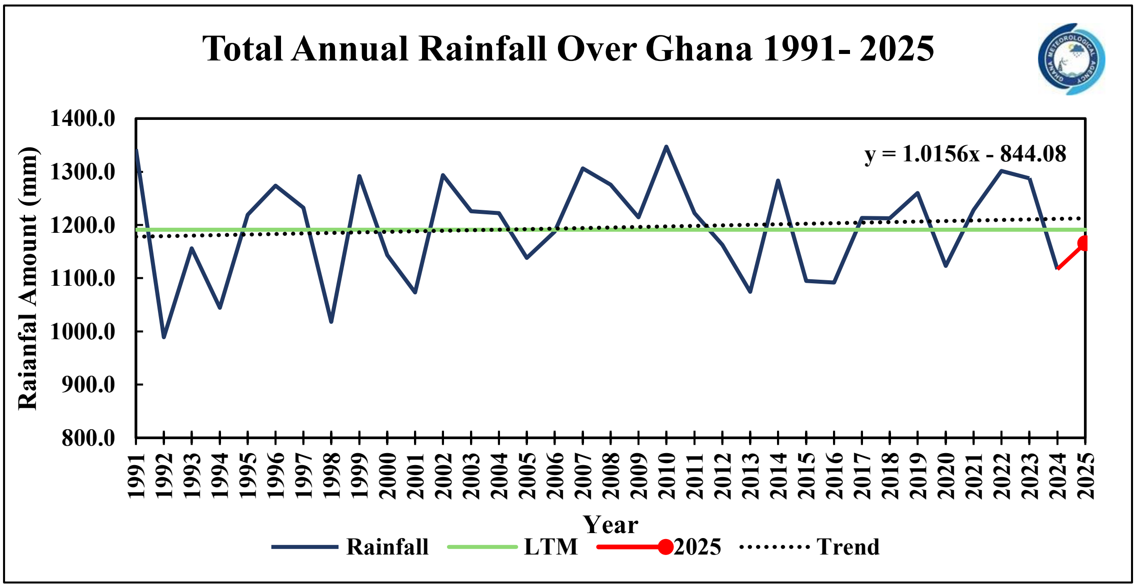


Figure 4.1 Total Annual Rainfall Over Ghana 1991- 2025

In 2025**,** Ghana recorded a total annual rainfall of approximately 1,160 mm, which was below the 1991-2020 long-term mean of about 1,200 mm. This rainfall deficit reflects the combined effects of below-average rainfall during key seasons of the year, particularly during parts of the major rainy season and the latter part of the year. Although the annual total remained within the range of historical variability, it indicates relatively drier conditions compared to the climatological average.

Long-term analysis of total annual rainfall over the period 1991-2025 reveals a slight upward trend in annual rainfall amounts. This trend suggests a gradual increase over time; however, its magnitude is small relative to the pronounced inter-annual variability that characterizes Ghana’s rainfall regime.

4.4.2 Seasonal Trends

Analysis of AMJ and MAM Rainfall Trends (1991–2025).

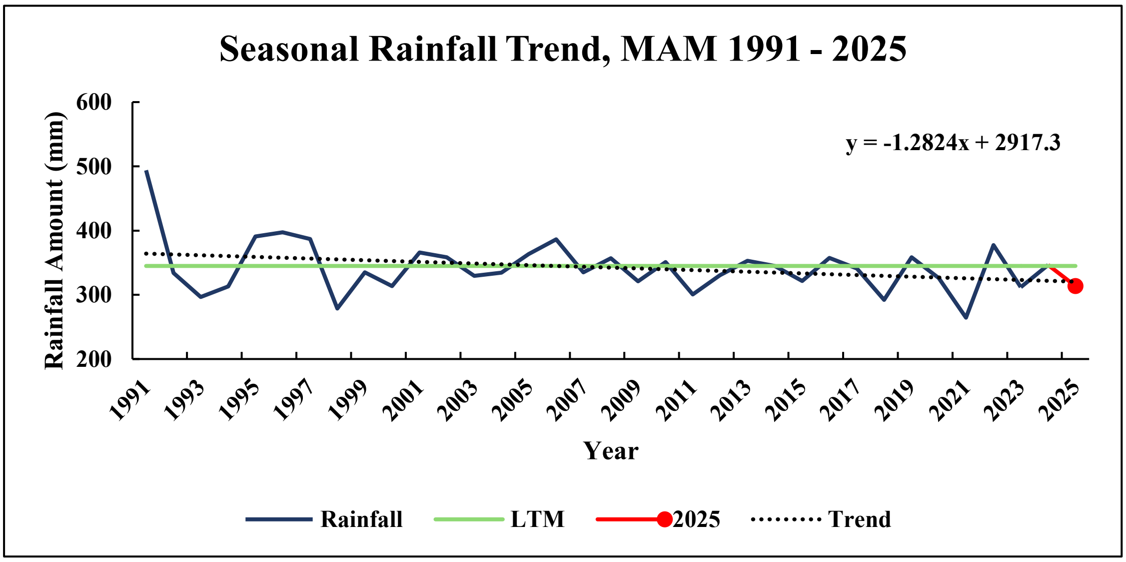


Figure 4. 2 Seasonal Rainfall Trend, MAM 1991 - 2025

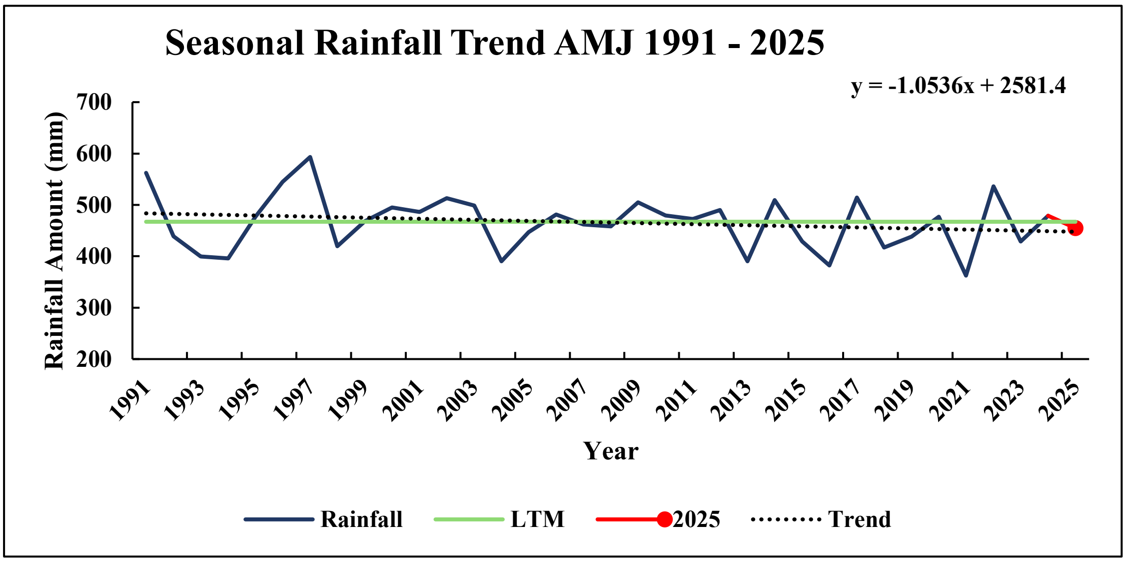


Figure 4.3 Seasonal Rainfall Trend, AMJ 1991 - 2025

An assessment of the March-April-May (MAM) and April-May-June (AMJ) seasonal rainfall over the period 1991-2025 indicates a persistent but gradual decline in rainfall across both seasons. This pattern is consistent with broader signals of changing rainfall patterns in Ghana, likely influenced by long-term climate variability and evolving regional circulation patterns.

During the MAM season, rainfall exhibits considerable interannual variability, with seasonal totals ranging from approximately 200 mm to over 500 mm. The early 1990s were characterized by relatively wetter conditions, with a notable peak observed in 1992. Over subsequent years, however, rainfall amounts have shown a general downward tendency. In 2025, MAM rainfall was below the long-term mean, reinforcing the observed drying tendency during the early part of the rainy season.

Similarly, the AMJ season is characterized by generally higher rainfall totals, typically ranging between 350 mm and 600 mm, with less pronounced year-to-year variability compared to MAM. Despite this relative stability, a gradual decline in rainfall is evident over the long-term record. The 2025 AMJ season recorded rainfall slightly below the climatological average, broadly consistent with recent seasonal behaviour and indicative of a continued, though modest, reduction in early-to-mid season rainfall.

Overall, the observed decline in both MAM and AMJ rainfall suggests a weakening of early rainy season conditions, which may have implications for soil moisture availability, planting decisions, and agricultural productivity, particularly in southern and transition zones. Continued monitoring and the integration of seasonal climate information into planning processes remain essential for enhancing climate resilience.

Analysis of MJJ, JJA, and JAS Rainfall Trends (1991–2025)

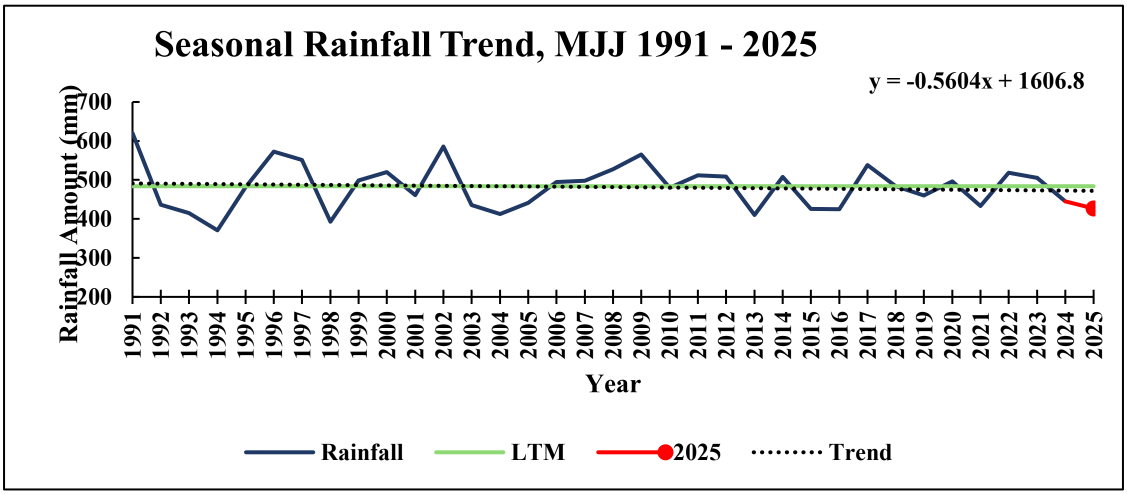


Figure 4.4 Seasonal Rainfall Trend, MJJ 1991- 2025

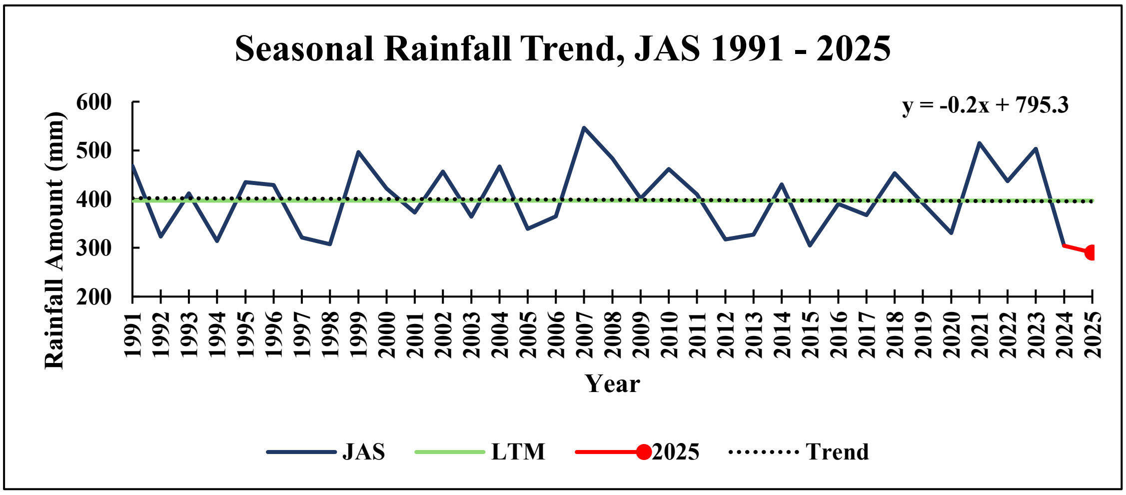


Figure 4.5 Seasonal Rainfall Trend, JJA 1991- 2025

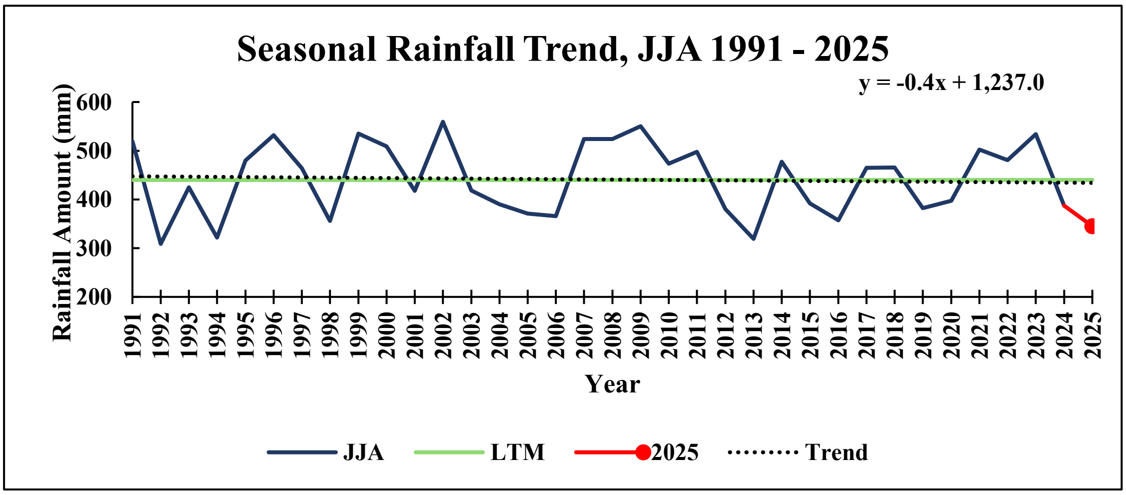


Figure 4.6 Seasonal Rainfall Trend, JAS 1991- 2025

The mid-year rainfall period, spanning May-July (MJJ), June-August (JJA), and July-September (JAS), represents a critical phase of Ghana's rainfall climatology. These overlapping seasons support agricultural production, water resource replenishment, and ecosystem functioning across the southern, transitional, and northern zones. An assessment of long-term rainfall performance over the period 1991–2025 indicates a general tendency toward declining seasonal rainfall, accompanied by pronounced year-to-year variability.

Rainfall during the MJJ season shows a gradual long-term decline, suggesting a weakening of early to mid-season rainfall. This reduction has important implications for soil moisture availability and early crop establishment, particularly in the southern and transition zones where timely rainfall onset is essential for agricultural activities.

The JJA season, which marks the peak of the rainy season for northern Ghana, also exhibits a slight downward trend in rainfall totals. Although individual years continue to experience above-normal rainfall, the overall pattern points to increasing variability and a subtle drying tendency. This has potential consequences for rain-fed agriculture, groundwater recharge, and rangeland conditions across the northern savannah areas.

Similarly, rainfall during the JAS season, representing the latter part of the peak rainy period, shows a weak but consistent decline over time. Reduced rainfall during this season can affect crop maturation and grain filling stages, as well as surface water availability toward the end of the rainy season.

In 2025, all three seasons, MJJ, JJA, and JAS, recorded rainfall amounts below their respective long-term means, consistent with the broader drying signals observed over the historical record. The deficit during the JAS period was particularly notable, suggesting a weakened or early retreat of the rainy season, which likely contributed to moisture stress during the latter stages of agricultural production in parts of the northern and transition zones.

Analysis of SON Rainfall Trends (1991–2025)

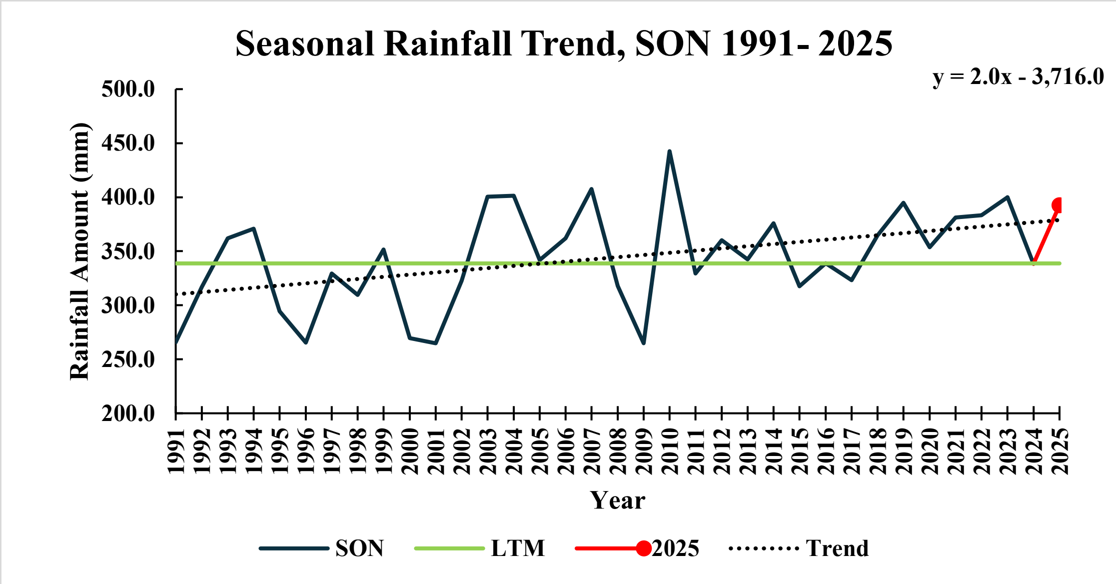


Figure 4.7 Seasonal Rainfall Trend, SON 1991- 2025

Rainfall during the September-October-November (SON) season, which corresponds to the minor rainy season in southern Ghana and the cessation phase of the rainy season in the north, exhibits notable interannual variability over the period 1991-2025. Despite this variability, the long-term pattern indicates a gradual increase in seasonal rainfall totals over time.

Seasonal rainfall amounts during SON generally range between approximately 260 mm and 450 mm, with several years recording markedly above-normal rainfall, particularly from the early 2000s onward. The early part of the record is characterized by relatively lower and more variable rainfall totals, while recent decades show a tendency toward more frequent above-average seasons, suggesting a strengthening of the SON rainfall contribution in parts of the country.

In 2025, SON rainfall was above the long-term mean, ranking among the wetter seasons within the historical record. This enhanced rainfall performance contrasts with the declining trends observed during the mid-year seasons and indicates a shift in rainfall distribution toward the latter part of the year. The relatively wet SON season likely contributed to improved soil moisture conditions and water availability in southern Ghana, although it may also have increased the risk of flooding in low-lying and urban areas.

4.4.3 Total Rainfall Ranking

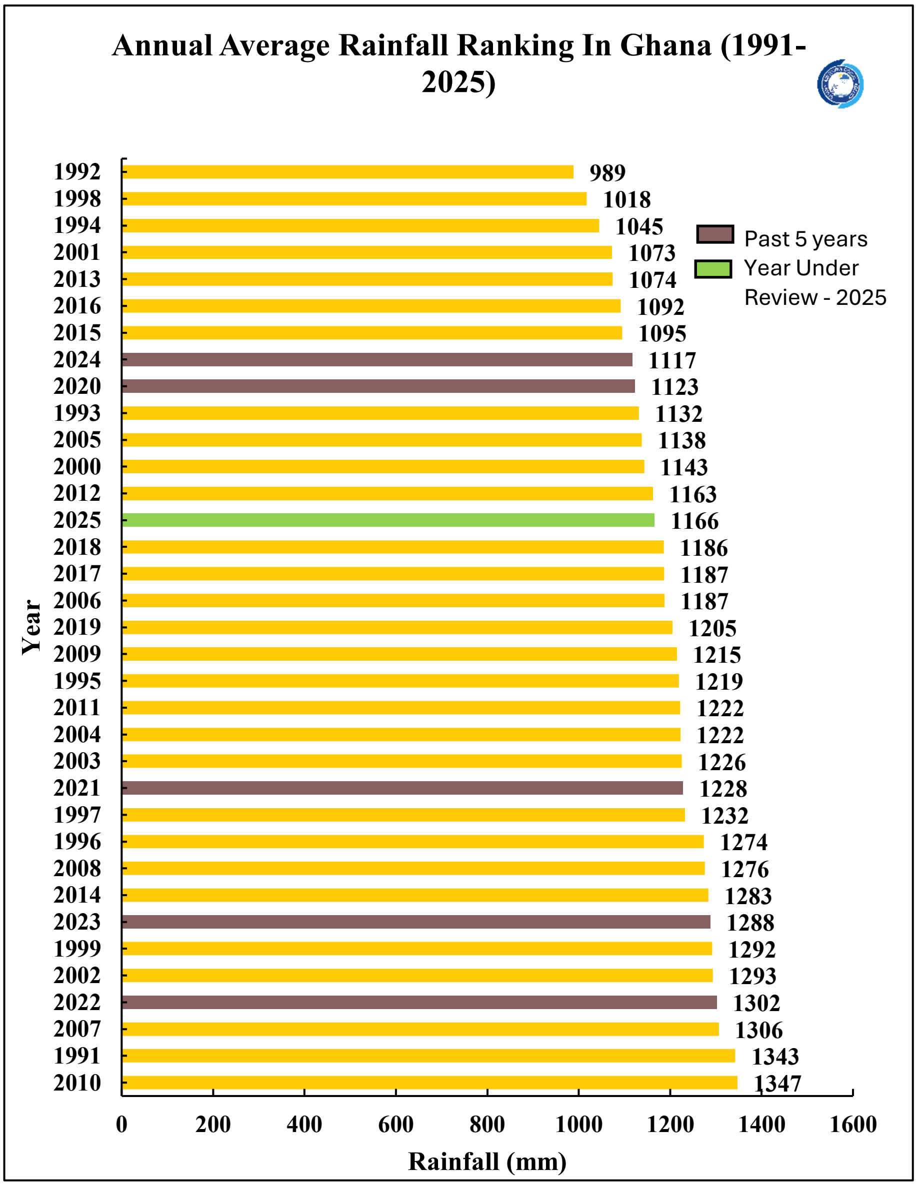


Figure 4.8 Total Annual Rainfall Rankings, 2025

The chart shows that the year under review, 2025, recorded an annual average rainfall of about 1,166 mm in Ghana which is highlighted in green among the other years. Relative to the entire 1991–2025 period, 2025 was ranked as the 22nd highest. In terms of performance, 2025 continued the generally wetter conditions of recent decades without setting new records, showing a solid but not exceptional rainfall year.

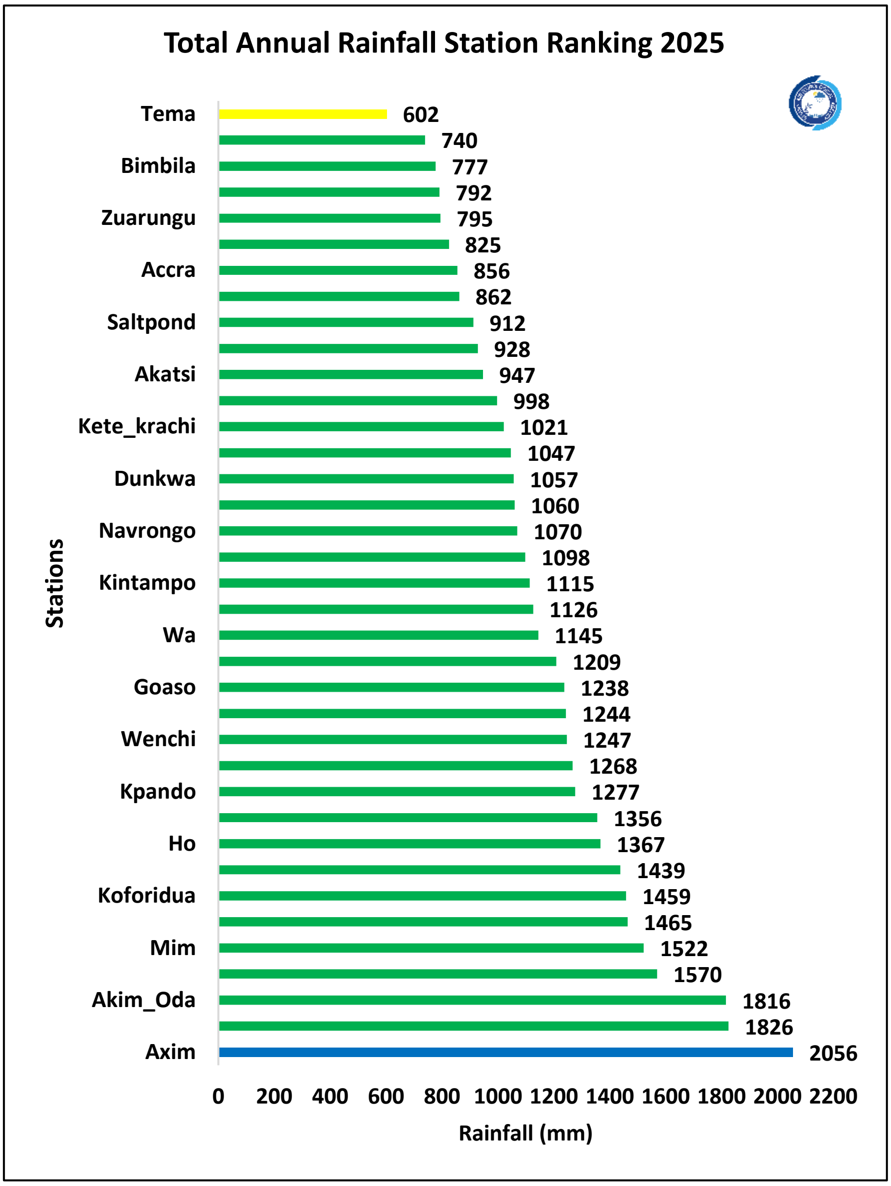


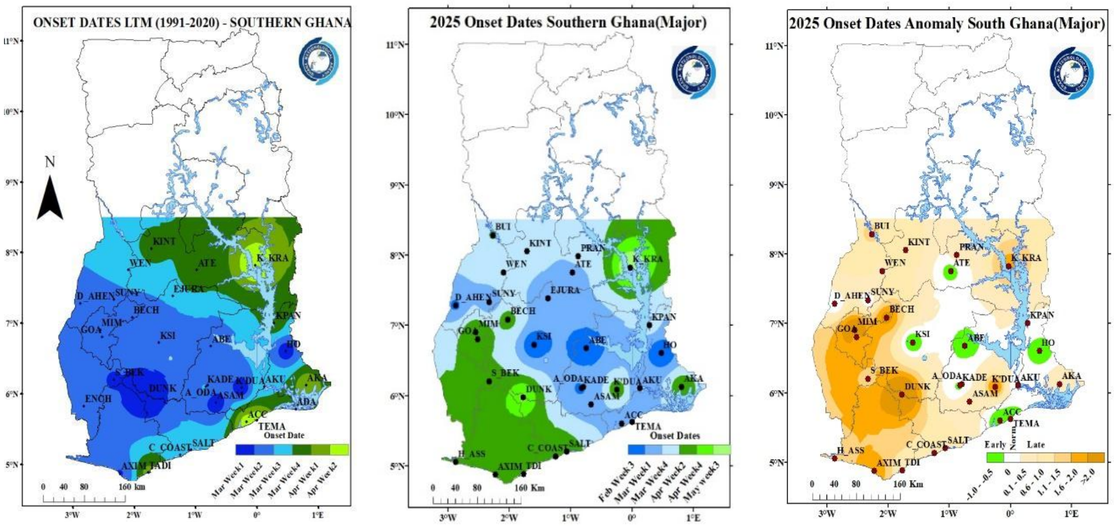
Figure 4.9 Total Annual Rainfall Station Rankings, 2025

The 2025 rainfall ranking shows pronounced spatial variability across Ghana. **Axim** recorded the highest annual rainfall, with totals **2,056** mm, followed by several stations in the southwestern and forest zones that received more than 1500 mm. Stations in the transition and northern savannah zones recorded comparatively lower totals, generally below 1100 mm. The lowest annual rainfall was observed at Tema**,** which recorded about 602 mm**,** consistent with the typically drier conditions along parts of the eastern coast.

5.0 REVIEW OF AGRO-CHARACTERISTIC FOR SOUTHERN GHANA (MAJOR SEASON)

5.1 Rainfall Onset

The 2025 major rainfall season in Southern Ghana began early in the forest zone, with Ho and its surroundings recording the earliest onset on February 18, whereas Dunkwa experienced a significantly delayed onset in the latter part of April. The entire coast experienced a late onset. The transition zone experienced a normal onset except for Kete-Krachi, which recorded a late onset.



Map 5. 1.Spatial distribution of LTM, 2025 and anomalies for onset dates.

The 2025 major rainfall season over southern Ghana began in the forest zone, with the earliest onset observed at Ho on 18 February, corresponding to the third week of the month. Compared with the 1991–2020 long-term mean, most places within the forest zone including Abetifi, Akim Oda, and Kumasi recorded an earlier-than-average onset, occurring in the third week of April 2025. However, Dunkwa-on-Offin experienced a delayed onset, recorded within the fourth week of April.

In the coastal region, rainfall began in Accra during the second week of March, marking the onset along the eastern coast. Coastal areas such as Cape Coast, Takoradi, Saltpond, and Axim experienced a late onset of rainfall, which occurred in the fourth week of April. The standardized anomaly map illustrates the disparity between regions in the south, highlighting areas with very early rainfall onset compared to those with a considerably delayed start.

5.1.1 Rainfall Onset Dates Trend Analysis for Southern Ghana

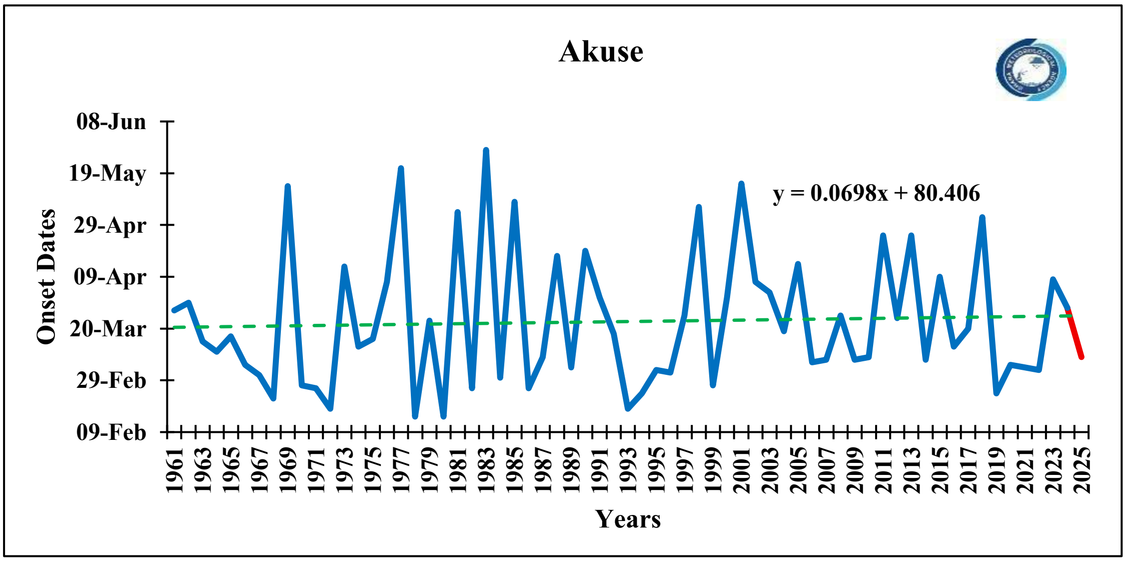


Figure 5.1. Trends in Onset Dates for Southern Ghana, Akuse

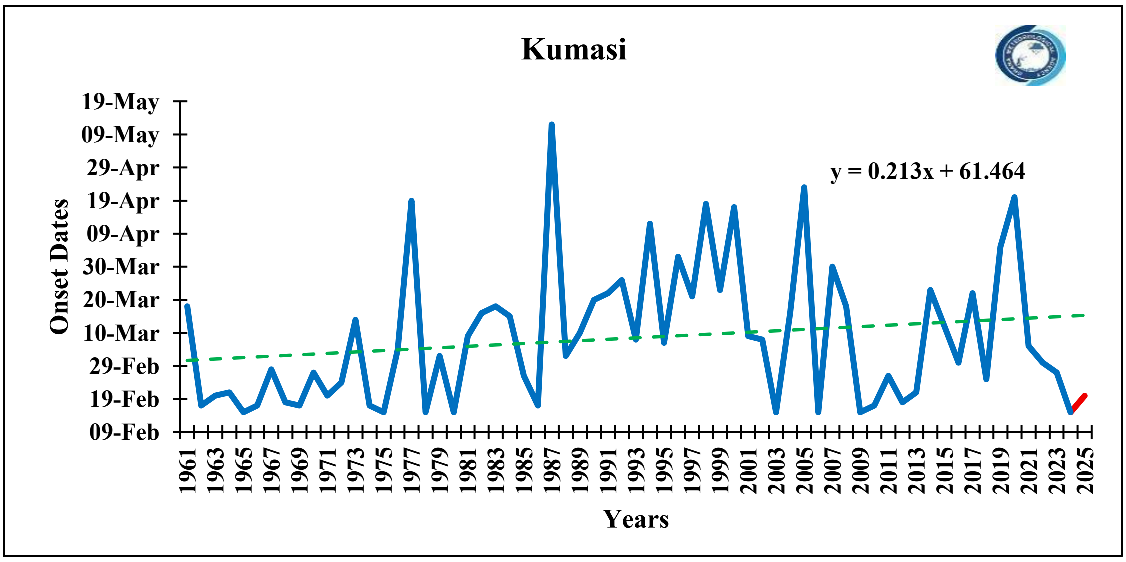


Figure 5.2. Trends in Onset Dates for Southern Ghana, Kumasi

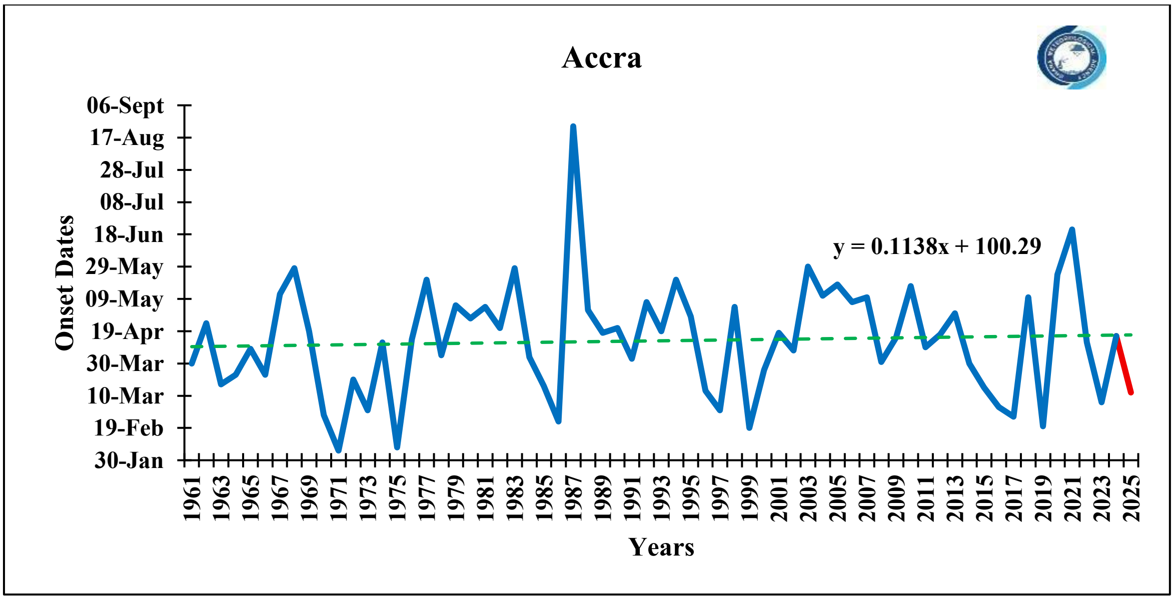


Figure 5.3. Trends in Onset Dates for Southern Ghana, Accra.

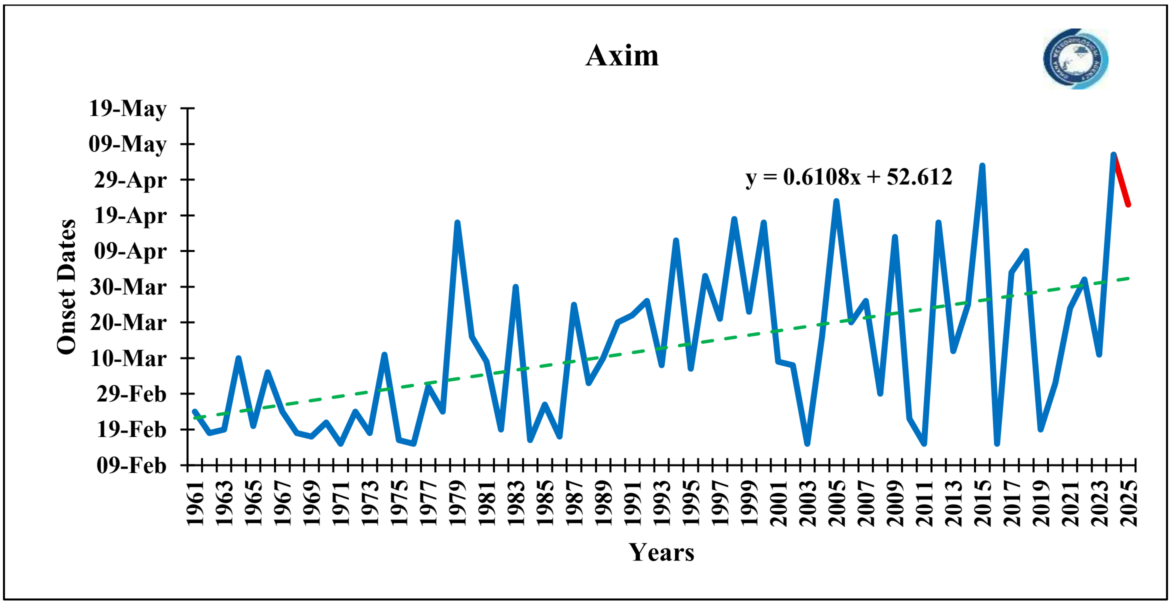
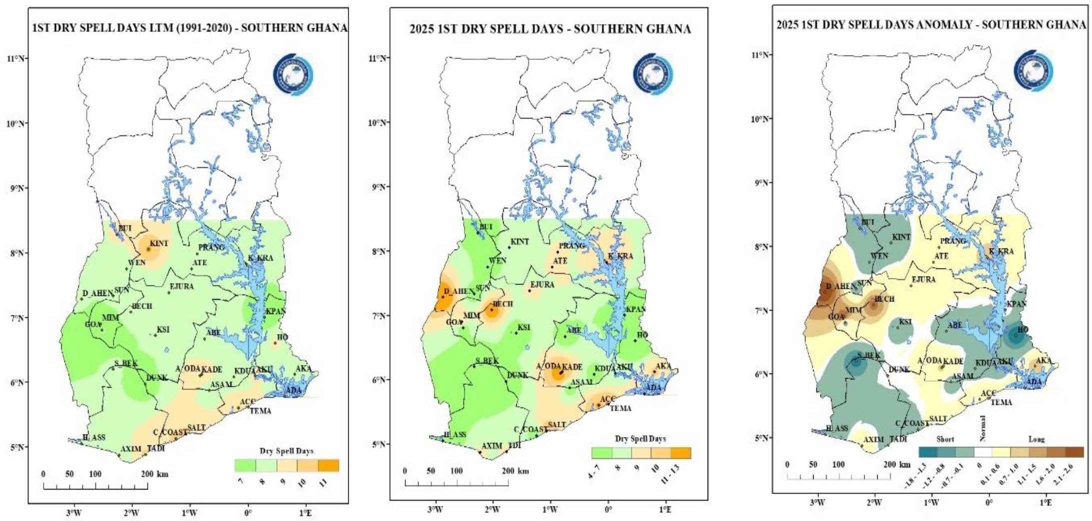


Figure 5.4. Trends in Onset Dates for Southern Ghana, Axim.

The trendlines of the graphs indicate an upward trend, which shows that the onset dates have been pushed back over the past years. This corresponds to delays at the start of the season.

5.1.2 Early/1st Dry Spell



Map 5.2. Spatial distribution of LTM, 2025 and anomalies for 1st/early dry spell days.

From the start of the season up to day 50, the longest uninterrupted period without rain is called the 1st/Early Dry Spell.

Generally, most parts of Southern sector for 2025 experienced between 5 and 10 dry spell days, with an average of 9 days during the early portion of the season. The longest dry spells were observed in and around Dormaa Ahenkro and Kade which recorded 13 consecutive dry days.

In the transition zone, areas such as Bui, Kintampo, Wenchi, and surrounding environs experienced relatively shorter dry spells of 7–8 days, which were below their respective LTMs. Conversely, Kete-Krachi, Atebubu, Prang, and nearby areas recorded dry spells of 9-10 days which were above their LTMs.

Across the forest zone, most areas experienced dry spells ranging from 4 to 9 days. Notably, Dormaa Ahenkro, Mim, Bechem and Goaso registered the greatest departures from their climatological norms, indicating prolonged dry conditions than usual. They recorded dry spells days ranging from 10 to 13 days.

Along the Coastal belt, majority of the areas recorded dry spells longer than their LTMs. However, Cape Coast, Takoradi and their surrounding areas recorded dry spell days of 7-9 days, which were below their respective LTMs. Places such as Akatsi, Ada, Accra, Tema, Saltpond, Axim and their environs recorded between 8 and 12 dry spell days.

5.1.3 Early/ 1st Dry Spell Trend Analysis for Southern Ghana

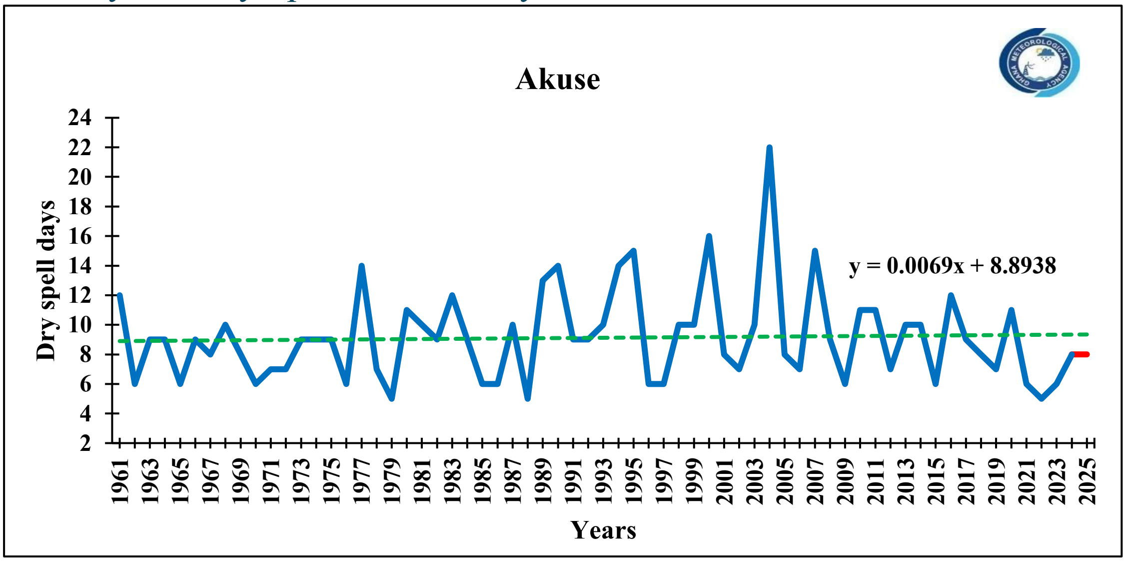


Figure 5.5. Trends in 1st /Early Dry Spell Days for Southern Ghana in Akuse.

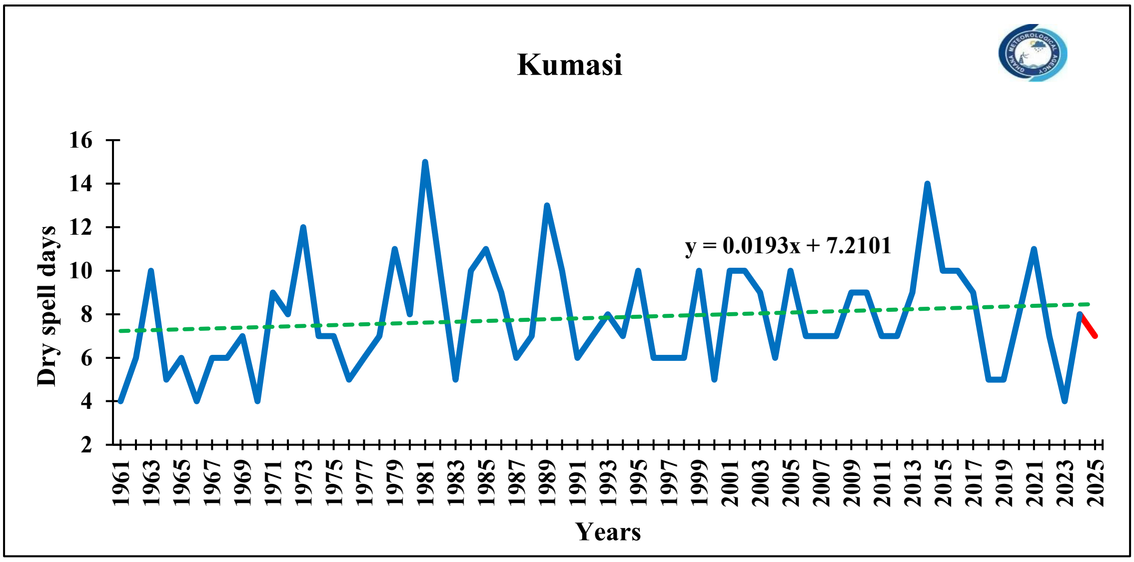
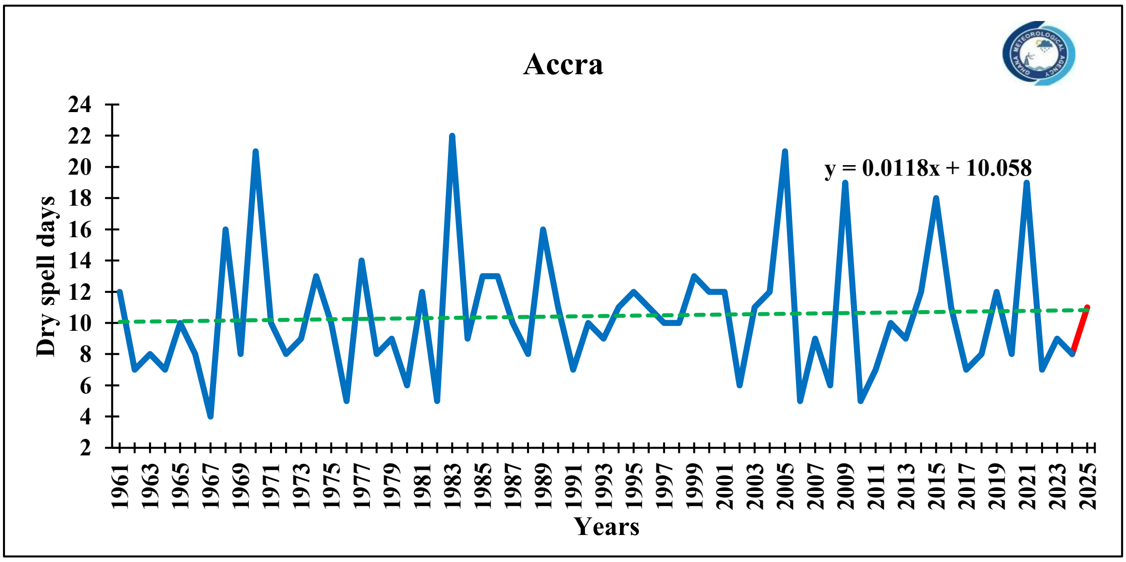


Figure 5.6. Trends in 1st /Early Dry Spell Days for Southern Ghana in Kumasi.



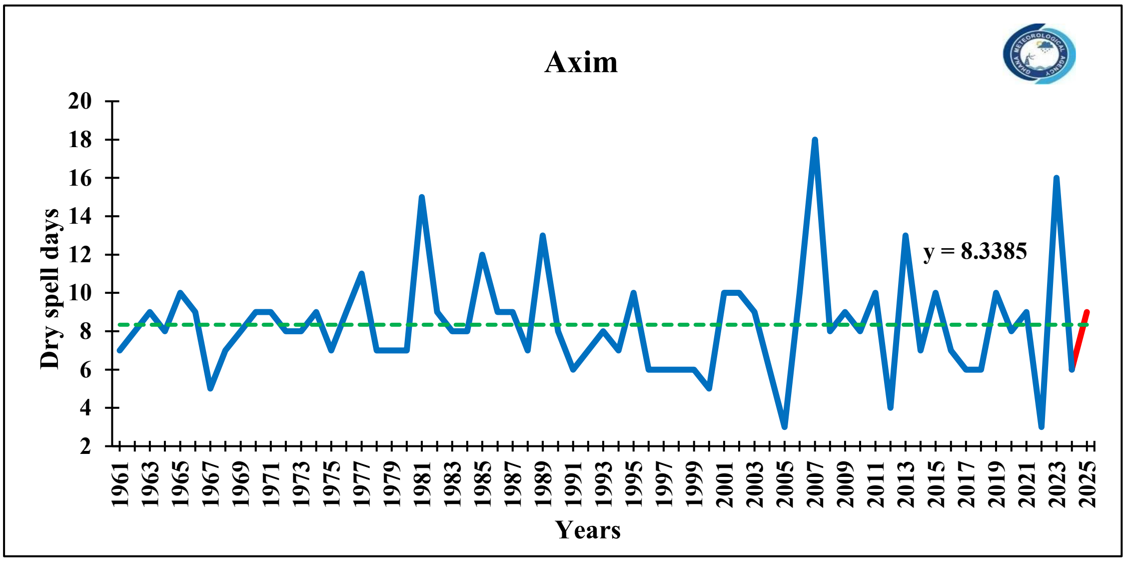
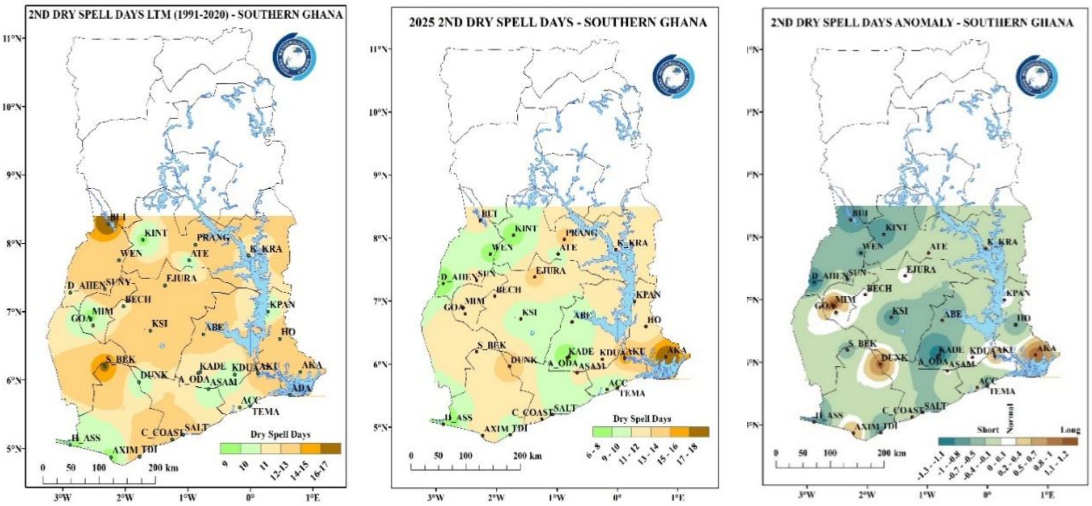


Figure 5.8. Trends in 1st /Early Dry Spell Days for Southern Ghana in Axim

Kumasi and Akuse show an upward trend in the number of dry spell days over the period. However, Accra and Axim show a neutral trend, indicating that the number of dry spell days have not changed significantly over the years.

5.1.4 Late/ 2nd Dry Spell



Map 5.3. Spatial distribution of LTM, 2025 and anomalies for 2nd/late dry spell days.

In 2025, most parts of southern Ghana recorded between 6 and 12 dry spell days during indicating generally moderate to prolonged dry conditions. The longest dry spells (about 15–18 days) were observed around Akatsi and Akuse.

In the transition zone, areas around Wenchi and Kintampo recorded shorter dry spells (6–8 days), whiles Bui, Atebubu, Prang, and Kete-Krachi experienced slightly longer. Across the forest belt, most areas recorded 8–12 dry spell days.

Along the coastal belt, areas in and around Cape Coast, Saltpond, Accra and Tema recorded 9-12 dry spell days. Akatsi and its environs recorded the longest spell within the major season with about 18 consecutive days without rain. In contrast, west coast areas such as, Half Assini and Takoradi recorded 6-8 dry spells whiles Axim and its environs experienced dry spells ranging from 11 to 12 days. Overall, much of the southern sector experienced near- to below-normal dry spell activities.

5.1.5 Late/2nd Dry Spell Trend Analysis for Southern Ghana

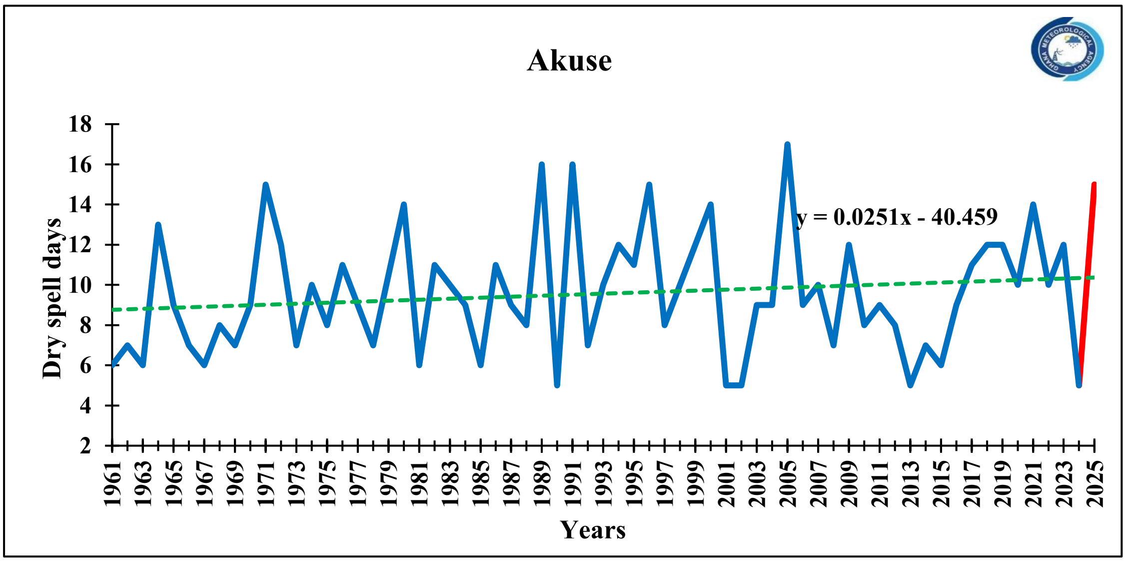


Figure 5.9. Trends in 2nd /late Dry Spell Days for Southern Ghana in Akuse

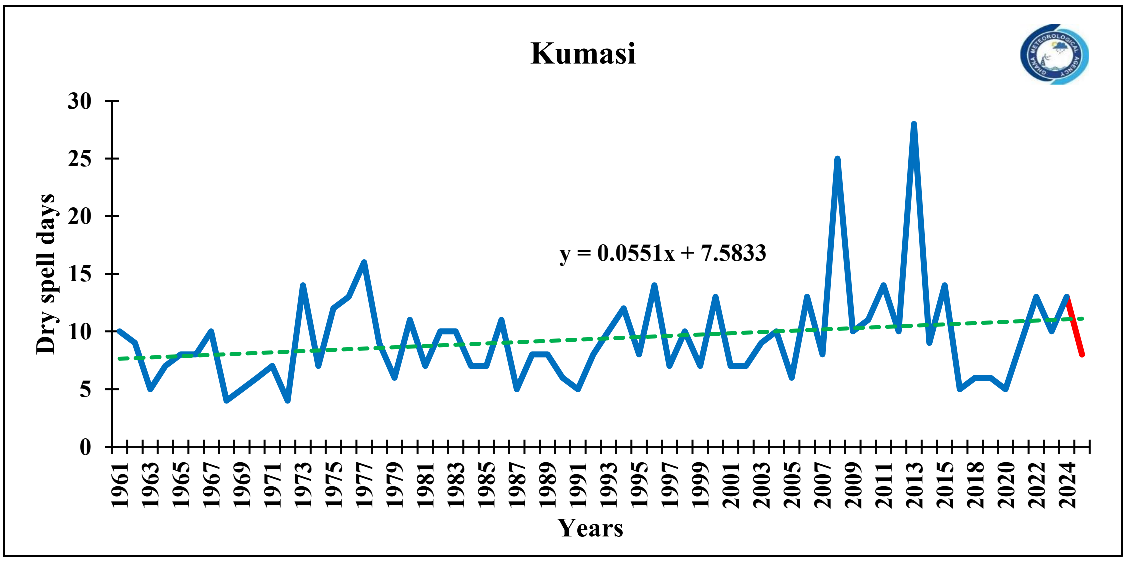


Figure 5.10. Trends in 2nd /late Dry Spell Days for Southern Ghana in Kumasi

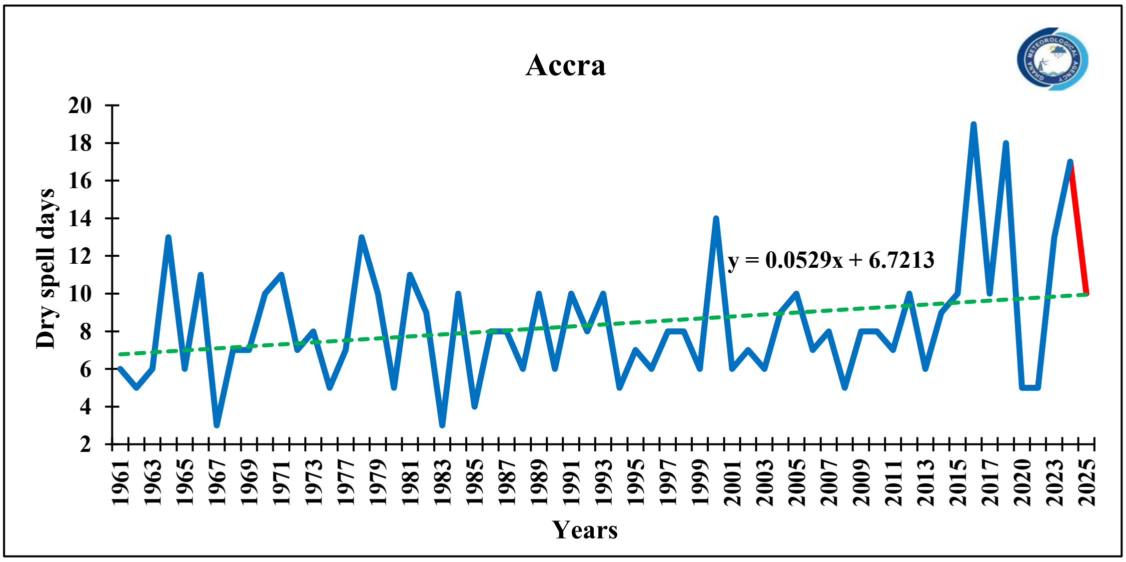


Figure 5.11. Trends in 2nd /late Dry Spell Days for Southern Ghana in Accra.

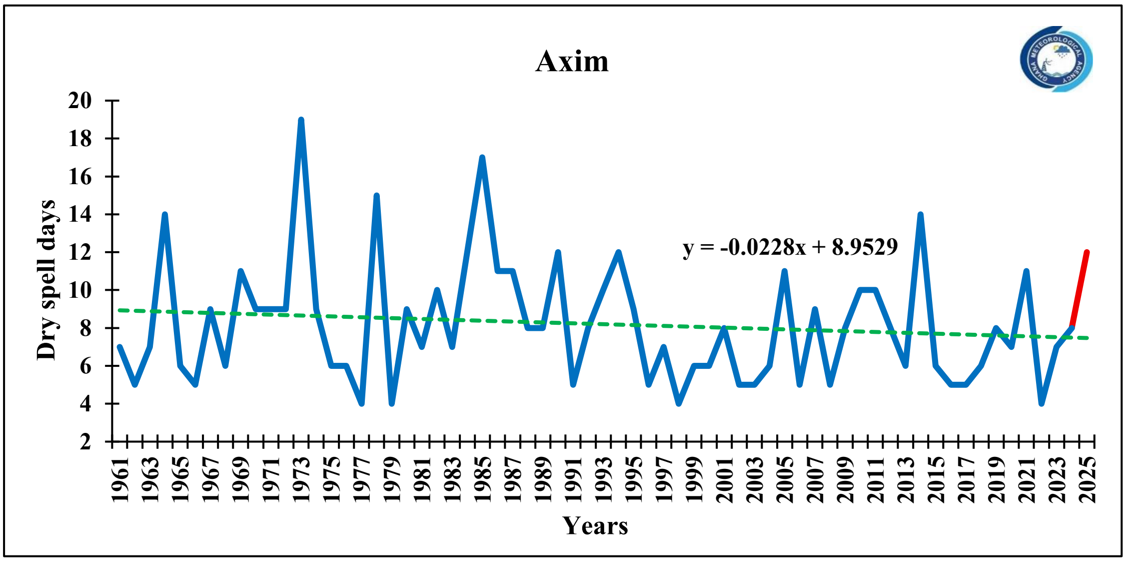
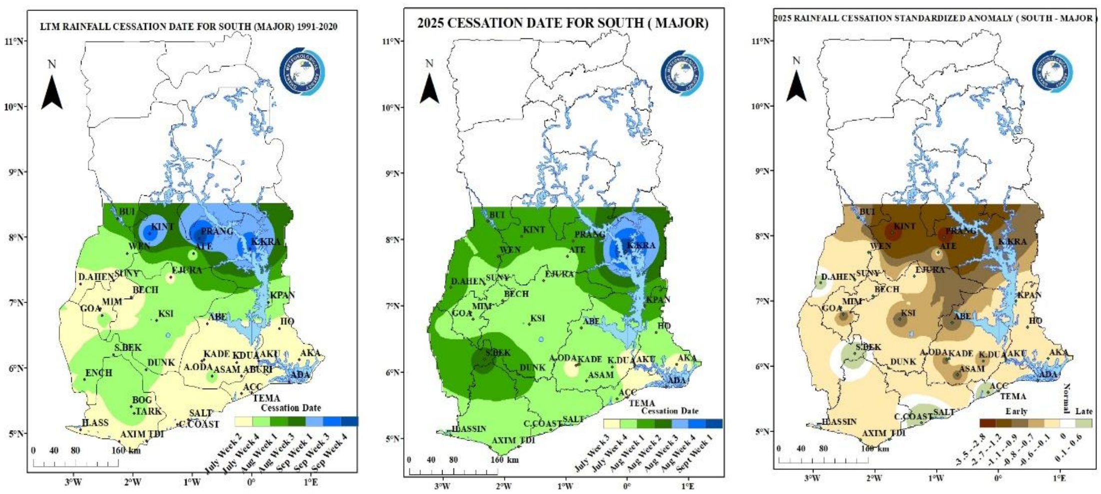


Figure 5.12. Trends in 2nd/late Dry Spell Days for Southern Ghana in Axim.

The graphs for Kumasi, Akuse, and Accra show an upward trend. This indicates an increase in the average number of dry spell days. However, Axim shows a downward trend which suggests a decrease in the average number of dry spell days.

5.2 Cessation



Map 5.4 Spatial distribution of LTM, 2025 and anomalies for cessation dates.

The 2025 major season cessation map for southern Ghana shows early rainfall cessation along the coast from July week 3 to 4, in areas such as Accra, Tema, Ada, Cape Coast, Takoradi, Axim Saltpond, and Half Assini. Areas in the forest zone, including Koforidua, Akim Oda, Goaso, Dunkwa, Sunyani, Bechem, Kumasi, and Sefwi Bekwai, experienced cessation from the second week of July to the Second week of August. Areas within the transition, such as Atebubu, Ejura, Wenchi, Techiman, and Kintampo, also experienced their cessation around late August, and Kete Krachi showed cessation in the first week of September.

The standardized anomaly map for 2025 shows how early or later the major rainy season was expected to end compared to the long-term average. The map revealed that most areas in the transition zone, Kintampo, Prang, and Atebubu, experienced very early rainfall cessation. Some areas in the forest zone, such as Goaso, Kumasi, Abetifi, Koforidua, Kade, and Asamankese, also experienced an early cessation. Normal to late cessation was recorded in Dormaa Ahenkro, Sefwi Bekwai, Cape Coast, Saltpond, Accra, and Tema, whereas Ada experienced a normal cessation.

5.2.1 Cessation Dates Trend for Southern Ghana

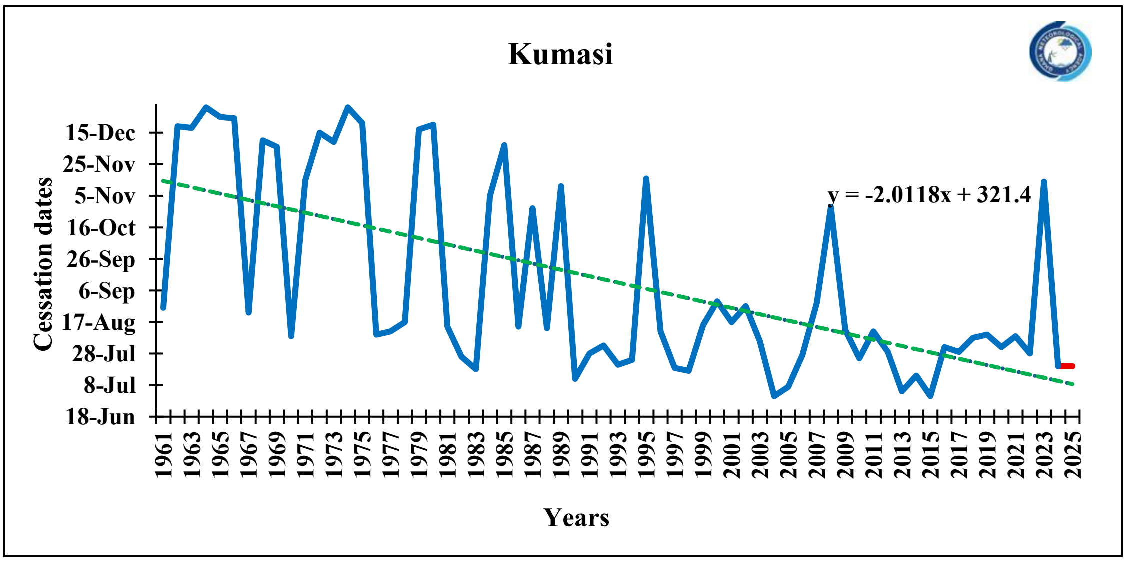


Figure 5.14. Trends in Cessation Dates for Southern Ghana in Kumasi.

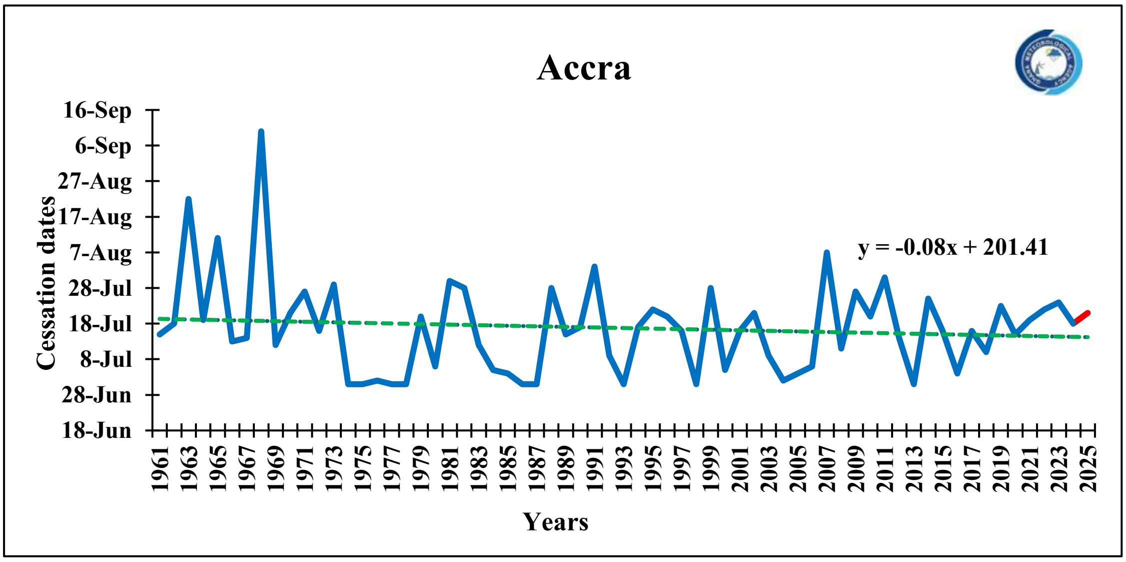


Figure 5.15. Trends in Cessation Dates for Southern Ghana in Accra.

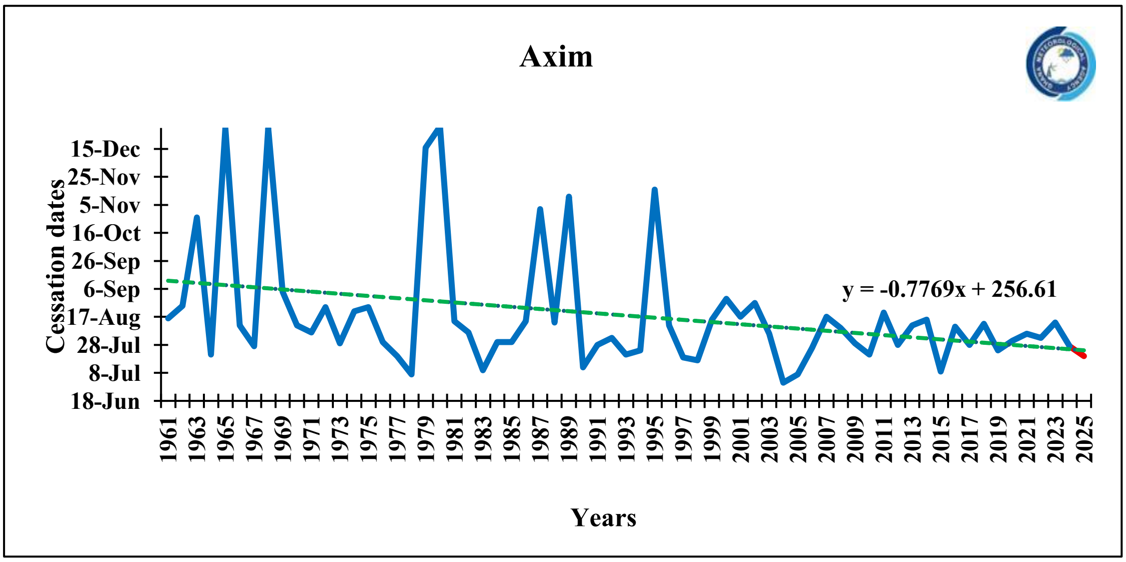
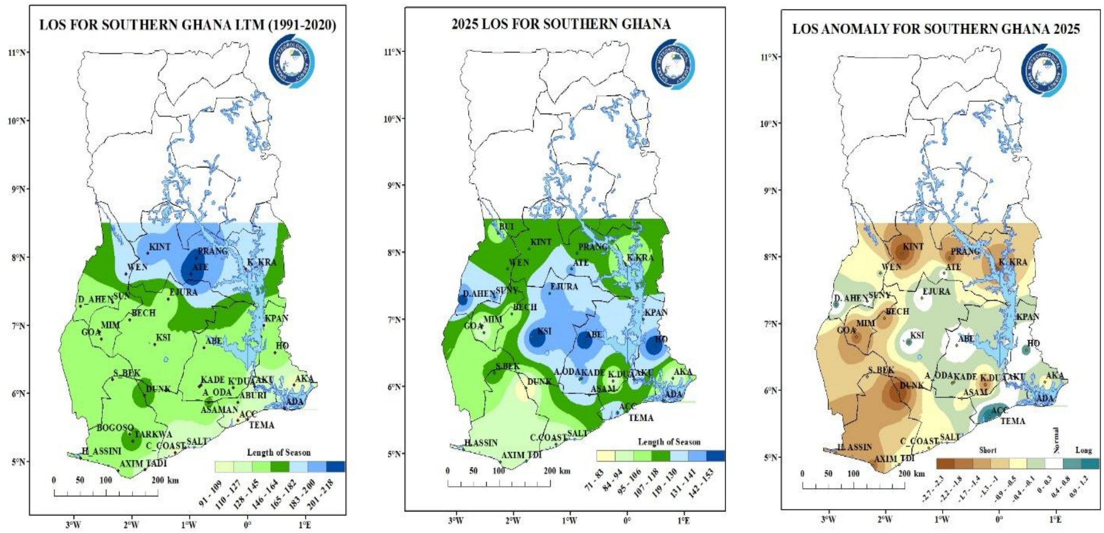


Figure 5.16. Trends in Cessation Dates for Southern Ghana in Axim.

Over the years, from 1961 – 2025, the trendlines shows marginal decreases over Accra and Akuse, and sharp decreases over Axim and Kumasi. This suggests that the rains ended earlier as compared to previous years.

5.2.2 Length of Season



Map 5.5. Spatial distribution of LTM, 2025 and anomalies for length of season.

The 2025 major rainy season in southern Ghana was characterized by considerable variability in its duration across different areas.

In the transition zone, Wenchi, Kintampo and Prang recorded a seasonal length between 107 and 118 days, whiles Kete-krachi experienced the least of 90 days.

In the forest zone Ho, Kumasi, Abetifi, Dormaa with their environs experienced between 142 and 153 days. Dunkwa recorded the least seasonal length of 71 days.

Along the east coast, Accra recorded the longest seasonal length of 131 days, whiles Ada recorded the least with 84 days.

In comparison with the normal length of season for the major season for the South, Accra, Tema, Ho, Kumasi and Dormaa Ahenkro recorded longer than normal seasons. Sunyani, Ejura, Atebubu, Abetifi and Akuse recorded normal whereas the rest of the areas in the south experienced shorter than normal seasonal length. The transition zone through to the western portions of the country experienced significantly shorter length of season in 2025 major rainfall season.

5.2.3 Length of Season Trend Analysis for Southern Ghana

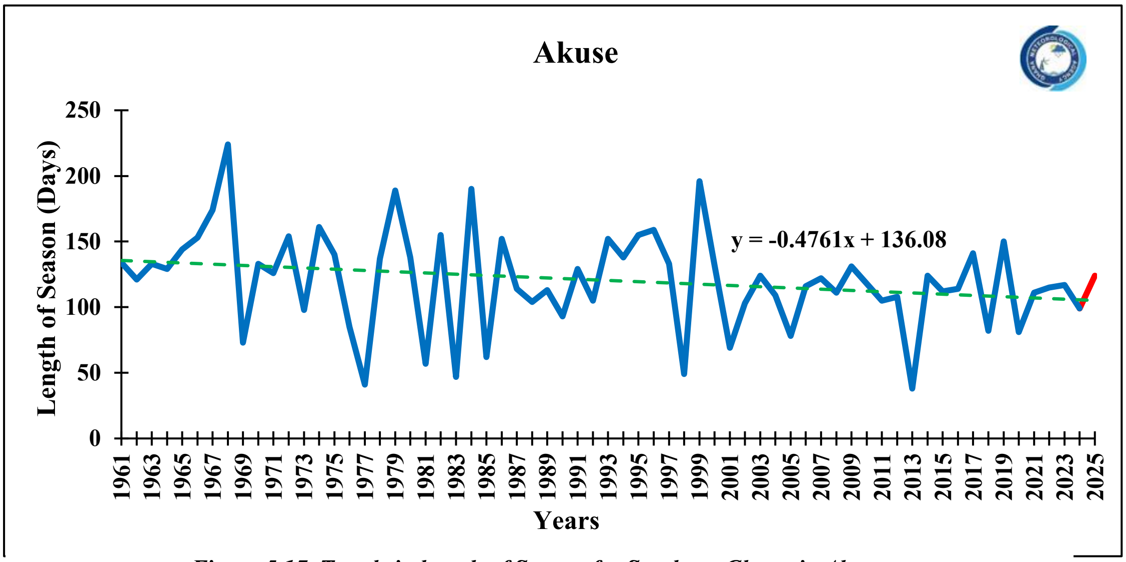


Figure 5.17. Trends in length of Season for Southern Ghana in Akuse.

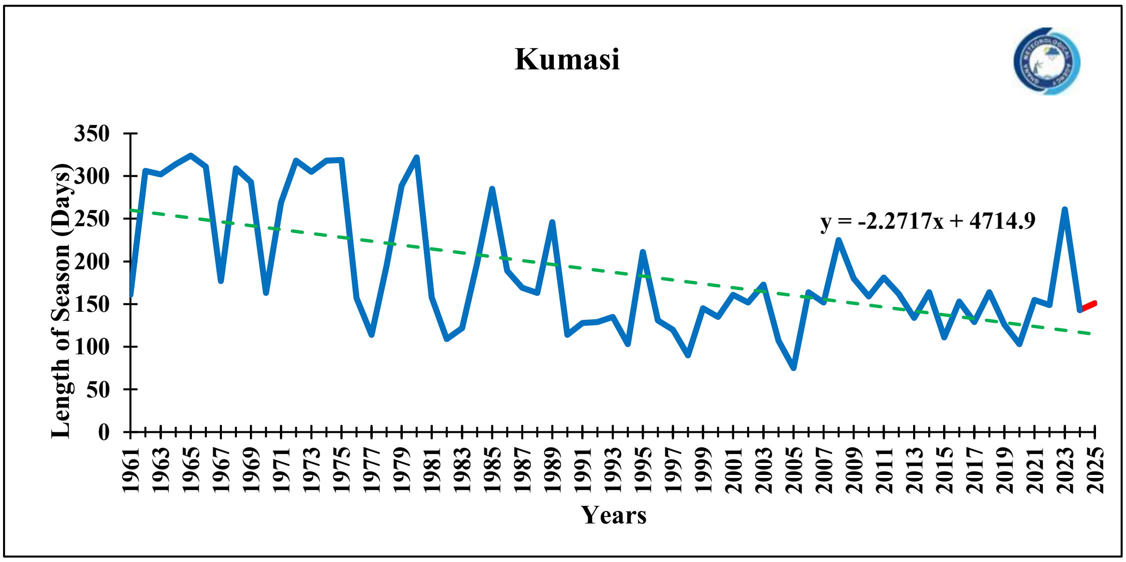


Figure 5.18.Trends in length of Season for Southern Ghana in Kumasi.

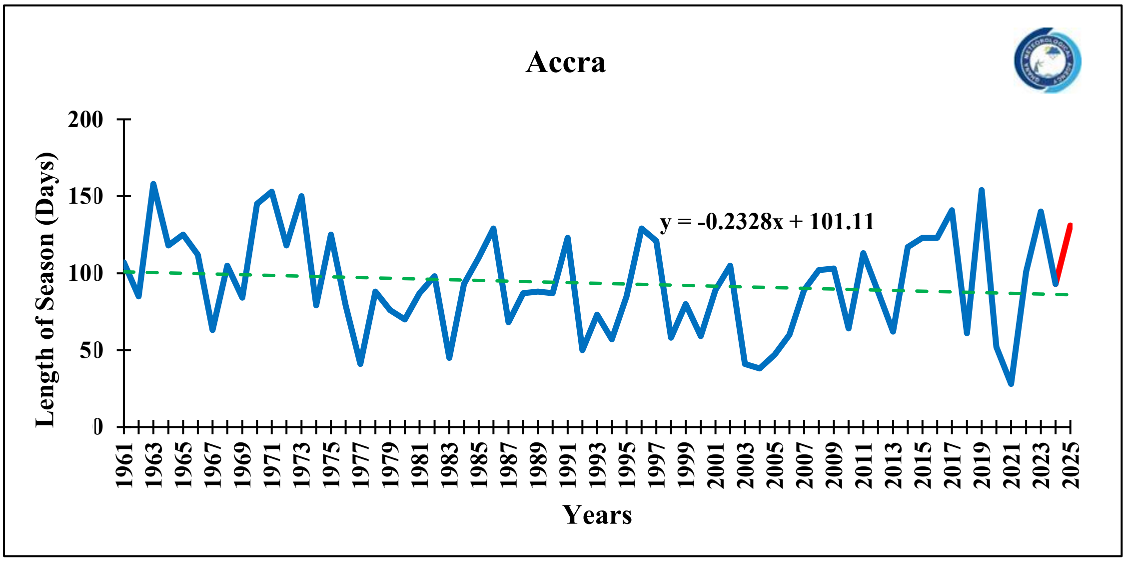


Figure 5.19. Trends in length of Season for Southern Ghana in Accra.

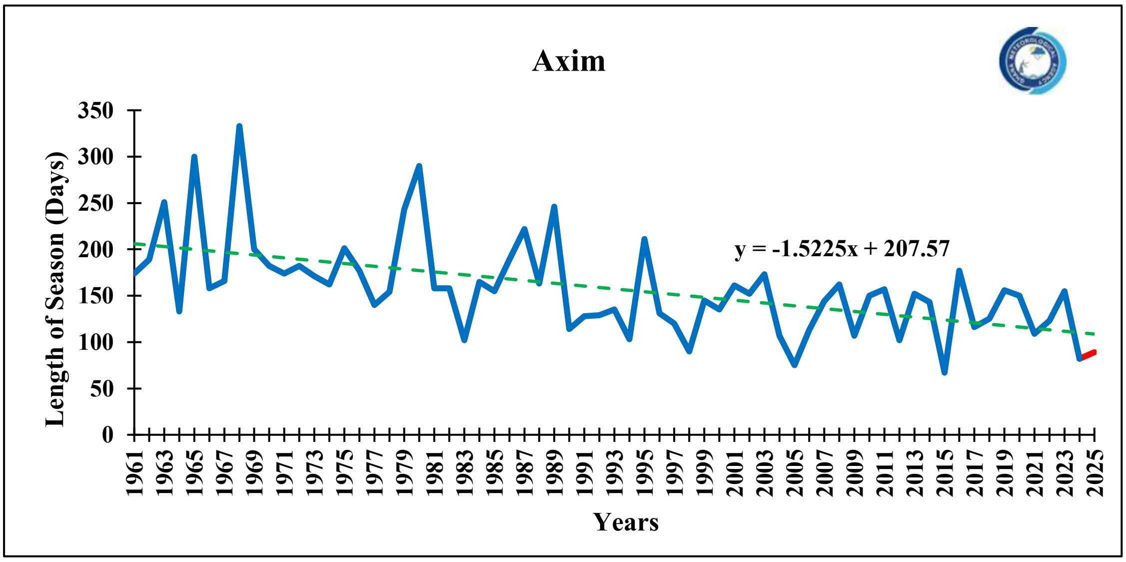
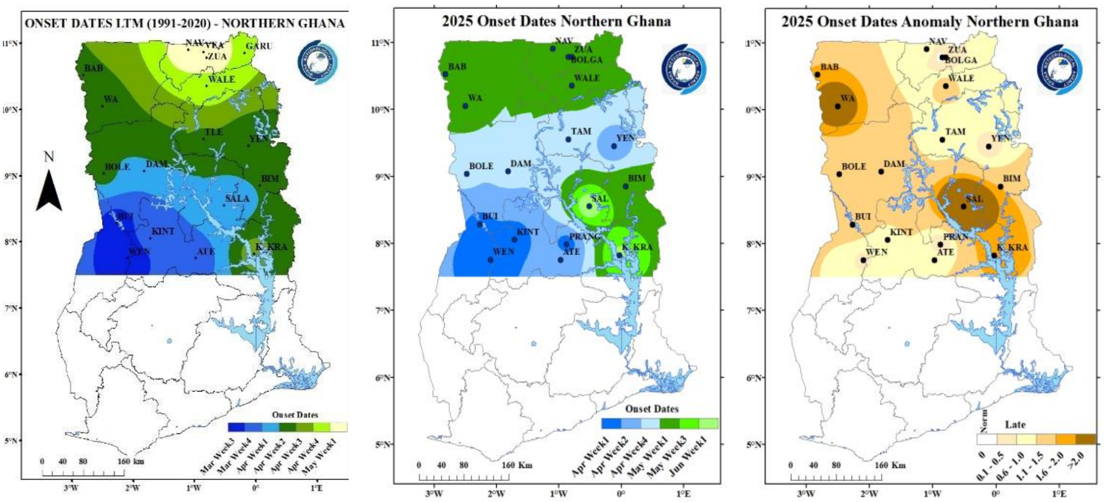


Figure 5.20. Trends in length of Season for Southern Ghana in Axim.

In the Forest zone, overall trends indicate a decrease, with Kumasi experiencing a rapid decline and Akuse showing a more gradual decrease. Along the coast, there has been a consistent decline in seasonal length, with Axim showing a continuous drop and Accra experiencing a gradual decrease.

6.0 REVIEW OF AGRO-CHARACTERISTICS FOR NORTHERN GHANA

6.1 Rainfall Onset



Map 6.1. Spatial distribution of LTM, 2025 and anomalies for onset dates.

In the northern zone, the onset of the season was observed in the second week of April in Bui, Yendi, and their environments, followed by Bole and Tamale in the last week of April. The entire northern sector recorded late rainfall onset when compared with the long-term mean. Wenchi, Kintampo, and Prang recorded their onset dates of the season in April week 1. Usually, the rains start in Salaga and Wa within the 1st and 2nd week of April, respectively. However, in 2025, Wa recorded its onset within the first week of March, whereas Salaga recorded its onset in the 1st week of June.

6.1.1 Onset Dates Trend Analysis for Northern Ghana

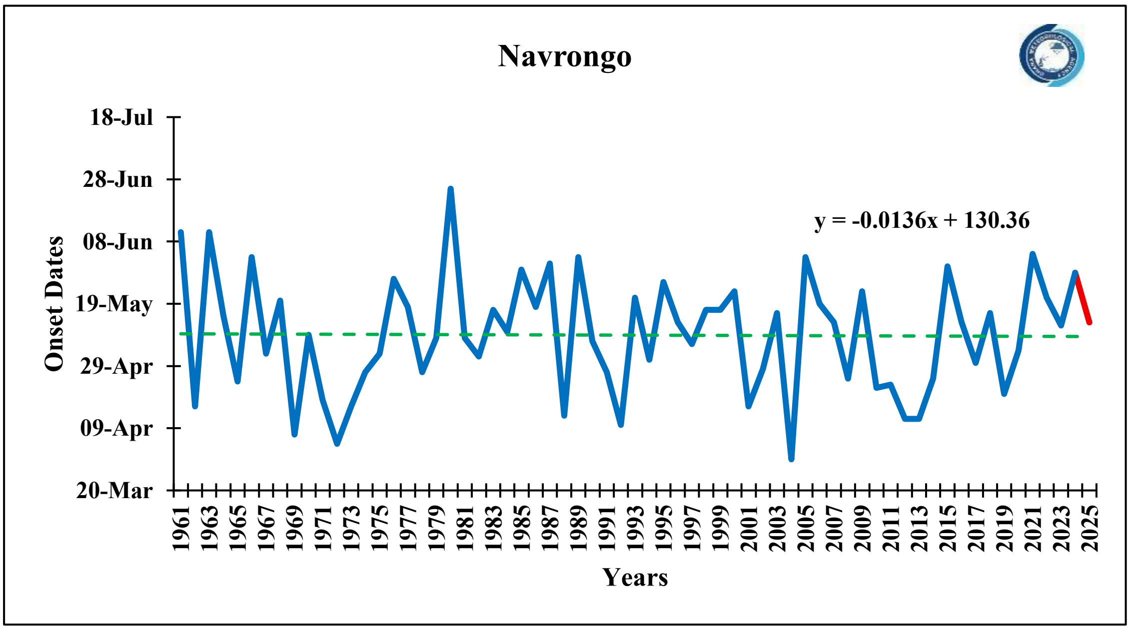


Figure 6.1. Trends in Onset Dates for Northern Ghana in Navrongo.

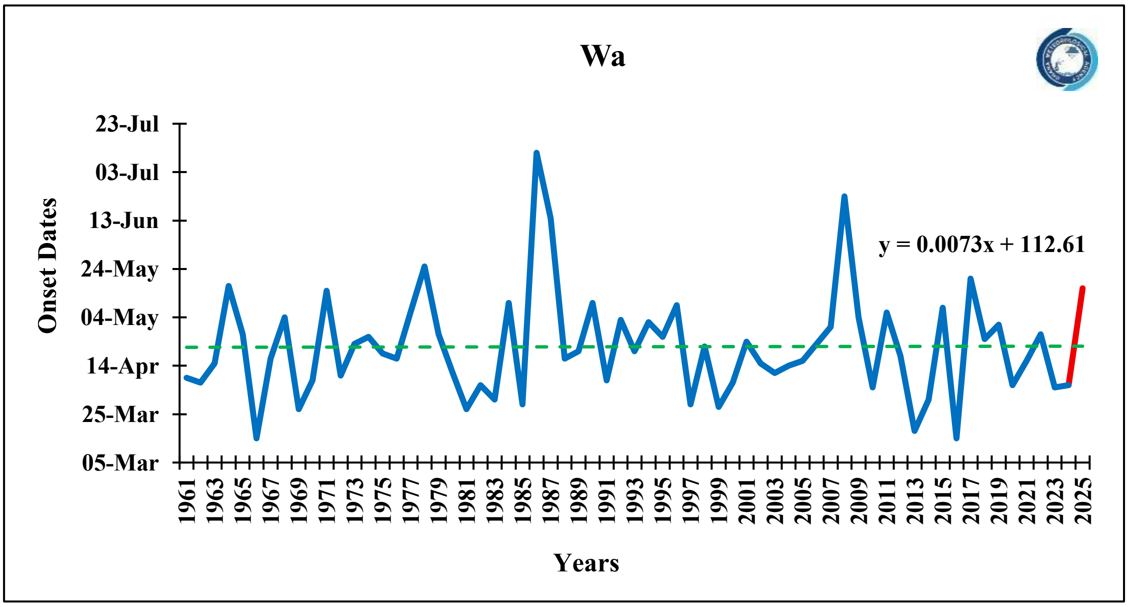


Figure 6.2. Trends in Onset Dates for Northern Ghana in Wa.

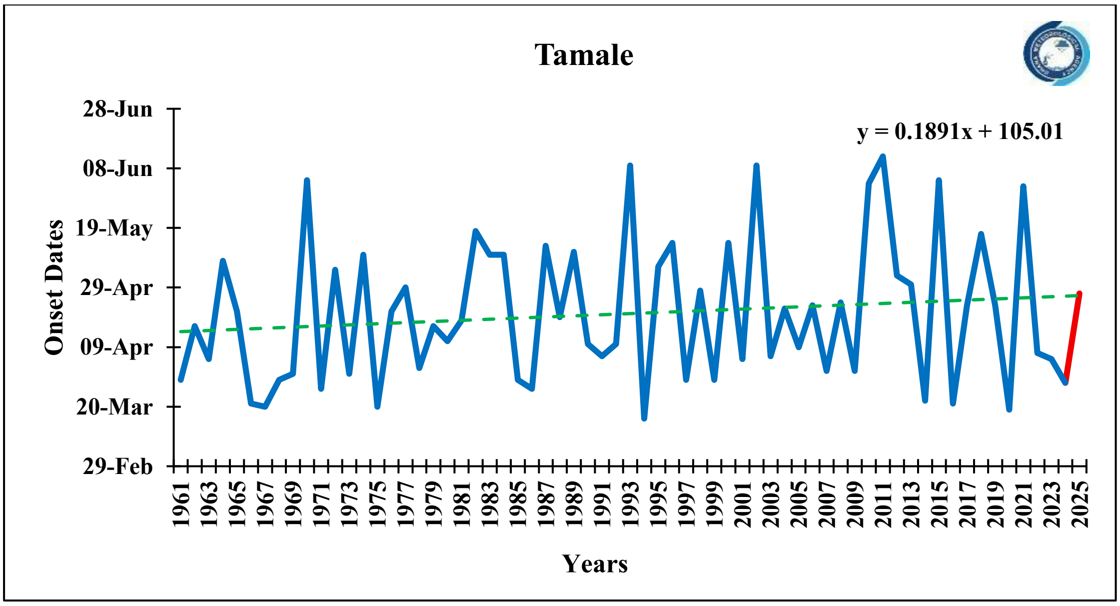


Figure 6.3. Trends in Onset Dates for Northern Ghana in Tamale.

Navrongo shows a slightly declining trendline, indicating early start of the season in recent years. Tamale and Wa, on the other hand, show a push-back in onset dates. This indicates a late start of the season.

6.1.2 Onset Dates Trend Analysis for Transition Zone

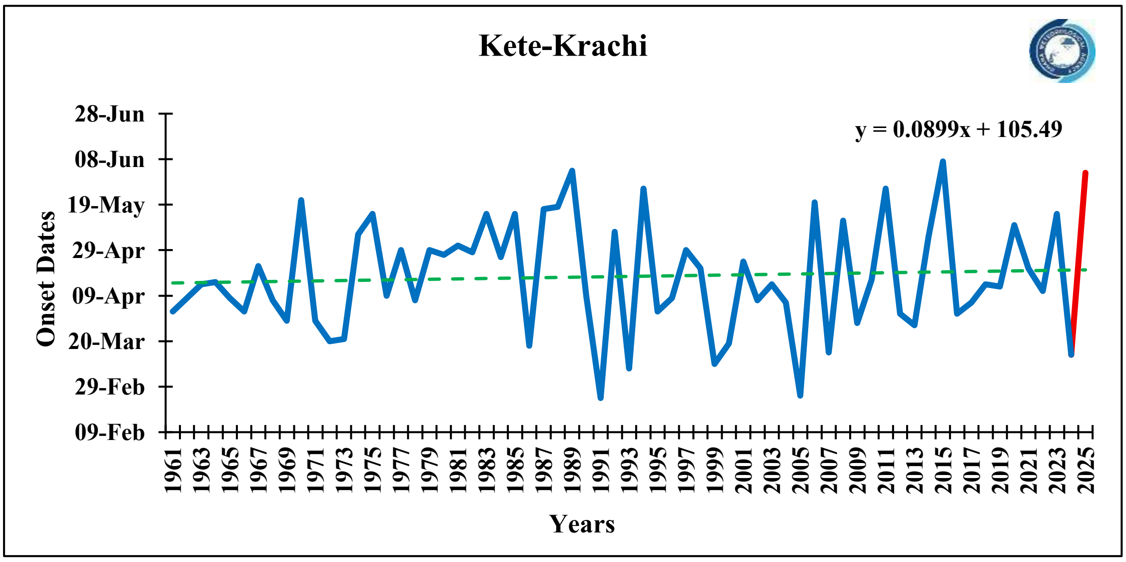


Figure 6.4. Trends in Onset Dates for the Transitional Zone for Kete-Krachi.

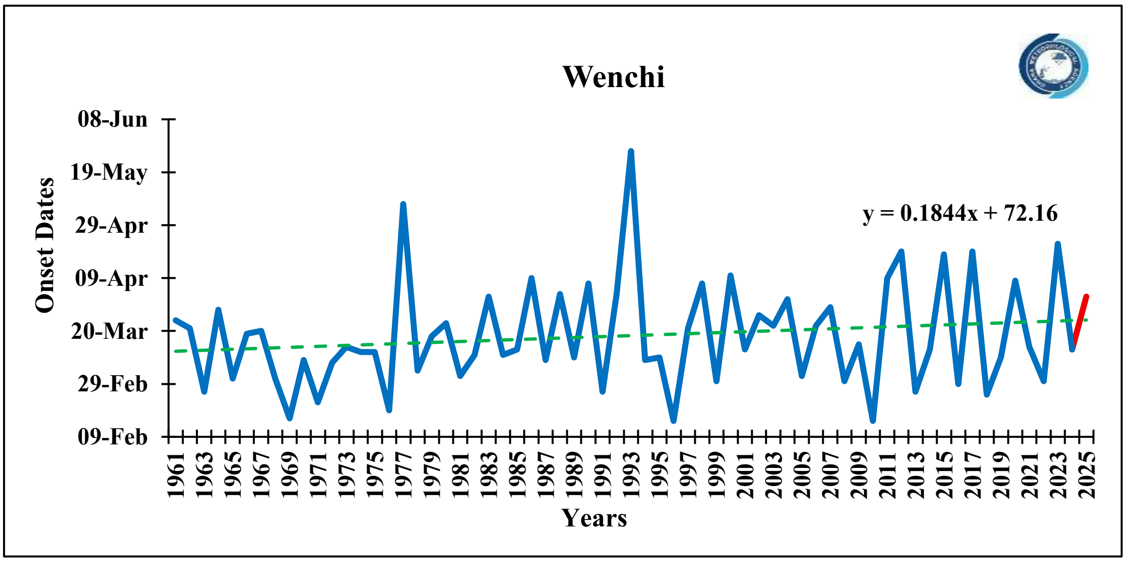
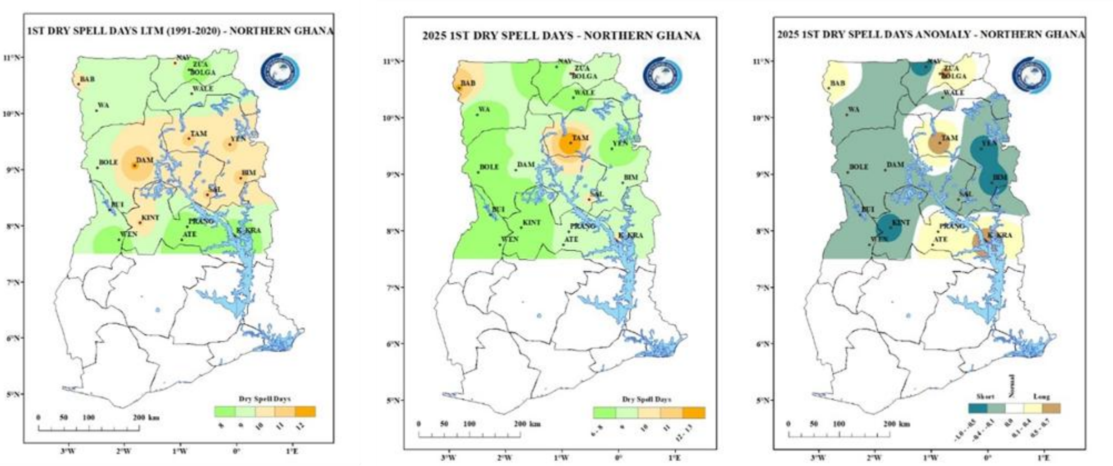


Figure 6.5. Trends in Onset Dates for the Transition Zone for Wenchi

The transition zone (precisely Kete-Krachi and Wenchi) records a slight upward trend, which shows delays in onset dates for the past.

6.2 Early/1st Dry Spell



Map 6.2. Spatial distribution of LTM, 2025, and anomalies for 1st/early dry spell days.

NB: *The longest uninterrupted period without rain from the start of the season to day 50, is called* ***the 1st/Early Dry Spell.***

In the Northern sector, Tamale recorded the longest dry spell with a maximum of 13 consecutive dry days following the onset of the season. Navrongo and its surrounding areas experienced the shortest dry spell in the sector, with 6 dry days. Most places across the sector recorded 7–10 dry spell days, while areas in and around Babile experienced 10 dry days.

Notably, Tamale, Kete-Krachi, Babile, Zuarungu, and Bolgatanga, along with their surrounding areas, recorded dry spells that were longer than their respective LTMs. Additionally, places such as Tamale, Prang, Atebubu, and Kete-Krachi also experienced extended dry conditions compared with their climatological averages. In contrast, the remainder of the sector recorded shorter dry spells, with the most pronounced being observed at Navrongo, Yendi, Bimbila, and Kintampo.

6.2.1 Early/1st Dry Spell Trend Analysis for Northern Ghana

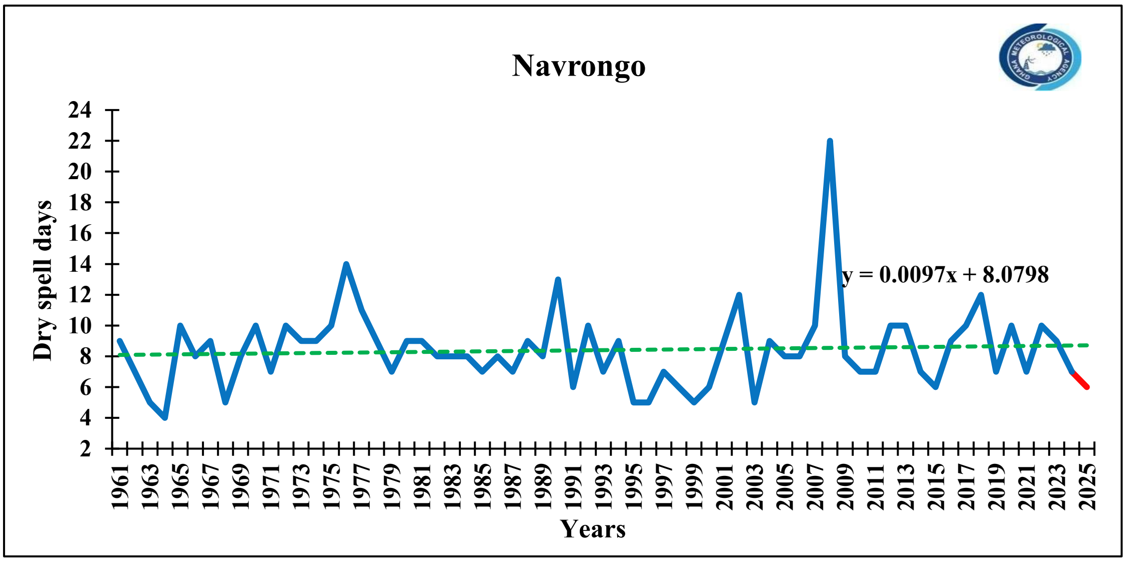


Figure 6.6: Trends in 1st /Early Dry Spell Days for Northern Ghana in Navrongo

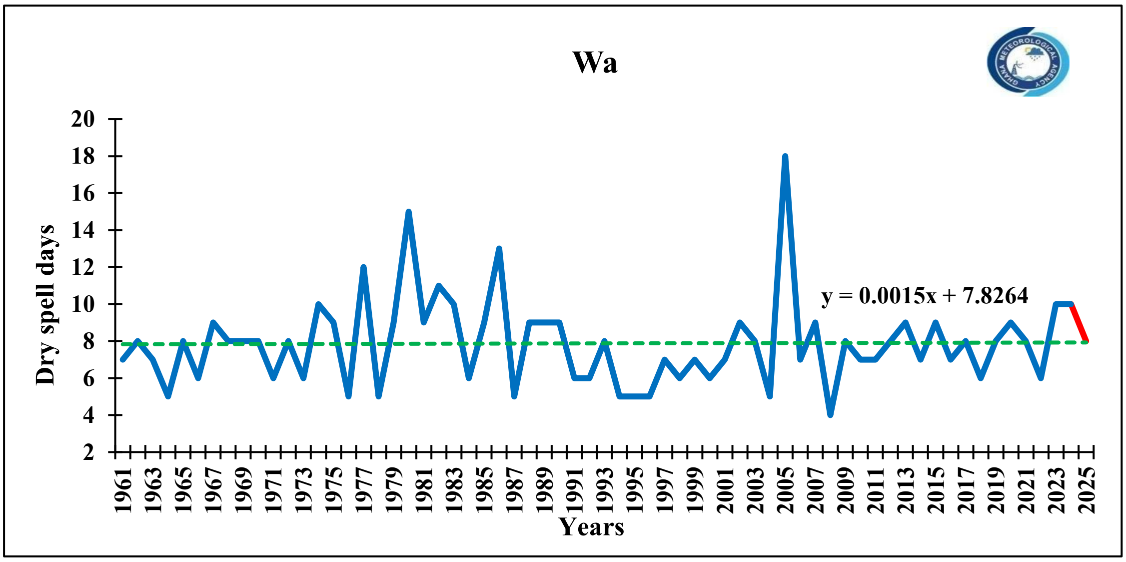


Figure 6.7: Trends in 1st /Early Dry Spell Days for Northern Ghana in Wa.

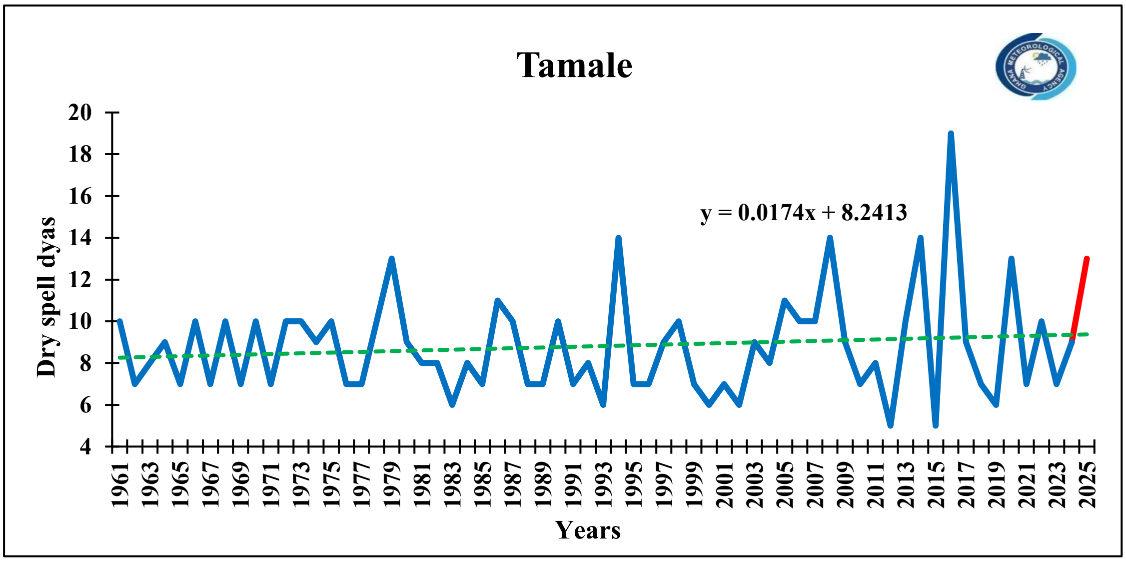


Figure 6.8 Trends in 1st /Early Dry Spell Days for Northern Ghana in Tamale

Navrongo and Tamale show an upward trend over the years. This indicates that there was an increase in the length of dry spell days during the period. However, Wa shows a neutral trend which implies that the dry spell days have not changed significantly over the years.

6.2.2 Early/1st Dry Spell Trend Analysis for Transition zone

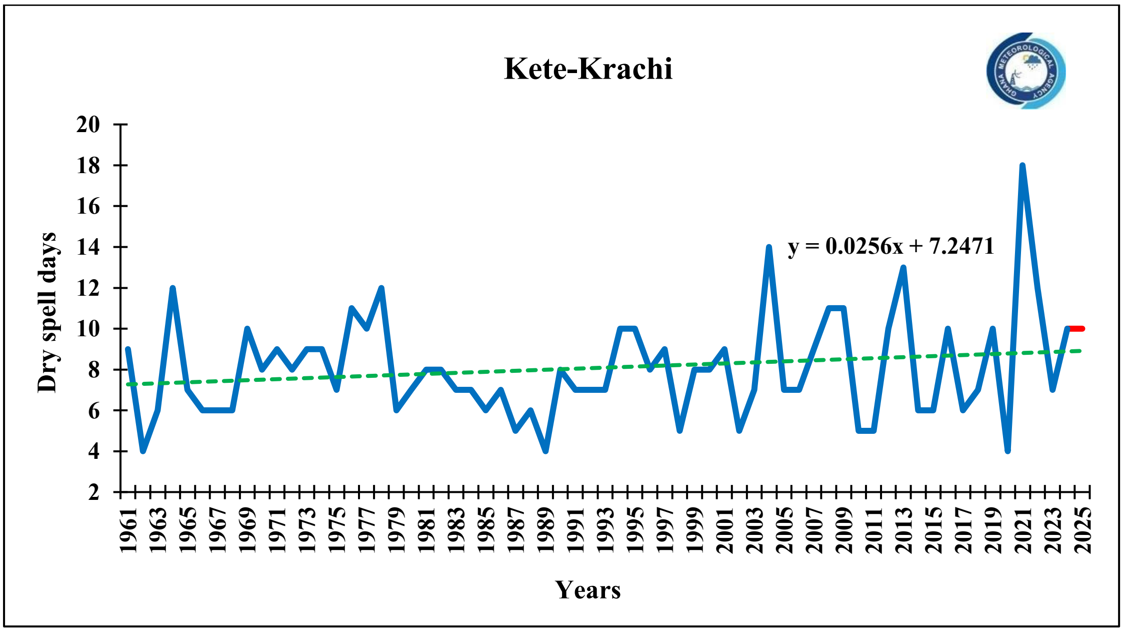


Figure 6.9: Trends in 1st /Early Dry Spell Days for Northern Ghana in Kete-Krachi.

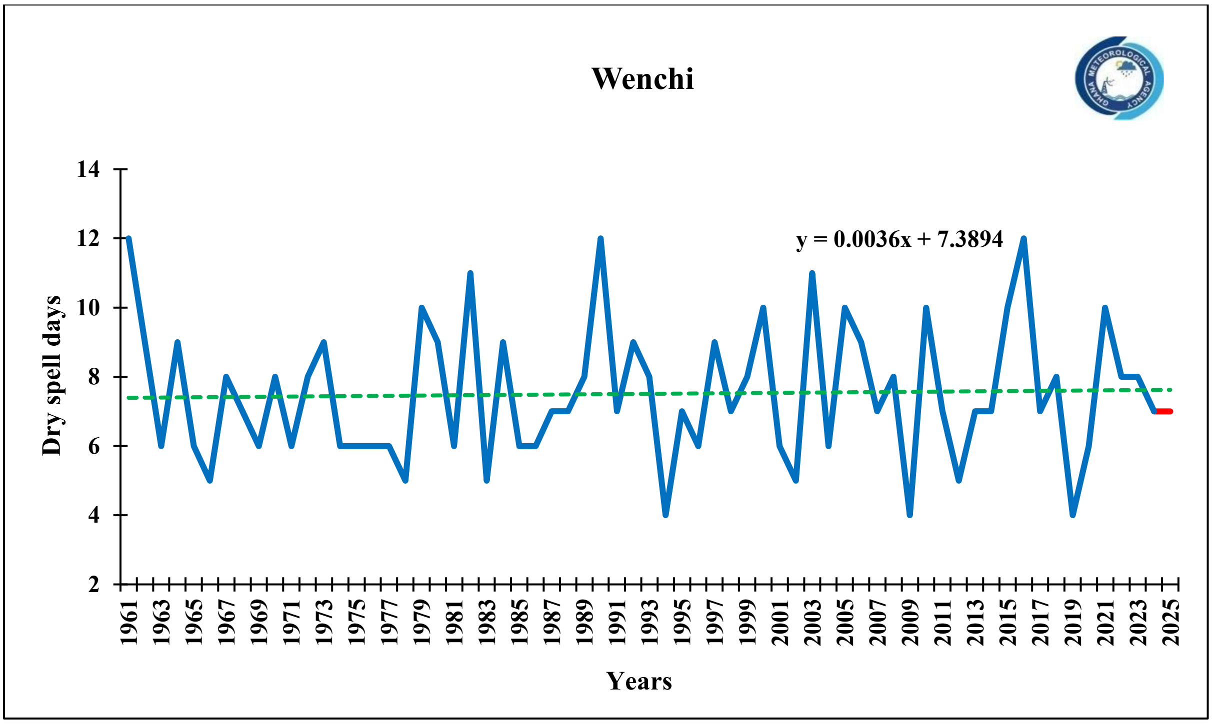
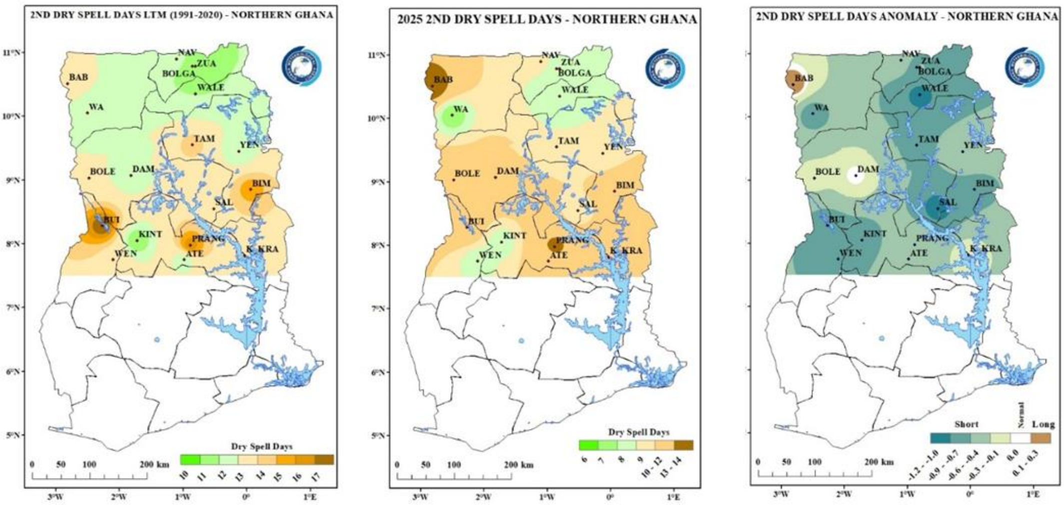


Figure 6.10: Trends in 1st /Early Dry Spell Days for Northern Ghana in Wenchi.

The trends for Kete Krachi and Wenchi, in the transition zone, have remained largely unchanged over the years. Even though Kete Krachi shows an upward trend, the dry spell days have not changed significantly over the years.

6.3 Late/2nd Dry Spell



Map 6.3. Spatial distribution of LTM, 2025, and anomalies for 2nd/late dry spell days.

NB:** From the 51st day of the season to the cessation date, the longest consecutive number of dry days is termed as **Late Dry Spell**. Climatological data of Northern Ghana (above 8°N) for 1991-2020 have shown that late dry spell days normally span from **10 to 17 days.

In 2025, Babile recorded the longest dry spell period with a number of 14 days without rain (a day longer than its LTM) within the season. Whereas Wa recorded the shortest dry spell period of 7 days, 5 days shorter than its LTM.

Damongo together with its environs recorded normal dry spell days as compared to its LTM. Across the Northern sector, Babile and its environs recorded shorter late dry spell period whiles the rest of the Northern sector recorded shorter late dry spell periods as compared to their respective LTMs.

6.3.1 Late/2nd Dry Spell Trend Analysis for Northern Ghana

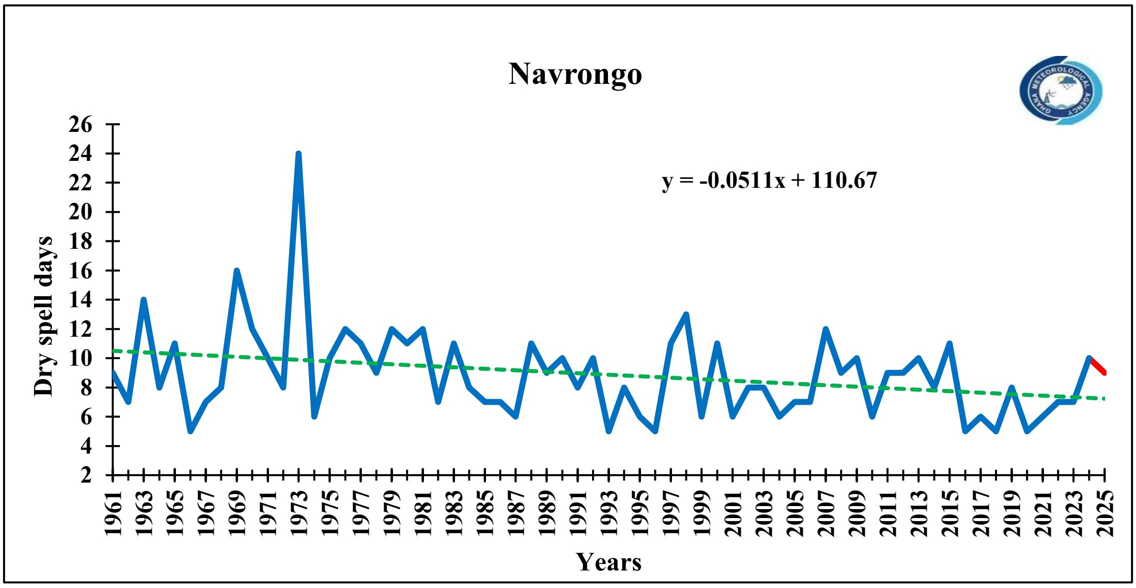


Figure 6.11. Trends in 2nd /Late Dry Spell Days for Northern Ghana in Navrongo.

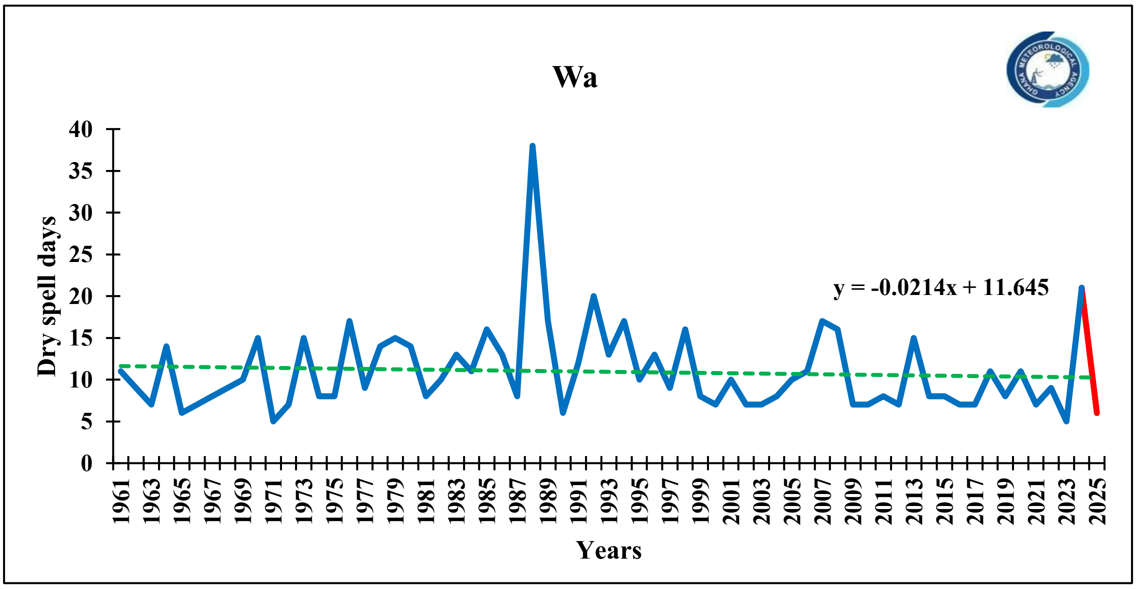


Figure 6.12. Trends in 2nd /Late Dry Spell Days for Northern Ghana Wa.

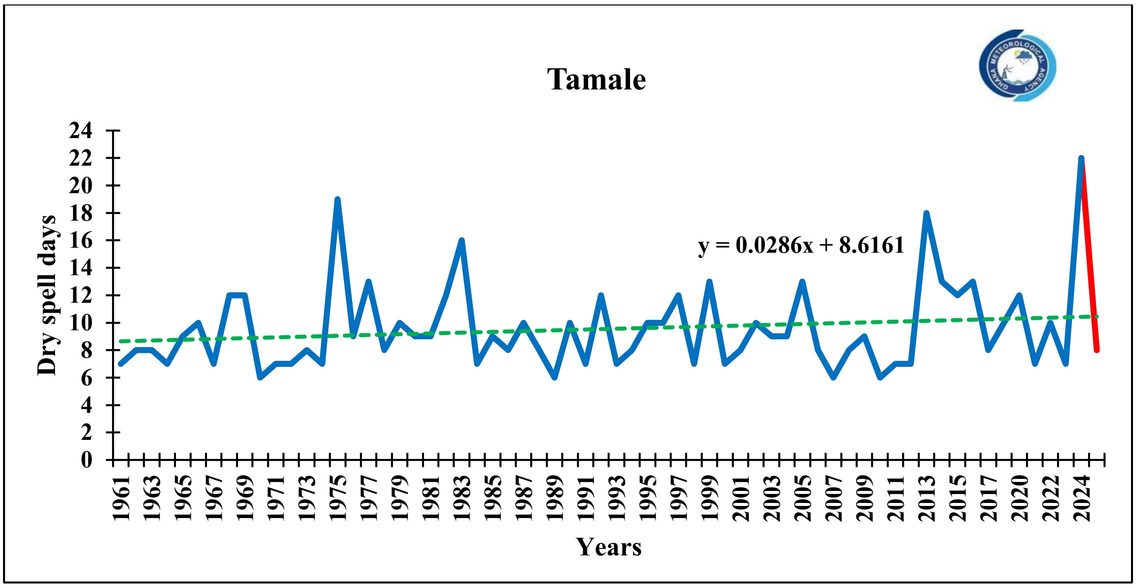


Figure 6.13. Trends in 2nd /Late Dry Spell Days for Northern Ghana Tamale..

Over the period under review, Navrongo shows a downward trend which suggests a decrease in the average length of dry spell days. The graph for Tamale shows an upward trend, indicating an increase in the average number of dry spell days. Wa, on other hand, shows a neutral trend meaning, there is no significant change in the number of dry spell days along the period.

6.3.2 Late/2nd Dry Spell Trend Analysis for Transition zone Ghana

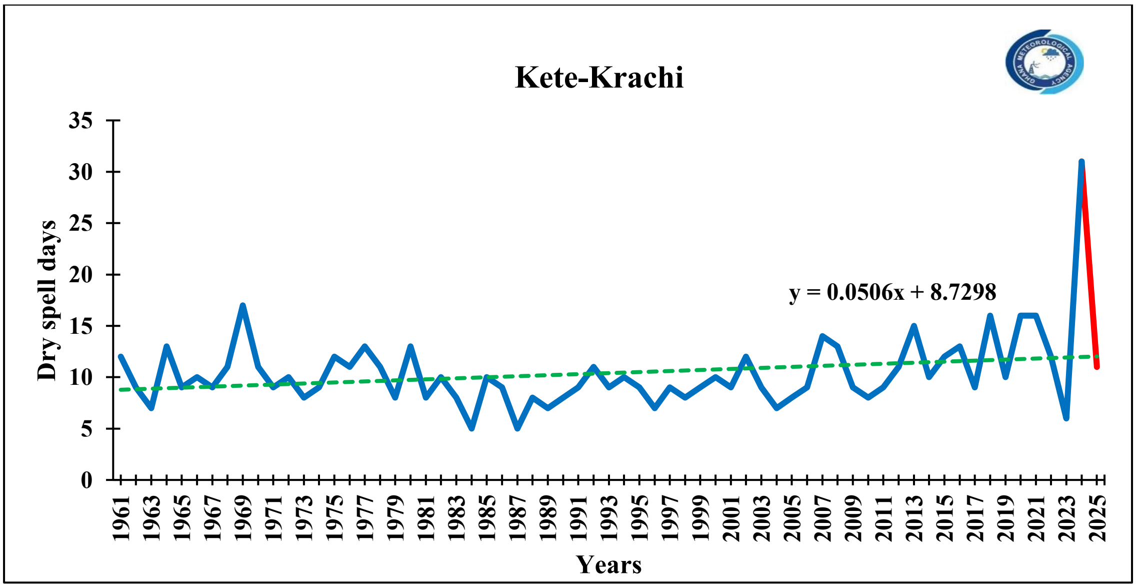


Figure 6.14. Trends in 2nd /Late Dry Spell Days for Northern Ghana Kete-Krachi.

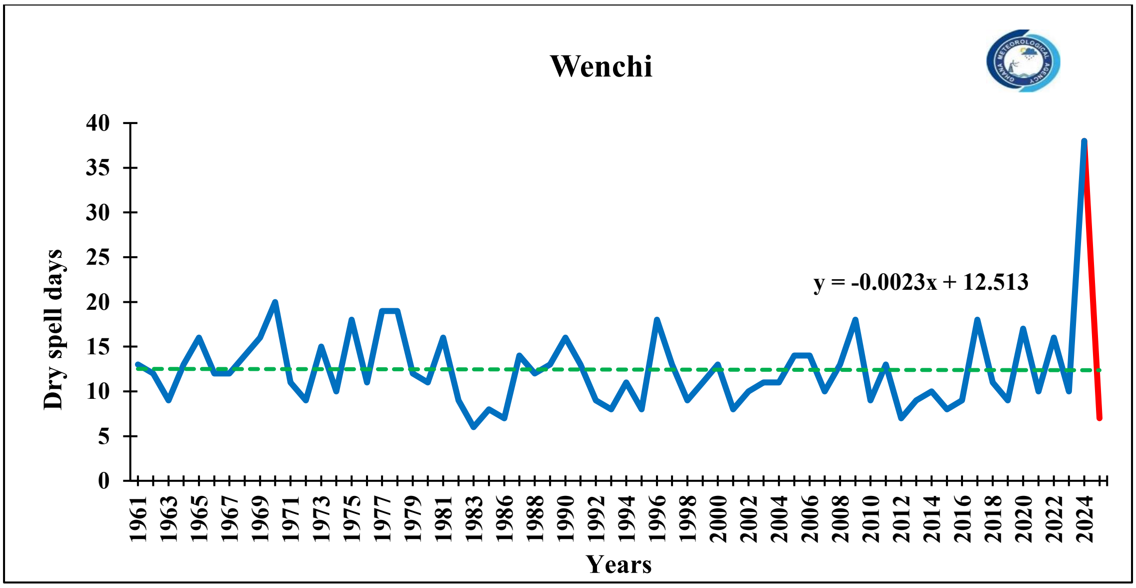
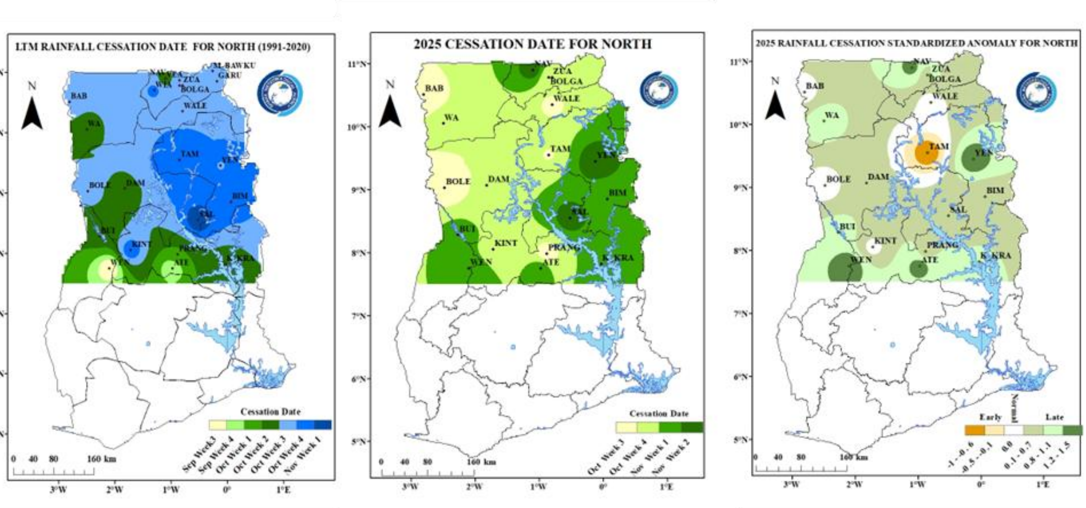


Figure 6.15. Trends in 2nd /Late Dry Spell Days for Northern Ghana in Wenchi.

Kete-Krachi shows an upward trend indicating an increase in the average number of dry spell days. On the contrary, Wenchi has a downward trend which suggests a decrease in the average number of dry spell days.

6.4. Cessation



Map 6.4. Spatial distribution of LTM, 2025 and anomalies for cessation dates.

The 2025 rainfall cessation for the northern part of Ghana occurred mainly between late October, Week 3 to 4, and early November, Week 1 to 2. Early cessation from late October was experienced in parts of Wa, Bole, Damango, Walewale, Babile, Prang, and Tamale. Late cessation from early November was dominant in Yendi, Bimbila, Salaga, Krachi, Wenchi, Navrongo, and Atebubu, indicating a relatively extended rainy season there.

The cessation anomaly for northern Ghana indicates predominantly near-normal to slightly late cessation across most areas during the season. However, early cessation anomaly was evident in Tamale, and late cessation anomalies are in parts of Yendi, Navrongo, Wenchi, and Atebubu in the transition.

6.4.1 Cessation Dates Trend for Northern Ghana

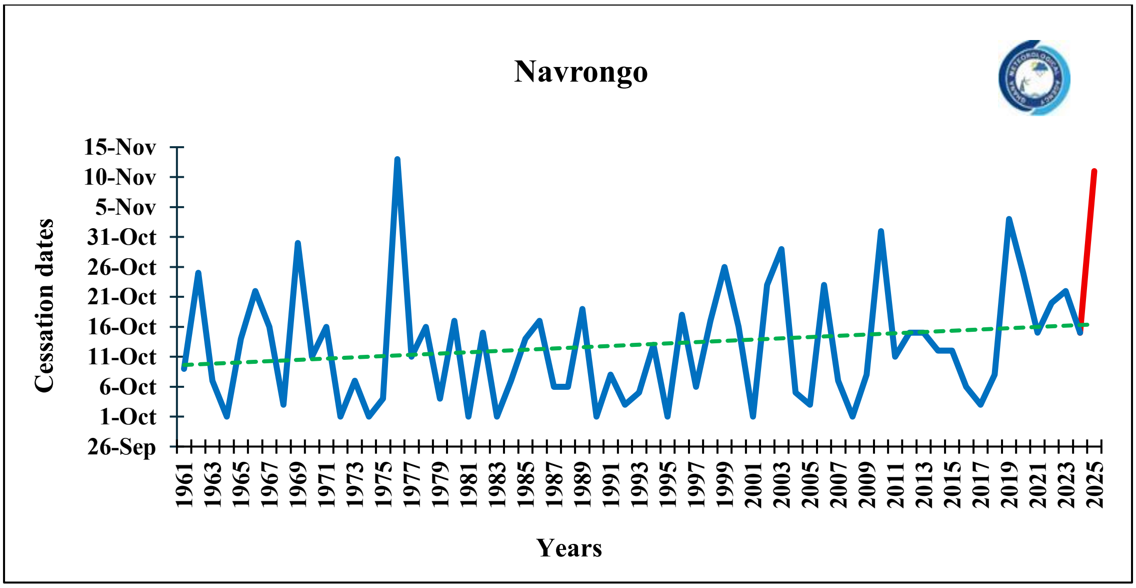


Figure 6.16. Trends in Cessation Dates for Northern Ghana in Navrongo

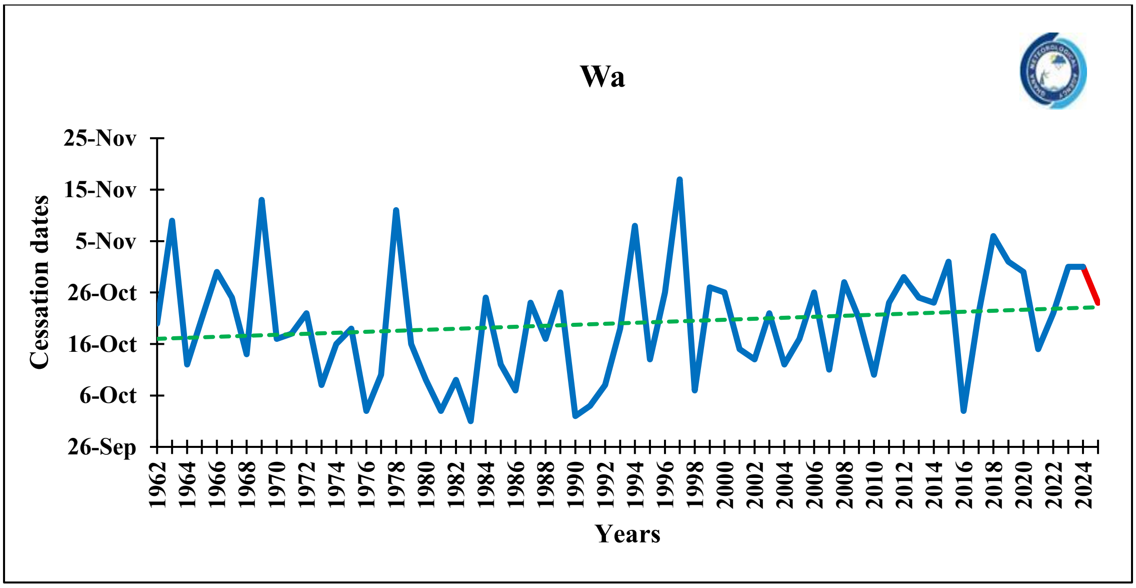


Figure 6.17. Trends in Cessation Dates for Northern Ghana in Wa.

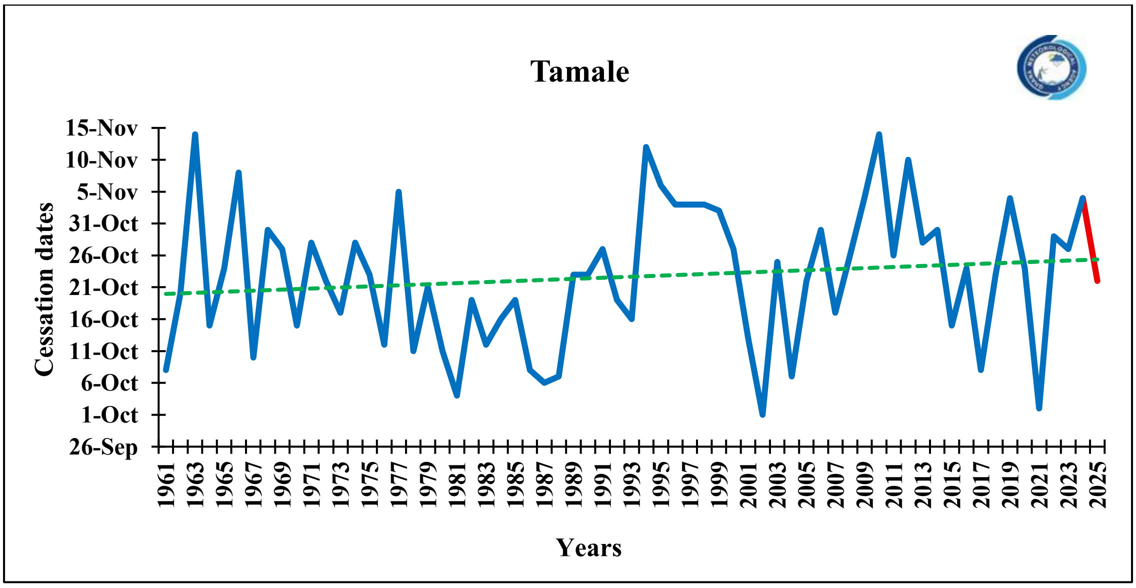


Figure 6.18. Trends in Cessation Dates for Northern Ghana in Tamale.

The cessation dates indicate a general increasing trend in Navrongo, Wa, and Tamale in the Northern parts of the country. Despite the increasing pattern, there is a significant variation in the years. Most cessation dates occur from the first week of October to the Second week of November.

6.4.2 Cessation Dates Trend for Transitional Zone

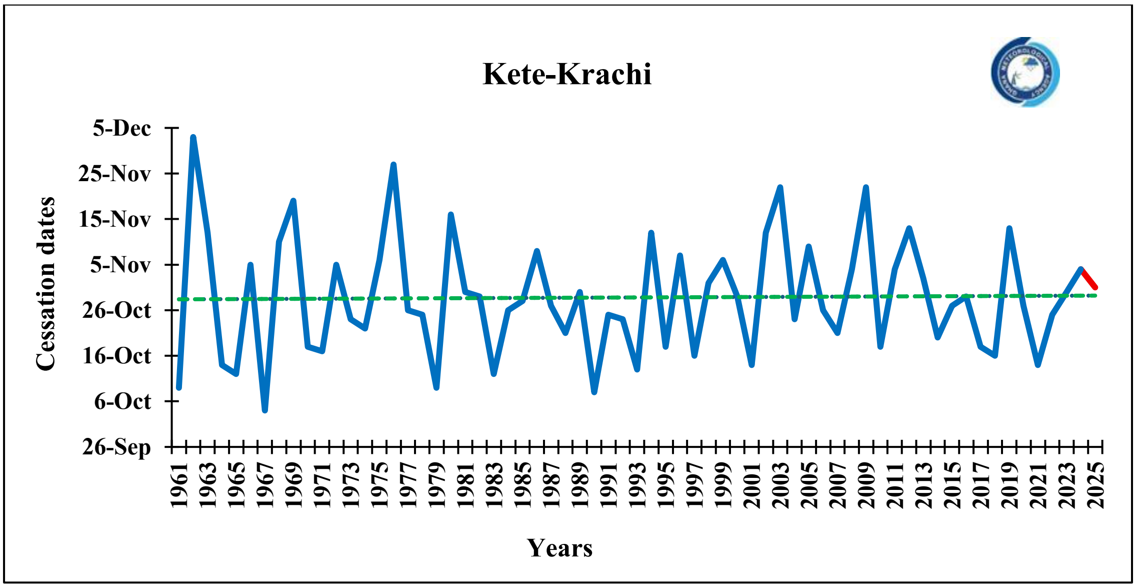


Figure 6.19. Trends in Cessation Dates for Northern Ghana in Kete-Krachi.

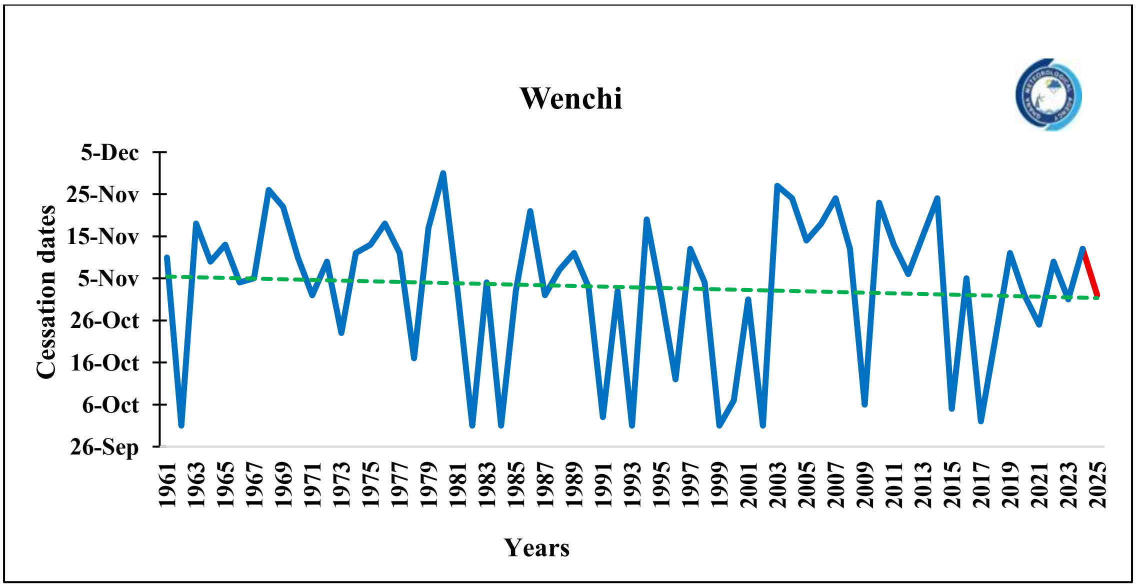
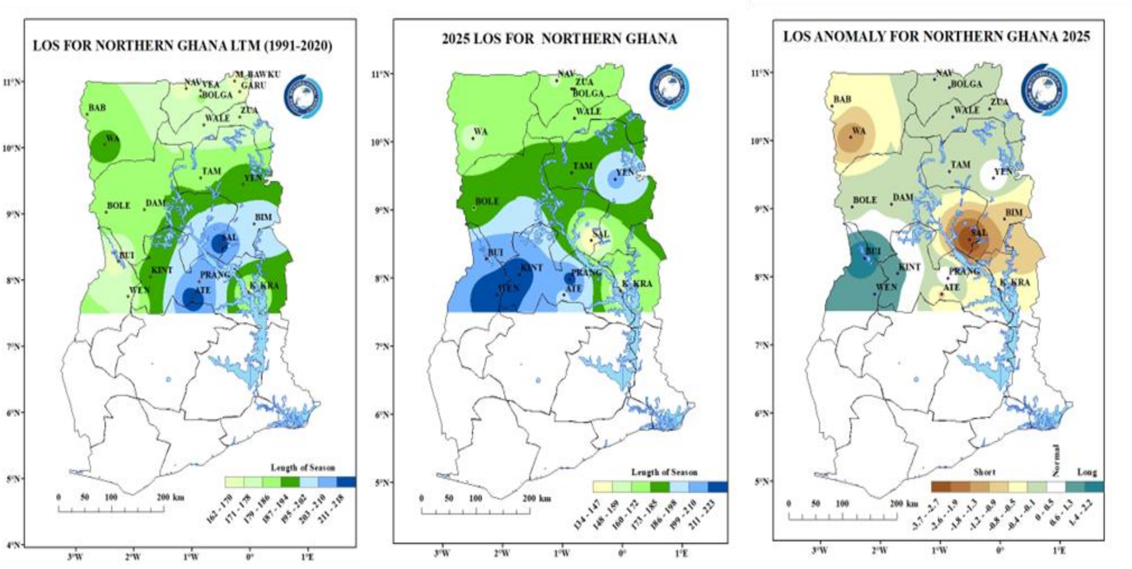


Figure 6.20. Trends in Cessation Dates for Northern Ghana in Wenchi.

The time series plots show significant variation in cessation dates from 1961- 2025. The trendline indicates that Kete Krachi increased marginally over time, while Wenchi had a decreasing trend over the years. The cessation dates vary significantly, from the first week of October to the first week of December.

6.5. Length of Season



Map 6.5. Spatial distribution of LTM, 2025 and anomalies for length of season.

Northern Ghana experienced noticeable variations in the length of the 2025 growing season across different zones.

In the Transition Zone, areas such as Wenchi, Kintampo, Prang, Bui, and Atebubu recorded relatively longer season lengths ranging from 186 to 223 days. Wenchi, Kintampo, and Prang experienced the longest durations at 223, 218, and 215 days, respectively. In contrast, Kete-Krachi recorded a shorter season length of 151 days.

Within the Northern and Savannah Regions, Yendi experienced a long season of 201 days. Tamale and Bole recorded season lengths ranging between 173 and 185 days, while Salaga had the shortest duration in this zone at 134 days.

In the Upper Regions, season lengths ranged from 160 to 185 days. Bolgatanga, Walewale, and Zuarungu experienced season lengths between 160 and 172 days, whereas Wa and Navrongo each recorded 157 days.

Comparing the 2025 season to the climatology, Bui, Kintampo, Wenchi, and their surrounding areas experienced longer-than-normal seasons. Prang and Yendi recorded near-normal length of season, while most of the other areas across the sector experienced shorter-than-normal seasons.

6.5.1 Length of Season Trend Analysis for Northern Ghana

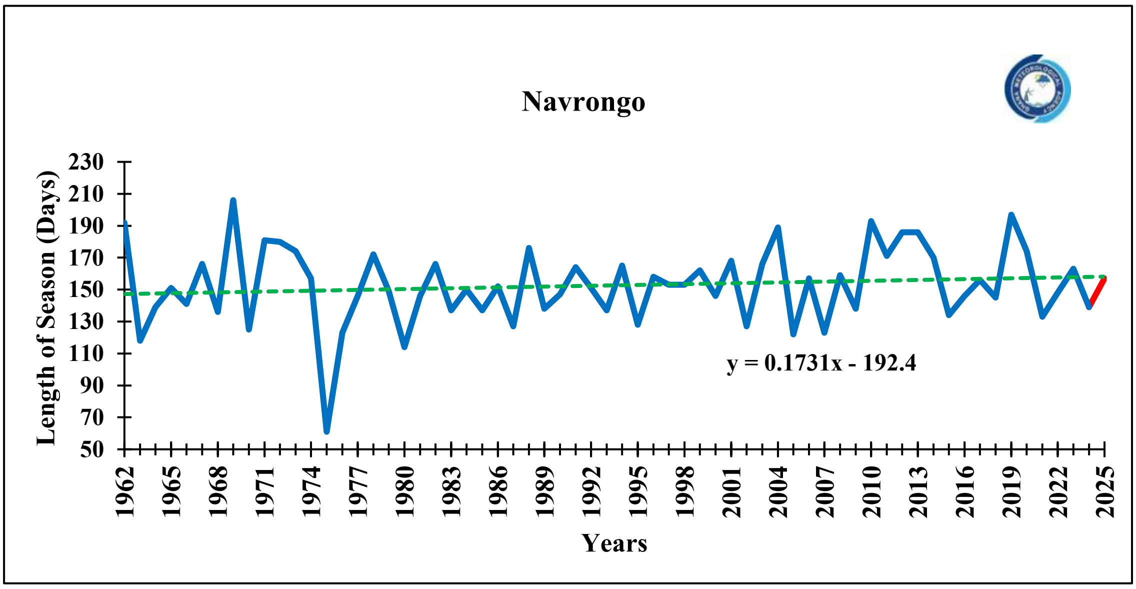


Figure 6.2 Trends in length of Season for Northern Ghana in Navrongo

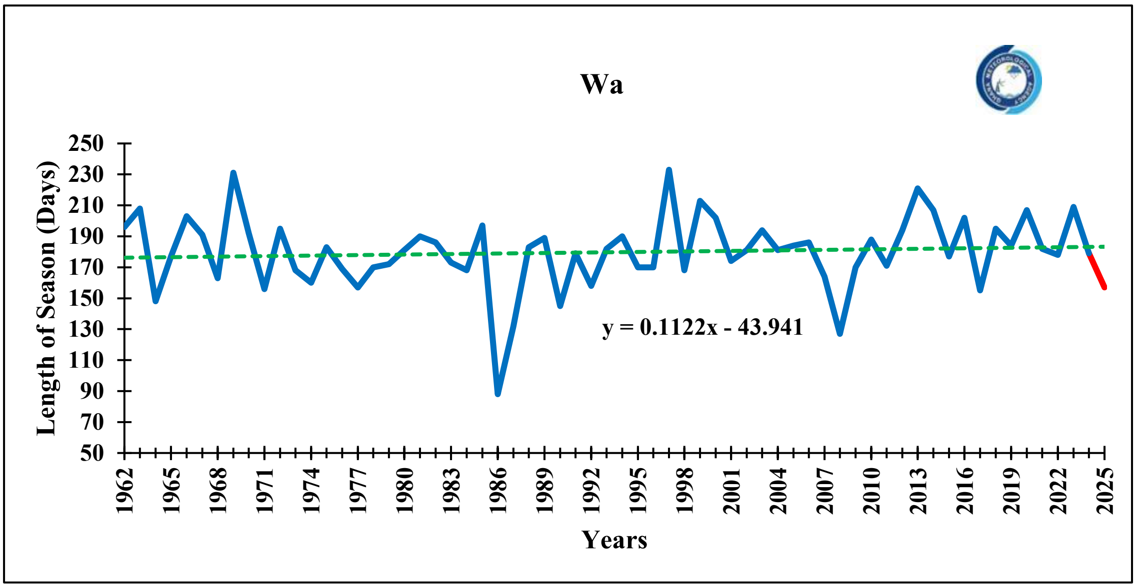


Figure 6.3 Trends in length of Season for Northern Ghana in Wa

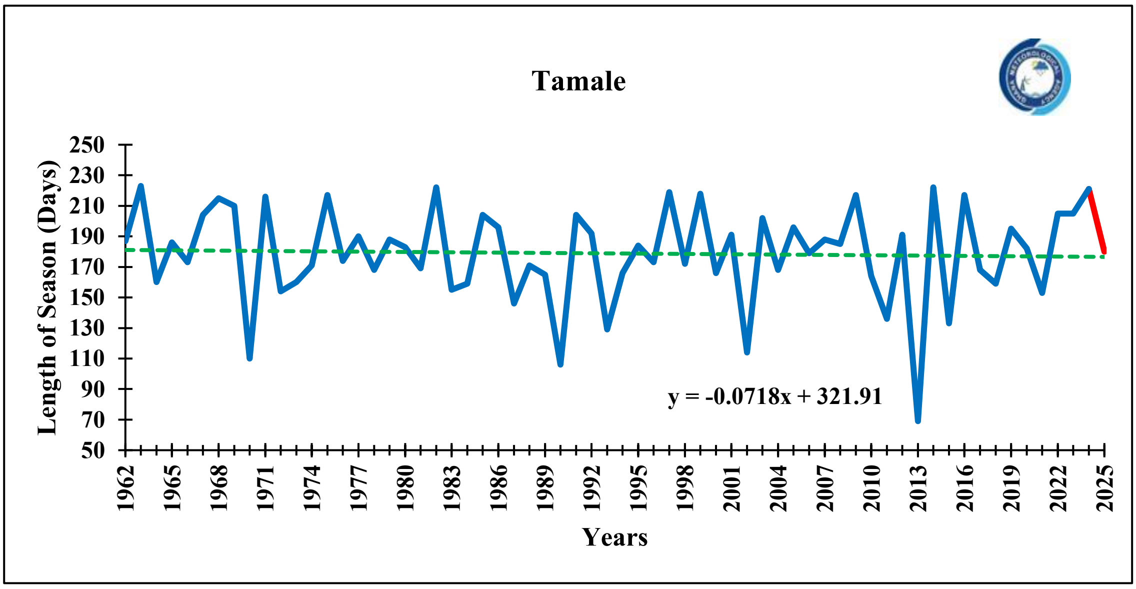


Figure 6.4 Trends in length of Season for Northern Ghana in Tamale

Since the 1960s, season lengths in the northern sector have displayed differing trends. Wa and Navrongo had an increase in season length. However, Tamale has experienced a slight decrease in length of season.

6.5.2 Length of Season Trend Analysis for Transitional Zone

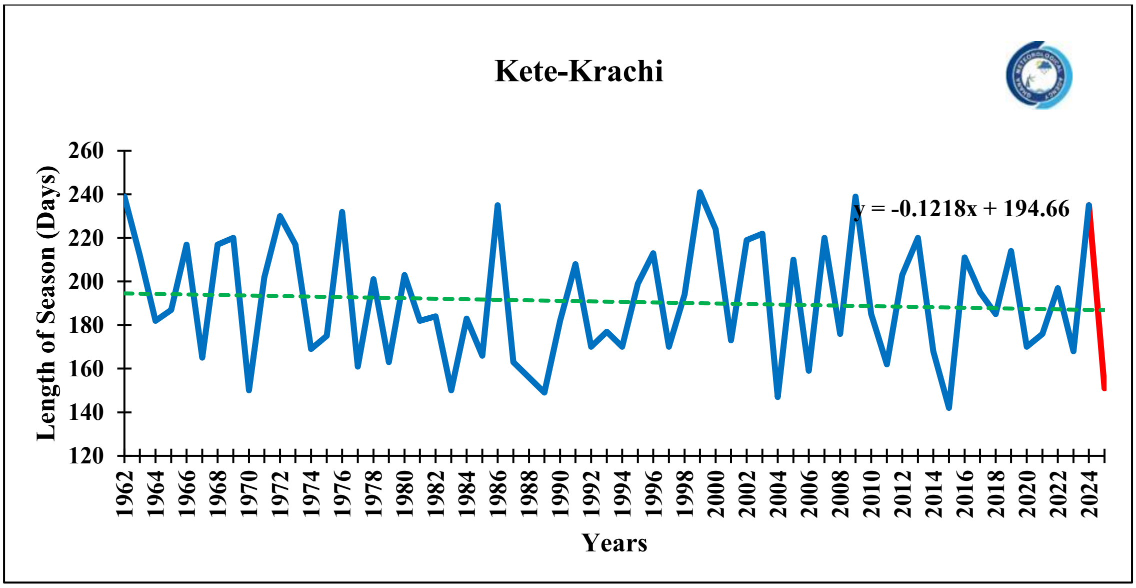


Figure 6.5. Trends in Length of Season for Transitional Zone in Kete-Krachi

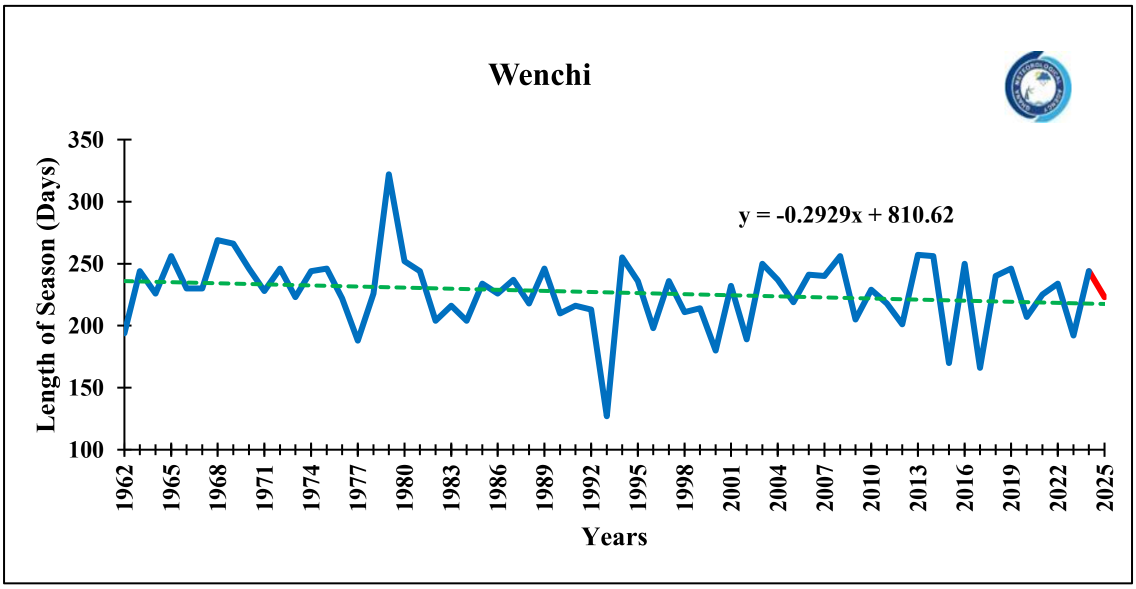
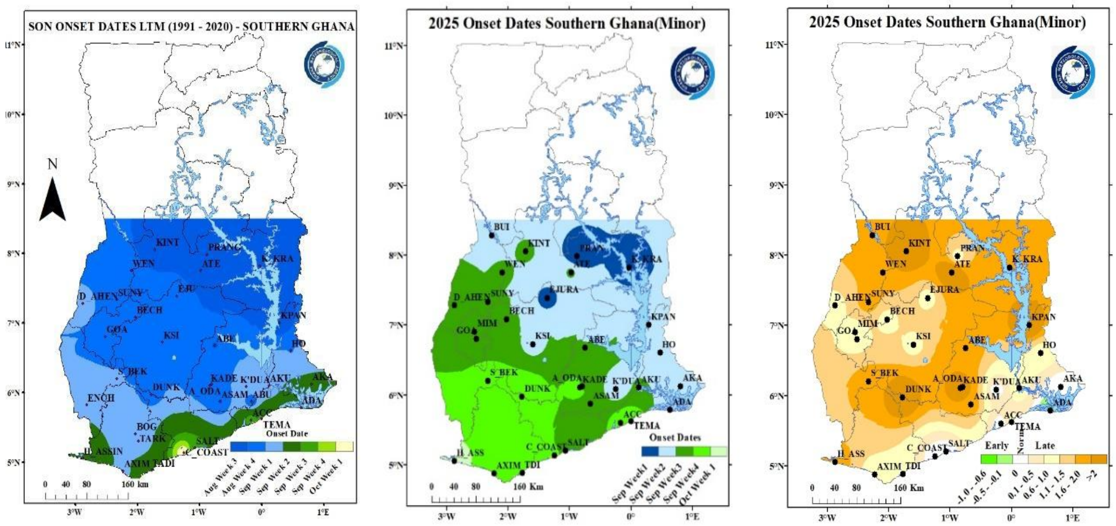


Figure 6.6. Trends in Length of Season for Transitional Zone in Wenchi.

In the transition, Wenchi and Kete Krachi show a declining trend in season length from 1962-2025.

7.0 REVIEW OF AGRO-CHARACTERISTICS SOUTHERN GHANA (MINOR SEASON)

7.1 Rainfall Onset



Map 7.1. Spatial distribution of LTM, 2025 and anomalies for onset dates

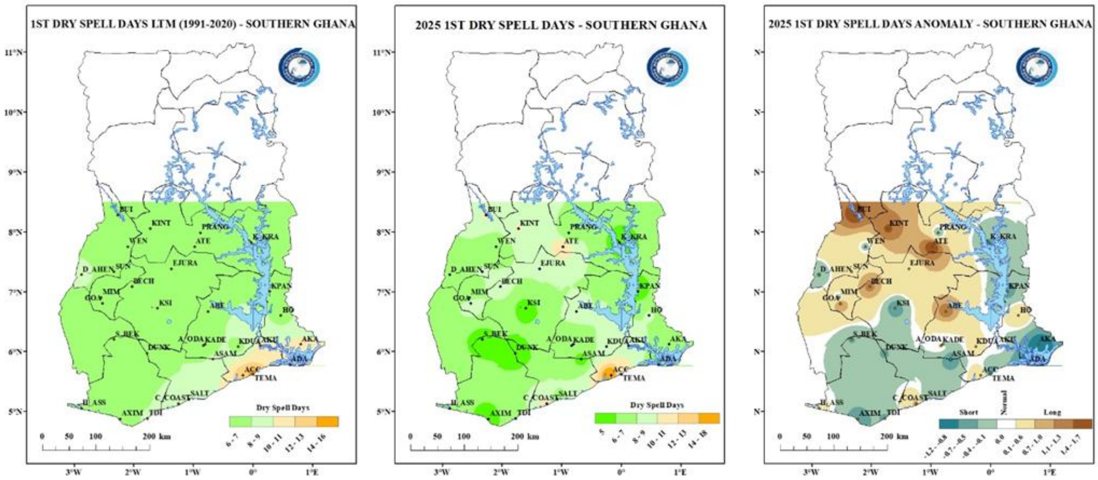
The transition zone of Ghana for the 2025 year exhibited a bimodal rainfall pattern as rains were recorded during the minor rainfall season (SON) for Southern Ghana. The SON season had rains starting in areas like Prang, Ejura, and Kete Krachi in the first week of September.

The entire forest zone recorded onset from the second week of September to the fourth week of September.

The Coastal sector, Akatsi and Ada recorded the earliest onset which occurred in the second week of September, whereas the rest of coastal zone experienced onset from the third week of September to the first week of October.

For anomalies, almost the entire southern sector recorded positive anomalies, indicating a generally late onset. Ada, Accra, Akatsi, Koforidua and their surroundings experience near-normal onset. However, Ada and its enclave recorded an early onset.

7.2 Early/1st Dry Spell

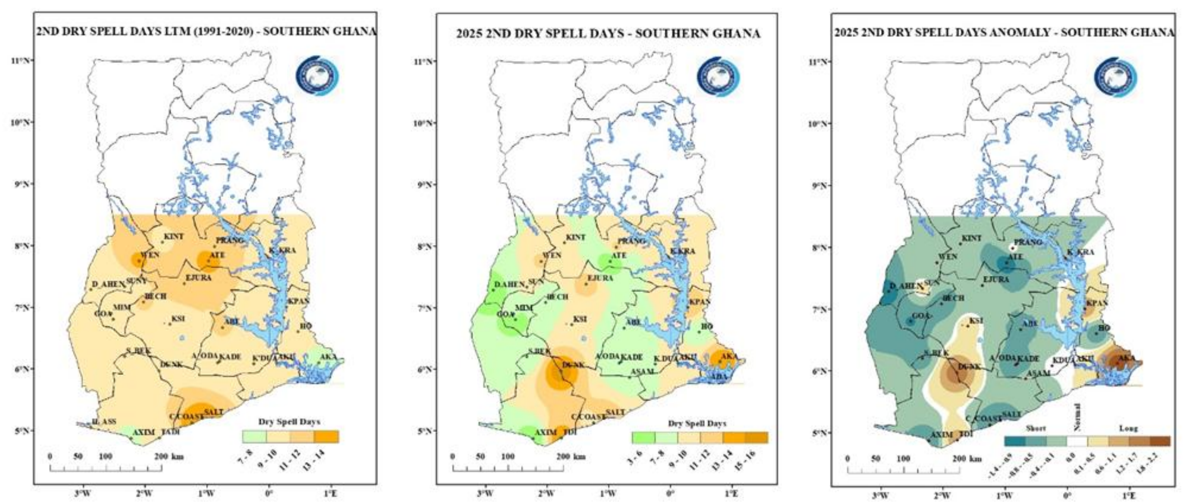


Map 7.2. Spatial distribution of LTM, 2025 and anomalies for 1st/early dry spell days

During the minor season, which typically begins in September, most places in the Southern sector recorded dry spell days ranging from 5 to 10 days. Notably, areas around Ada, Asamankese, Axim, Dunkwa, Kete-Krachi, Kpando, Kumasi, and Sefwi Bekwai each experienced 5 dry days. In contrast, Accra recorded the longest dry spell in the sector, with 18 consecutive days without rain at the onset of the minor season.

In the Transition zone, areas such as Bui, Kintampo, and Atebubu experienced longer dry spells relative to their longterm means (LTMs), indicating drier-than-usual conditions. Conversely, KeteKrachi and Prang recorded 5 and 6 dry days, respectively, which were shorter than their respective LTMs. Similarly, Kpando, Dormaa Ahenkro, Kumasi, Sefwi Bekwai, Dunkwa, and Asamankese also experienced shorter dry spells. Abetifi and its surrounding areas recorded 9 dry days. Cape Coast, Accra, and nearby environs experienced longer dry spells.

7.3 Late/2nd Dry Spell



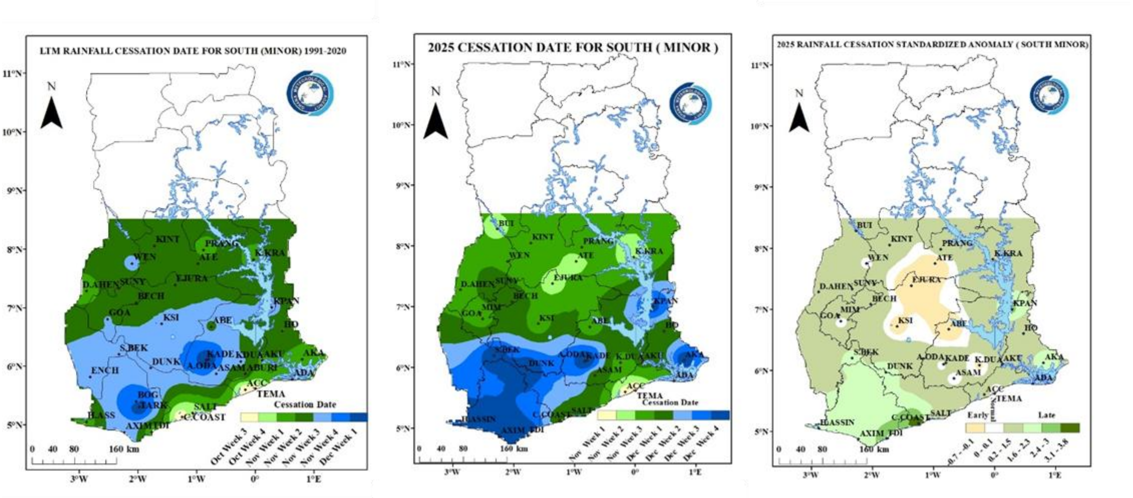
Map 7.3: Spatial distribution of LTM, 2025 and anomalies for 2nd/late dry spell days.

The second dry-spell period of the SON season is typically marked by relatively few rainy days, with dry spells generally lasting between 9 and 14 days. However, during the 2025 SON season, fewer dry-spell days were recorded compared to the long-term mean (LTM), although some extreme cases were observed. Atebubu recorded the shortest dry spell, with only 3 consecutive days without rainfall toward the end of the season. This represents a reduction of about 10 dry-spell days compared to its LTM, indicating increased rainfall activity during the season.

Similarly, areas in and around Dormaa Ahenkro and Goaso recorded 4 dry-spell days, representing decreases of 4 days and 6 days, respectively, relative to their LTMs. Cape Coast and its surrounding areas recorded 8 dry-spell days, considerably lower than the 13 dry days usually experienced.

In contrast, some areas experienced longer dry spells than usual. Along the coast, Akatsi, which normally records about 7 dry-spell days, and Takoradi, which typically experiences a maximum of 9 dry days, both recorded 14 consecutive dry days by the end of the 2025 SON season. Dunkwa recorded the longest dry spell during the season, with 16 consecutive days without rainfall, approximately 6 days longer than its LTM.

7.4 Cessation



Map 7.4. Spatial distribution of LTM, 2025 and anomalies for cessation dates.

The 2025 minor-season rainfall cessation across southern Ghana was generally delayed, with the season ending between the first week of November and the fourth week of December. In the coastal zone, Accra and Tema recorded cessation in the first week of November. Across the Transition and Forest Zones, cessation dates ranged from the second week of November to the fourth week of December. Notably, places within the forest-zone such as Sefwi Bekwai, Axim, Half Assini, Dunkwa-on-Offin, Kpando, and Akatsi experienced cessation as late as the fourth week of December.

Most parts of southern Ghana recorded positive anomalies in the 2025 minor-season rainfall cessation, indicating a generally late end to the season. Coastal and forest areas, including Takoradi and Cape Coast, as well as southwestern and eastern areas such as Half Assini, Axim, Kpando, and Akatsi, experienced delayed cessation.

Conversely, Ejura, Kumasi, Atebubu, Abetifi, and Koforidua recorded early cessation, while Wenchi, Goaso, Kade, and Asamankese experienced cessation dates close to the climatological normal.

8.0. EXTREME WEATHER EVENTS IN 2025

In 2025, Ghana experienced a range of high-impact extreme weather events, primarily associated with intense rainfall and high tidal waves, resulting in significant humanitarian, economic, and infrastructure impacts. Recurrent coastal erosion driven by high tidal waves affected communities in the Ketu South Municipality of the Volta Region, including Agavedzi, Salakope, and Amutinu, leading to repeated displacement of residents and loss of livelihoods. These events highlight the increasing vulnerability of low-lying coastal communities to sea-level rise and storm surge impacts.

The year was also marked by frequent and severe flooding events, particularly in urban and peri-urban areas. Major urban flooding episodes occurred in Accra, Cape Coast, Takoradi, and several districts in the Central Region, triggered by heavy torrential rainfall, overwhelmed drainage systems, and, in some cases, weak infrastructure. These floods resulted in loss of lives, displacement of more than 5,700 people, damage to homes and vehicles, disruption of electricity supply, and significant economic losses. Prolonged flooding in the Central Region during June was especially severe, affecting multiple districts and underscoring systemic drainage and river overflow challenges

In addition, agricultural flooding during September severely affected vegetable farming areas in Anloga in the Volta Region, where intense rainfall destroyed approximately 1,200 acres of farmland, impacting about 600 farmers and leading to substantial income and livelihood losses. Overall, the extreme events recorded in 2025 demonstrate the growing influence of climate variability and extremes on Ghana's socio-economic systems, emphasizing the need for strengthened early warning systems, resilient infrastructure, and targeted adaptation measures.

The table below presents a summary of significant extreme weather events observed in Ghana during 2025, highlighting the event type, cause, affected areas and casualties.

Date	Event Type	Cause	Areas Affected	Casualties / Impact	Source (Access Link)
28-Feb-2025	Coastal erosion	High tidal waves	Ketu South municipal in Volta Region: Agavedzi, Salakope, Amutinu	A total of 519 people from 101 households in the three communities.	https://gna.org.gh/2025/02/tidal-waves-displace-519-people-in-ketu-south-nadmo/
4-Mar-2025	Coastal erosion	High tidal waves	Ketu South	Several residents displaced	https://www.ghanaweb.com/blogs/tednewsghana/Ketu-South-Hit-by-Severe-Coastal-Erosion-as-Tidal-Waves-Displace-Residents-9800
25-Mar-2025	Major urban flooding	Heavy rain + strong winds	Accra (A&C Mall)	80+ vehicles damaged	https://www.graphic.com.gh/news/general-news/heavy-rains-cause-solar-panel-collapse-at-a-c-mall-damaging-over-80-vehicles.html
26-Apr-25	Flooding	Heavy rains	Accra & ECG areas	Widespread outages	https://citinewsroom.com/2025/04/heavy-rainstorm-causes-power-outages-in-parts-of-ghana-ecg-assures-swift-restoration
18th May 2025	Major urban flooding	Heavy rain	Accra (Adentan Municipality - Lakeside, Nanakrom, and New Legon)	3 deaths	https://www.myjoyonline.com/3-confirmed-dead-in-adentan-flood-mce-blames-construction-on-waterways/
26-May-2025	Coastal erosion	High tidal waves	Ketu South municipal: Agavedzi, Salakope, Amutinu	Several residents displaced	https://citinewsroom.com/2025/05/v-r-tidal-waves-ravage-coastal-communities-in-ketu-south/
14th June 2025	Flooding	Heavy rains	Takoradi	Displacement of residents and disruption of economic activities	https://www.youtube.com/watch?v=vpfW0c4Zd3s
22nd June 2025	Major urban flooding	Torrential rainfall + weak/dilapidated building structure	London Bridge Area, Cape Coast (Central Region)	**2 deaths, 3 serious injuries**	https://www.gbcghanaonline.com/general/two-dead-three-injured-after-building-collapses-during-downpour-in-cape-coast/2025/
18–27 June 2025	Flooding	Persistent heavy rainfall, overflow of rivers and drainage systems, poor drainage infrastructure	14 Districts in Central Region: KEEA, Assin North & South, Upper Denkyira East, Agona East & West, Mfantseman, Gomoa East, Awutu Senya East & West, Winneba, Dunkwa-on-Offin, Cape Coast Metro	**5,700+ displaced**, hundreds of homes damaged, livelihoods destroyed	https://www.myjoyonline.com/over-5700-residents-displaced-by-flooding-in-central-region-as-nadmo-responds-to-crisis/ https://gna.org.gh/2025/06/flood-fire-disasters-devastate-4636-residents-in-central-region-nadmo-rallies-support-for-victims/

12th September, 2025	Agricultural flooding	Intense downpour (heavy rain throughout the day)	Anloga, Volta Region (vegetable farms)	1,200 acres of vegetable farms destroyed; ~ 600 farmers affected (income/jobs lost, crop loss: tomatoes, shallots, onions, peppers)	https://www.myjoyonline.com/floods-destroy-1200-acres-of-farms-in-anloga-600-farmers-affected

Picture 1 Cape Coast, streets including the NIB road, Melcom and Kingsway to Tantri had their gutters overflowing and spewing plastic waste onto the streets following a sudden downpour that hit the city

Picture 2• Heavy rainfall triggered severe flooding across parts of Accra, Ghana on May 18, 2025, killing 5 people and displacing more than 3000 properties

Picture 3 Residents of Salakope, Agavedzi and surrounding communities in the Ketu South Municipality of the Volta Region counted their losses after series of new tidal waves destroy their belongings

Picture 4 A short but intense downpour on Friday, November 7, 2025, left parts of Accra, particularly Dzorwulu, heavily flooded, causing severe traffic congestion and disrupting movement across major routes.

CONCLUSION

The 2025 State of the Climate Report for Ghana provides clear and compelling evidence of a climate system undergoing measurable change, marked by persistent warming, increasing rainfall variability, and a growing incidence of climate extremes. Observations from national meteorological networks show that temperatures in 2025 remained well above the 1991-2020 climatological average, reinforcing the long-term warming trend that has become increasingly pronounced over the past two decades. The continued rise in both daytime and night-time temperatures highlights an intensification of heat stress conditions, with important implications for public health, energy demand, agriculture, and ecosystem stability.

Rainfall patterns in 2025 were characterized by strong spatial and seasonal contrasts. While total annual rainfall remained within historical variability, deficits during key periods, particularly across parts of northern Ghana during the peak monsoon season, underscore the increasing unpredictability of rainfall distribution. At the same time, enhanced late-season rainfall in some areas and localized extreme rainfall events contributed to flooding and associated socio-economic impacts. These patterns reflect the combined influence of large-scale climate drivers, intra-seasonal variability, and ongoing climate change.

Agro-climatological analyses further reveal increasing challenges for rain-fed agriculture, including delayed rainfall onset, prolonged dry spells, early cessation in some regions, and shortening of the effective growing season. These changes pose heightened risks to food security, livelihoods, and rural resilience, particularly for smallholder farmers who depend heavily on timely and reliable rainfall.

The findings presented in this report underscore the urgency of strengthening climate services, early warning systems, and climate-resilient development planning across all sectors. Enhanced observation networks, improved climate information delivery, and stronger integration of climate data into policy and decision-making are critical to reducing vulnerability and managing climate risks. As climate variability and extremes intensify, coordinated action among government institutions, communities, development partners, and the private sector will be essential to safeguard lives, livelihoods, and national development gains.

This report serves as both an authoritative record of Ghana’s climate conditions in 2025 and a call to action, reinforcing the need for sustained investment in climate science, preparedness, and adaptation to build a more resilient future for the nation.

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