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NiMet
Nigerian Meteorological Agency

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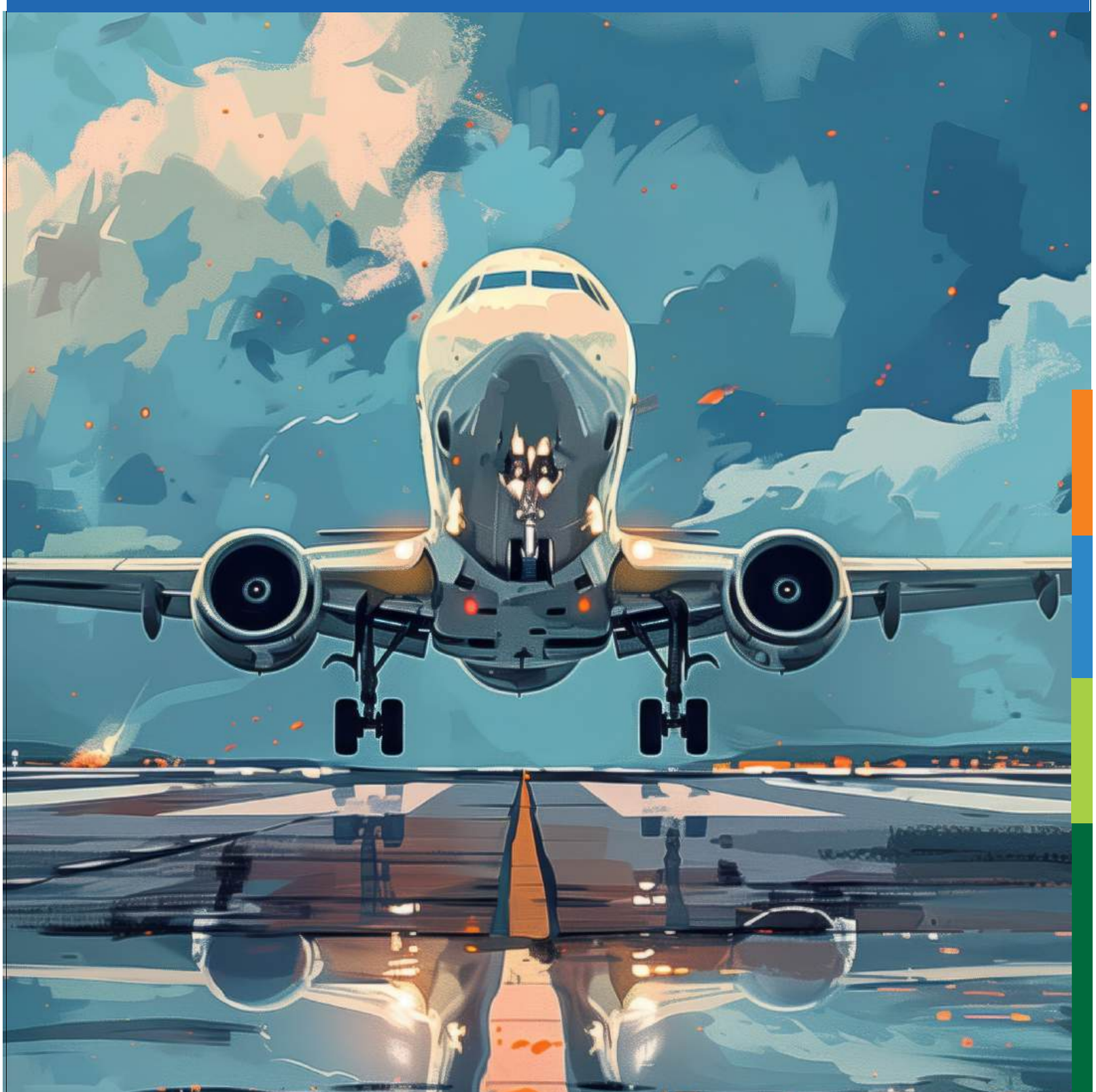
AERONAUTICAL METEOROLOGICAL BULLETIN

A PUBLICATION OF NIGERIAN METEOROLOGICAL AGENCY

4TH QUARTER 2024



Aerometeorological Bulletin

October - December 2024

A publication of Nigerian Meteorological Agency

Our Mandate

Our core mandate is to observe, collate and analyze meteorological data to provide timely and accurate reporting of weather and climate information for socio-economic development and safety of lives and properties.

Our Vision

To be a World Class provider of Weather and Climate services for safety and sustainable national socio-economic development.

Our Mission

To observe Nigerian Weather and Climate and provide Meteorological, Hydrological, and Oceanographic Services in support of National needs and International Obligations

Who We Serve

Aviation, Agriculture, Building and Construction, Commerce, Health, Hydrology, Marine, Oil and Gas, Sports, Social Events, Power and Energy, Telecommunication and more...

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Executive Summary

The Nigerian Meteorological Agency (NiMet) as part of its mandates provides weather information for safe air navigation in line with the Standard and Recommended Practices (SARPs) prescribed by the International Civil Aviation Organization (ICAO) and World Meteorological Organisation (WMO), and in compliance with the Nigerian Civil Aviation Regulations.

The strategic importance of weather and climate information to national security and aviation safety underscores their utilisation from siting of Airfields, Aerodromes, and Airports where wind rose is critical to the orientation of the runway and other critical assets. Take-off, landing, ground and enroute operations of aircraft depends on the prevailing weather phenomenon. Similarly, aircraft designs take into consideration climatology of weather information.

In the wake of changing climate, growing needs for operational efficiency, increased and frequent weather extremes, the value of weather information for ground and enroute safety can not be overstated. NiMet therefore ensures its aeronautical meteorological services are ISO 9001:2015 certified and maintained.

This bulletin encapsulates NiMet's aeronautical meteorological activities and its critical importance to safety across the country, covering analysis of the weather events that characterised the fourth quarter of 2024 (October, November, December) and how they affected flight operations at the five (5) major international airports namely:

- Nnamdi Azikiwe International Airport, Abuja, FCT.
- Murtala Muhammed International Airport, Ikeja, Lagos.
- Mallam Aminu Kano International Airport, Kano.
- Port Harcourt International Airport, Omagwa, Port Harcourt, Rivers.
- Akanu Ibiam International Airport, Enugu.

The weather elements considered include.

- Daily air temperature values,
- The maximum and minimum temperature values,
- The horizontal visibility values, rainfall amount,
- Thunder and lightning occurrences, and
- Flight documentations executed by the

Agency.

The Management of the Agency in its drive to provide more insight into its activities, products and services, particularly in the aviation sector, embarked on the production and publication of this aeronautical meteorological bulletin which has been designed to simplify some meteorological terminologies and phenomena for the understanding of aviation stakeholders and the general public, while also providing scientific information and analysis of various weather and climate parameters for other weather enthusiasts.

Professor Charles Anosike

Director General/CEO NiMet & Permanent Representative of Nigeria with WMO

Introduction

The Nigerian Meteorological Agency (NiMet) was established under the Nigerian Meteorological Agency Act of 2003. The Act provides the legal framework for the operation of the Agency; marking a significant step in enhancing meteorological services in the country. In addition to other sector-specific responsibilities, NiMet is vested with the responsibility of providing weather data and information for safe air navigation in line with the Standard and Recommended Practices (SARPs) prescribed by the International Civil Aviation Organization (ICAO) and World Meteorological Organisation (WMO), and in compliance with the Nigerian Civil Aviation Regulations.

Pursuant to the above, NiMet provides quality, accurate, and timely weather observations, forecasts, and warnings to the Aviation industry for safety of air navigation. The Aeronautical Meteorology (AEROMET) products and services (or weather information for aviation) produced by NiMet for flight operations in the Nigerian airspace include the following:

- METAR
- SPECI
- Terminal Aerodrome Forecast (TAF)
- Trend forecast
- Aerodrome warning
- Windshear warning
- SIGMET
- Area forecast (for low level flights)
- Flight documentation
- Pilot and crew briefing services

This bulletin covers the analysis of the weather events that characterised the first quarter of 2024 - January, February, and March, and how they affected flight operations at the five (5) major international airports namely:

- Nnamdi Azikiwe International Airport, Abuja.
- Murtala Muhammed International Airport, Lagos.
- Mallam Aminu Kano International Airport, Kano.
- Port Harcourt International Airport, Omagwa Port Harcourt.
- Akanu Ibiam International Airport, Enugu.

1.1 Weather Parameters and Aviation

Aviation is one of the sectors of the economy and fields of human endeavour that are very sensitive to weather. Extreme weather conditions are major hazards to flight operations all over the world. They contribute a significant percentage of aircraft accidents and incidents.

The frequency and severity of extreme weather events have been increasing globally due to climate change, accentuating weather-related hazards in weather-sensitive human activities, including aviation. Provision of accurate and timely weather information has therefore become more critical for aviation safety.

NiMet observes weather and collects weather data across Nigeria continuously. The data are used in generating aeronautical meteorological products for the aviation industry in Nigeria. In this bulletin, some of the weather parameters at five (5) airport stations in Nigeria during the quarter of 2024 are reviewed. The weather parameters reviewed are:

- Thunderstorms occurrence
- Precipitation
- Fog and Haze occurrence
- Maximum Temperature.
- Minimum temperature.
- Mean temperature.
- Minimum visibility from 5000m and below.
- Monthly Inter-Tropical Discontinuity (ITD) position.
- Dust

1.2 The Inter-Tropical Discontinuity (ITD) and Its Influence on Nigerian Weather

The Intertropical Discontinuity (ITD) is a significant feature in the weather system over Nigeria and West Africa. It refers to a boundary zone where the trade winds from the Northern and Southern Hemispheres converge. The latitudinal position of the ITD across Nigeria is not fixed but fluctuates seasonally and it is characterized by differences in temperature, humidity, and wind direction. The oscillatory movement of the ITD determines the weather zones and seasons over Nigeria.

The ITD is located in the tropical zone, typically around the equator, but it oscillates about an average position and moves northward during the Northern Hemisphere summer (approximately from March to October) and southward during the winter months (from November to March). The ITD plays a crucial role in the onset, cessation of the rainy season and distribution of rainfall across West Africa during the rainy season, as well as the harmattan dust haze during the dry season. As the ITD moves northward during the summer months, it allows the inflow of moisture-laden wind from the south, which results in the development of

rainfall. In the northern hemisphere winter, the ITD moves southwards; allowing the dry and dust-laden continental wind from the Sahara Desert to penetrate into Nigeria. This brings the Harmattan weather in the country. To the north of the ITD, the winds are dry, while to the south of the ITD, the air is more humid, coming from the Atlantic Ocean. The convergence of these different air masses causes the ITD to act as a zone of intense weather activity, especially where the moist air from the south meets the dry, hot air from the north, and extending to about 200km southward.

1.3 Summary of Weather Conditions in Nigeria in the last Quarter of 2024

The weather conditions across Nigeria during the quarter were a combination of the cessation of rainy season, and the onset of the dry season in different parts of the country.

October marked the end of the 2024 rainy season in most parts of Nigeria, especially in the northern parts. The southern states, including the coastal areas, continued to experience moderate rainfall, while dry season conditions were already being experienced in the northern states. Temperatures remained warm, particularly in the northern states, where the harmattan season had not fully set in, while high atmospheric humidity levels persisted, especially in the south and along coastal regions.

In November 2024, rainfall decreased significantly in most, parts of the country with only light showers occurring in most parts of southern Nigeria. The northern parts became hotter as the dry season began in full swing and temperatures were higher than usual, with some areas experiencing intense heat. The onset of the harmattan season in the northern parts of the country, resulted in dusty conditions and cooler evenings in many parts of the region.

The dry season was fully established in most of the country by December 2024, with little to no rainfall, especially in the northern and central regions of Nigeria. The southern part also recorded a reduction in rainfall, while temperatures continued to rise, particularly in the northern part of the country, where it was extremely hot during the day time. The lower temperatures associated with the harmattan season brought some relief to the northern regions, especially at night. Dust from the Sahara Desert became more prominent over the north, reducing visibility and affecting flight operations.

Highlights of the weather during the quarter are summarized as follows:

- During the quarter under review (October, November and December 2024) the ITD position varied between 07.0°N. and 14.8°N. Most cities in the northern part of the country (Kano and others) were

therefore predominantly under the influence of the dust-laden northeasterly winds. while cities in the south (Lagos, Enugu and Port Harcourt experienced milder weather with less rainfall transiting to harmattan season.

- The observed horizontal visibility across Nigeria during the quarter varied from 5000m to 0300m. The lowest visibility during the period was observed at Lagos on 17th October 2024.
- The lowest minimum temperature (Tmin) of 06.3°C was observed at Kano on 26th December 2024, while the highest minimum temperature of 25.6°C occurred at Lagos on 14th November 2024.
- The lowest maximum temperature (Tmax) of 25.2°C was observed at Kano on 28th December 2024 while the highest maximum temperature of 38.4°C also occurred at Abuja on 11th December 2024.

1.4 . Summary of NiMet's AEROMET Products Disseminated in the last Quarter of 2024

- NiMet produced a total of 6,396 Flight Documentation folders during the quarter under review and 4,815representing 75.3% were collected by the airlines.
- NiMet produced and transmitted a total of 22,080 METAR during the quarter under review.
- NiMet produced and transmitted a total of 1,472 TAF during the quarter under review and 360, representing 100% were collected by the airlines.
- A total of 154 aerodrome warnings were issued and transmitted to users during the period under review.

October 2024

2.1 Review of Position of the Inter-Tropical Discontinuity (ITD) and the Weather at the Airport Stations Across Nigeria in October 2024

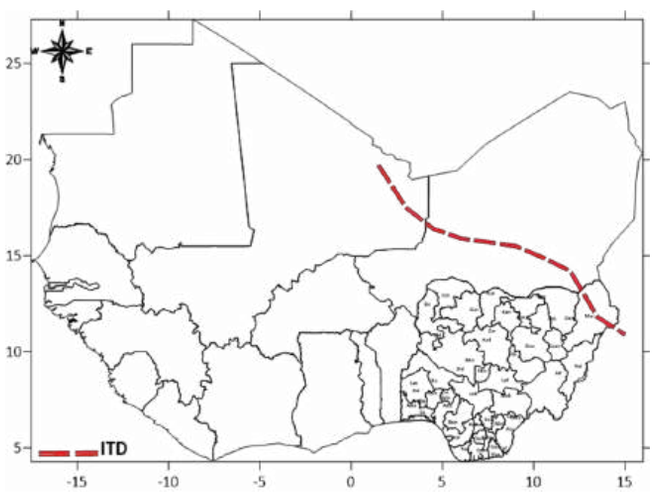


Figure 1: Mean Position of the ITD in October, 2024.

In October 2024, the ITD latitudinal position was approximately 17.8°N to the west and 12.9°N to the east of the country. The significance of this is that stations south of the ITD experienced moist winds. The weather over these places were characterized by thunderstorms, rainfall, squall, turbulence, and wind shear, while the areas north of the ITD were under the influence of dry winds which were accompanied by harmattan dust, sand storm and strong winds.

The reference airports (Nnamdi Azikiwe International airport, Abuja, Port Harcourt International Airport, Port Harcourt, Akanu Ibiam International Airport, Enugu and Murtala Mohammed International Airport, Lagos) were located south of the ITD during the month under review.

2.0.2: Temperature fluctuations in October 2024

Air temperature is a significant weather parameter whose fluctuations greatly affects aircraft performance during take-off, landing and in-flight. High temperatures extend aircraft's take-off run before lift, while low temperatures shorten the take-off run with optimum engine performance.

- Kano had the highest maximum temperature of 36.5°C in October 2024 while Enugu recorded the lowest maximum temperature of 27.4°C.
- Port Harcourt had the highest minimum temperature of 28.1°C in October 2024 while Kano recorded the lowest minimum temperature of 10.2°C.
- Abuja had the highest mean temperature of 28.7°C in October 2024 while Kano recorded the lowest mean temperature of 20.4°C.

2.1 Observed Mean Daily Temperature (TMean°C) at various Airports in Nigeria in October 2024

Port Harcourt International Airport

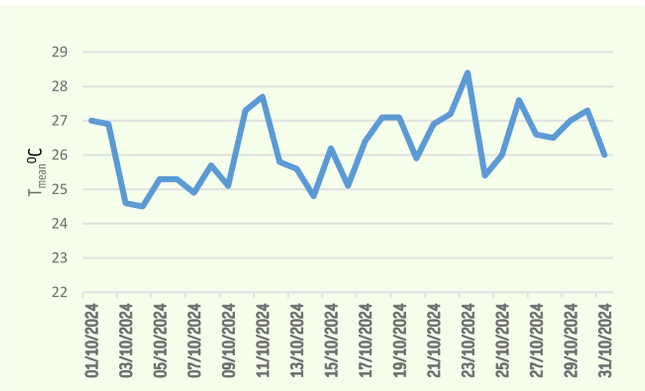


Figure 4: Mean Daily Temperature at Port Harcourt International Airport in October 2024

The highest mean temperature of 28.4°C was observed on the 23rd while the lowest was 24.5°C on the 4th of October (see Figure 4).

Mallam Aminu Kano International Airport Kano

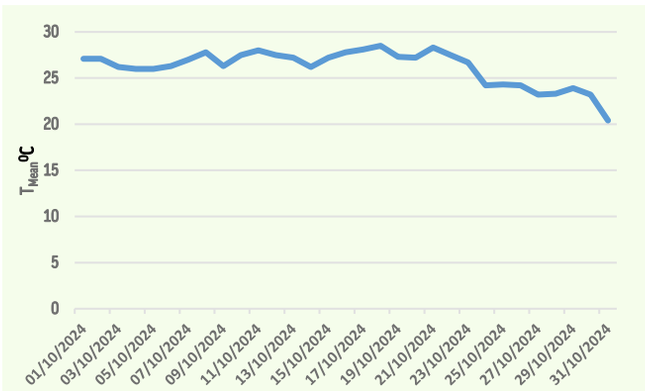


Figure 6: Mean Daily Temperature at Mallam Aminu Kano International Airport Kano in October 2024

The highest mean temperature of 28.5°C was observed on the 18th while the lowest was 20.4°C on the 31st of October. (See Figure 6).

Nnamdi Azikiwe International Airport Abuja

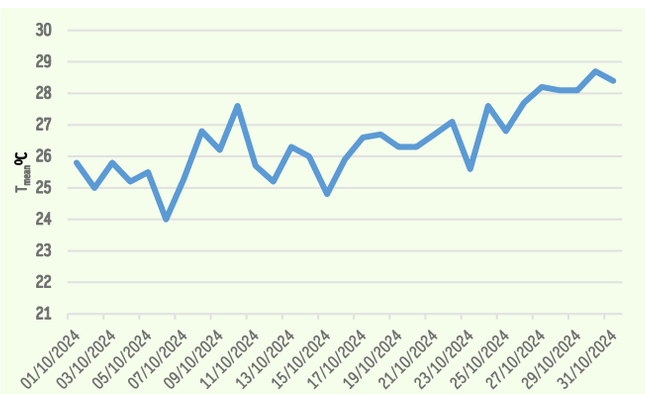


Figure 5: Mean Daily Temperature at Nnamdi Azikiwe International Airport Abuja in October 2024

The highest mean temperature of 28.7°C was observed on the 30th while the lowest was 24.0°C on the 6th of October. (See Figure 5).

Murtala Muhammed International Airport Lagos

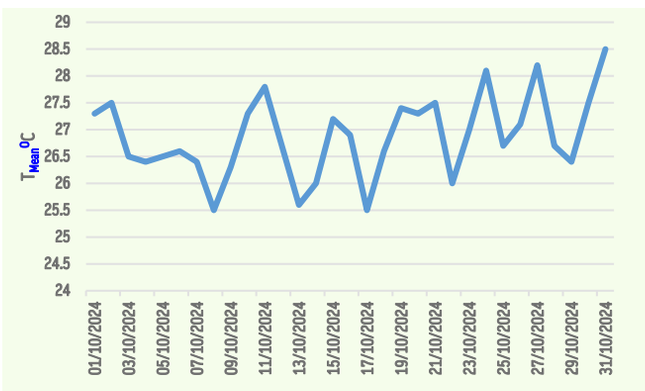


Figure 7: Mean Daily Temperature at Murtala Muhammed International Airport Lagos in October 2024

The highest mean temperature of 28.5°C was observed on the 31st while the lowest was 25.5°C on the 8th and 17th of October. (See Figure 7).

Akanu Ibiam International Airport Enugu

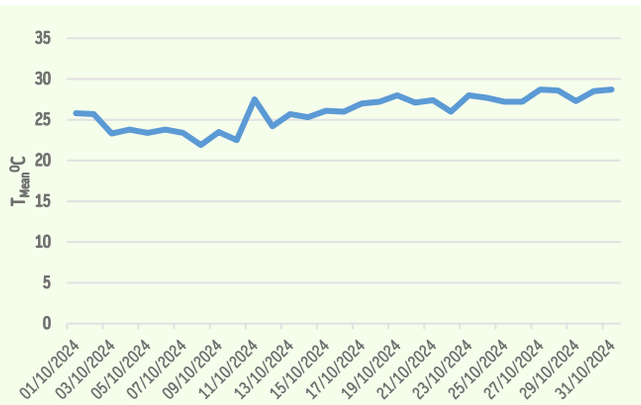


Figure 8: Mean Daily Temperature at Akanu Ibiam International Airport Enugu in October 2024

The highest mean temperature of 28.7°C was observed on the 27th and 31st while the lowest was 21.9°C on the 8th of October. (See Figure 8).

2.2 Observed Maximum Temperature (TMax) °C at various Airports in Nigeria in October 2024

Port Harcourt International Airport

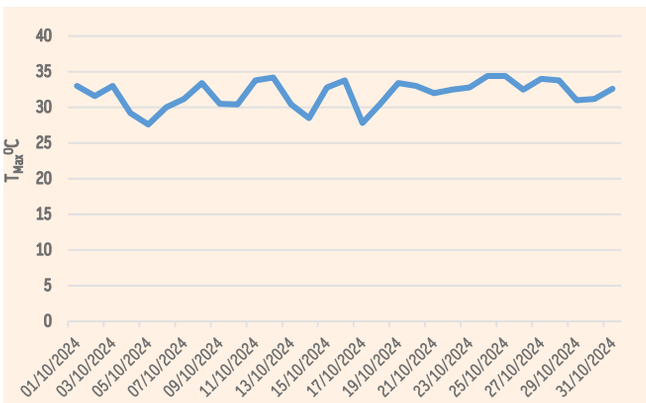


Figure 9: Maximum Temperature at Port Harcourt International Airport in October 2024

The highest maximum temperature recorded at Port Harcourt airport in October 2024 was 34.4OC. This was on 25th of the month. The lowest maximum temperature of 27.8OC was recorded on 17th of the month. (See Figure 9).

Nnamdi Azikiwe International Airport, Abuja

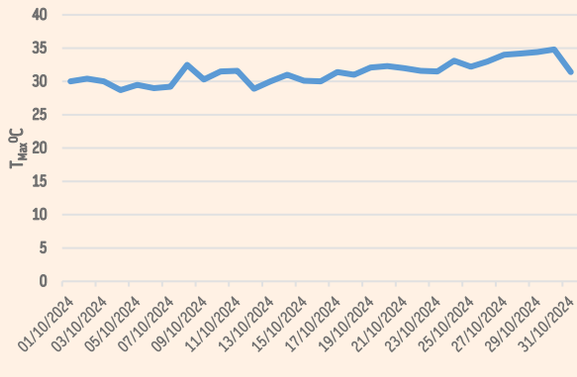


Figure 10: Maximum Temperature at Nnamdi Azikiwe International Airport, Abuja in October 2024

As depicted in Figure 10, the highest maximum temperature recorded at Abuja airport in October 2024 was 34.8°C and this was on the 30th of the month. while the lowest recorded was 28.7°C on the 4th of the month (see Figure 10).

Mallam Aminu Kano International Airport, Kano

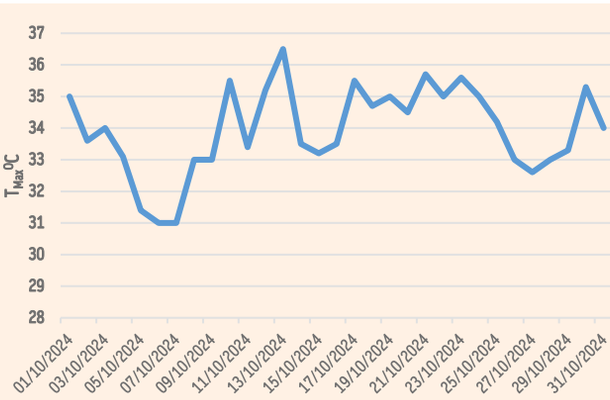


Figure 11: Daily Maximum Temperature at Mallam Aminu Kano International Airport Kano in October 2024

The highest maximum temperature recorded at Mallam Aminu Kano International Airport Kano in October 2024 was 36.5°C. This was on 13th of the month. The lowest maximum temperature of 31.0°C was recorded on 6th and 7th of the month. (See Figure 11).

Murtala Muhammed International Airport, Lagos

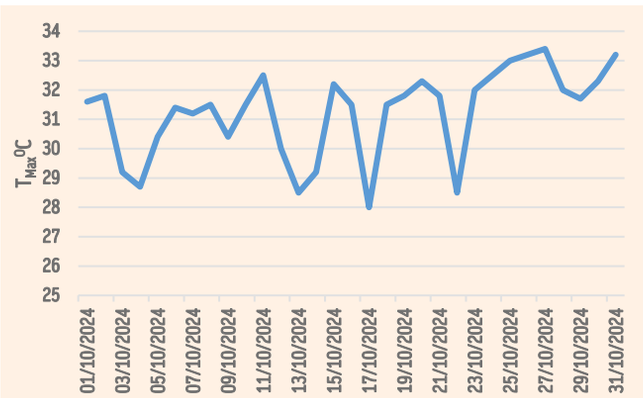


Figure 12: Daily Maximum Temperature at Murtala Muhammed International Airport, Lagos in October 2024

As depicted in Figure 12, the highest maximum temperature recorded at the Lagos airport in October 2024 was 33.4°C on the 27th, while the lowest maximum temperature of 28.0°C was recorded on the 17th of the month.

Akanu Ibiam Airport, Enugu

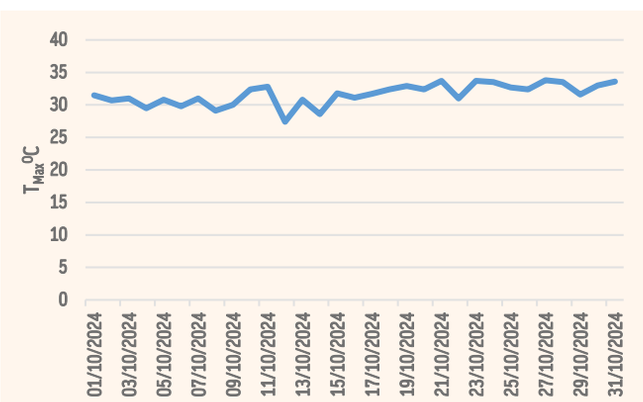


Figure 13: Daily Maximum Temperature at Akanu Ibiam International Airport, Enugu in October 2024

The highest maximum temperature recorded at Enugu airport was 33.8°C on the 27th while the lowest maximum temperature recorded was 27.4°C on the 12th of the month. (see figure 13)

2.3 Observed Minimum Temperature (Tmin) °C at various Airports in Nigeria in October 2024

Port Harcourt International Airport

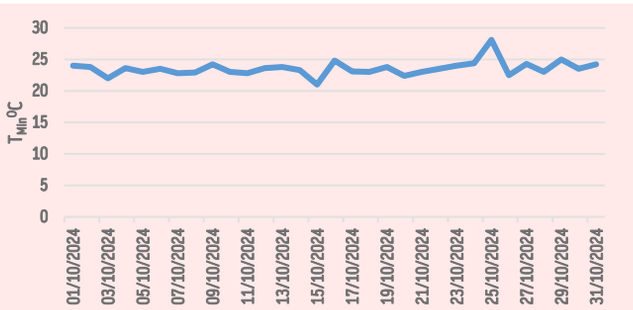


Figure 14: Daily Minimum Temperature at Port Harcourt International Airport in October 2024

The highest minimum temperature recorded at Port Harcourt airport was 28.1°C on the 25th of October 2024 while the lowest maximum temperature recorded was 21.0°C on the 15th of the month (see Figure 14)

Nnamdi Azikiwe International Airport, Abuja

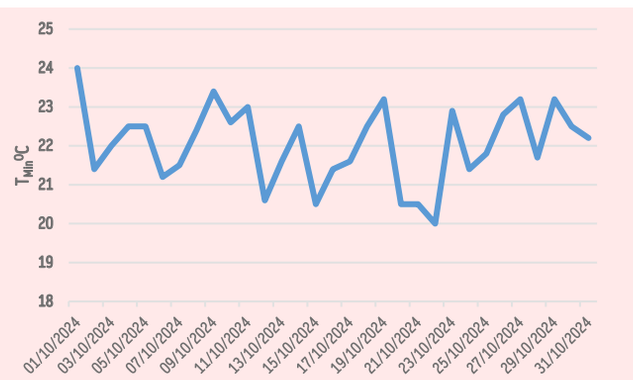


Figure 15: Daily Minimum Temperature at Nnamdi Azikiwe International Airport, Abuja in October 2024

The highest minimum temperature recorded at Abuja airport was 24.0°C on the 25th October 2024 while the lowest Minimum recorded was 20.0°C on the 22nd of the month (see Figure15)

Mallam Aminu Kano International Airport, Kano

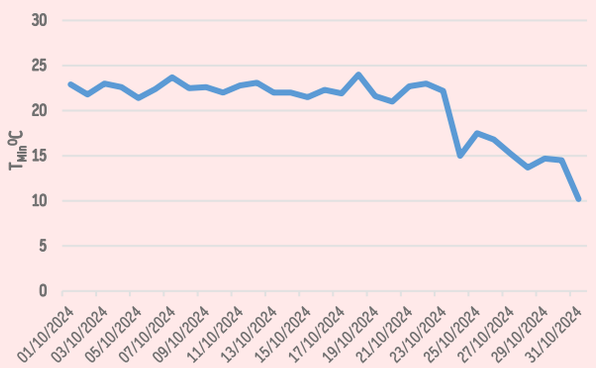


Figure 16: Daily Minimum Temperature at Mallam Aminu Kano International Airport Kano in October 2024

The highest minimum temperature recorded at Abuja airport was 24.0°C on the 18th October 2024 while the lowest recorded was 10.2°C on the 31st of the month recorded (see Figure 16).

Murtala Muhammed International Airport, Lagos Airport

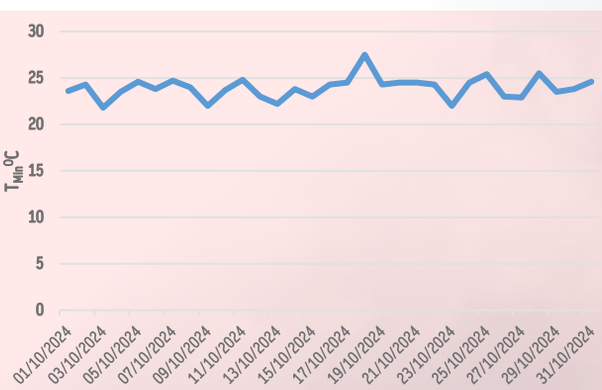


Figure 17: Daily Minimum Temperature at Murtala Muhammed International Airport, Lagos in October 2024

The highest minimum temperature recorded at Lagos airport was 27.5°C on the 18th October 2024 while the lowest recorded was 21.8°C on the 3rd of the month (see Figure 17)

Akanu Ibiam International Airport, Enugu

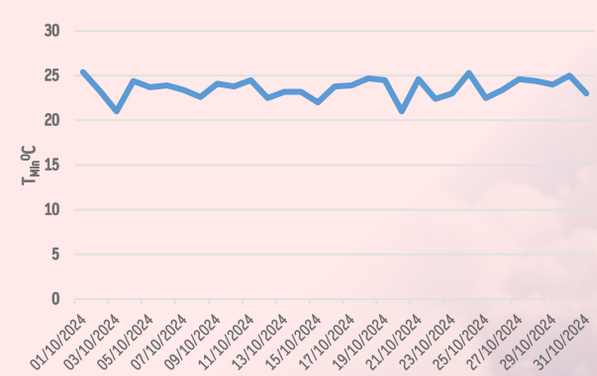


Figure 18: Daily Minimum Temperature at Akanu Ibiam International Airport Enugu in October 2024

The highest minimum temperature recorded at Enugu airport was 24.0°C on the 25th October 2024 while the lowest recorded was 21.0°C on the 3rd and 20th of the month (see Figure18)

2.4 Observed Visibility at the Five International Airports in October 2024

Nnamdi Azikiwe International Airport, Abuja

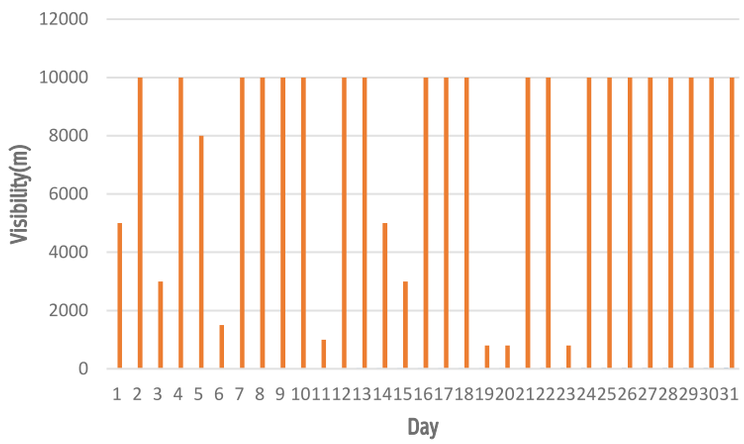


Figure 19: Daily Visibility at Nnamdi Azikiwe Airport, Abuja in October 2024

In October 2024, visibility of 5000m and below were recorded for 9 non-consecutive days at Abuja airport, and the lowest was 800m on 19th, 20th and 23rd of the month. (See Figure 17).

Akanu Ibiam International Airport, Enugu

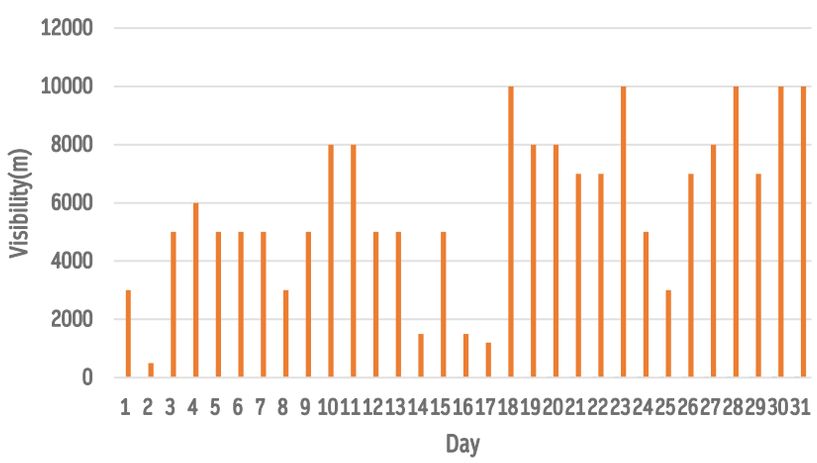


Figure 20: Daily Visibility at Akanu Ibiam International Airport, Enugu in October 2024

In October 2024, visibility of 5000m and below was recorded for 14 non-consecutive days at Enugu airport; the lowest was 500m on the 2nd of October 2024. (See Figure 20).

Murtala Muhammed International Airport, Lagos

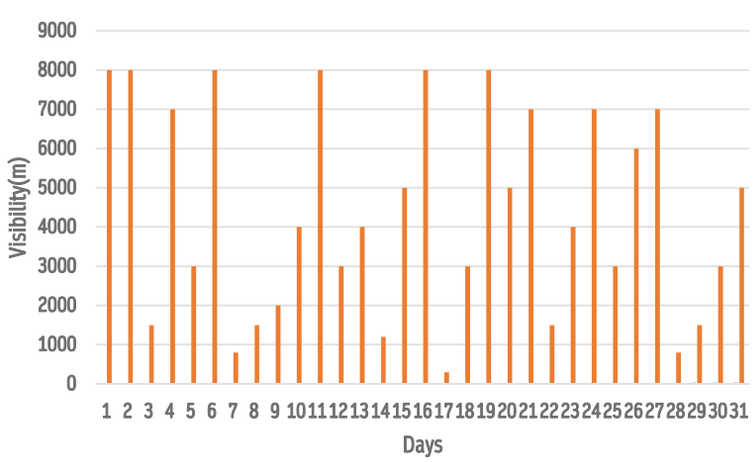


Figure 21: Daily Visibility at Murtala Muhammed International Airport, Lagos in October 2024

Visibility of 5000m and below was recorded for 19 non-consecutive days at Lagos airport in October 2024; the lowest was 300m recorded on the 17th of the month. (See Figure 21).

Mallam Aminu Kano International Airport, Kano

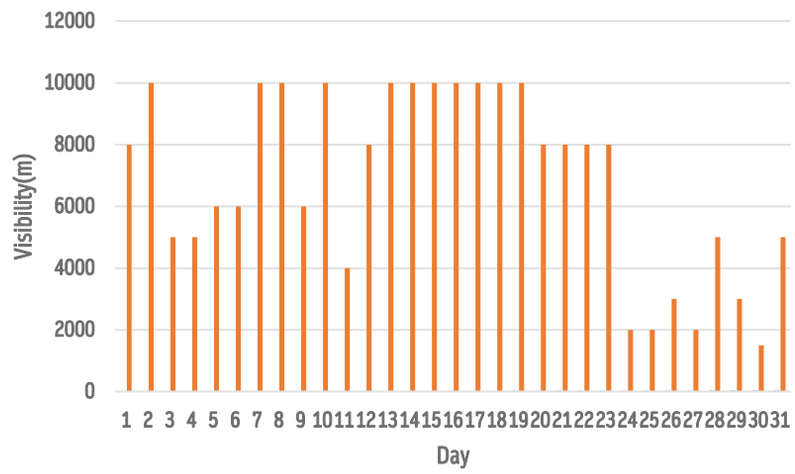


Figure 22: Daily Visibility at Mallam Aminu Kano International Airport, Kano in October 2024

Visibility of 5000m and below was recorded at Mallam Aminu Kano International Airport, Kano for 11 non-consecutive days in October 2024. The lowest visibility of 1500m was recorded on 30th of the month. (See Figure 22).

Port Harcourt International Airport

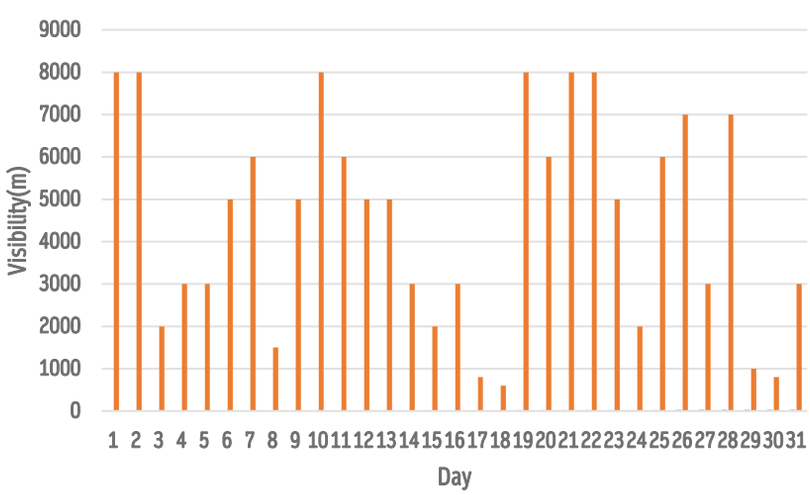


Figure 23: Visibility at Port-Harcourt International Airport in October 2024

As shown in Figure 23, visibility of 5000m and below was recorded for 16 non-consecutive days at Port Harcourt airport in October 2024; the lowest visibility of 600m occurred on the 18th of the month.

3.0 Production and Collection of Flight Documentation in October 2024

Flight documentation is a set of weather information assembled in a folder prepared by NiMet and issued to aircraft flight operators and flight crew members before their departure from the airport. The folder contains significant meteorological information for a specified period of time of departure, alternate, enroute and destination aerodromes, from surface to cruising levels as assigned to flights. Four aerodrome meteorological offices provide this service in Nigeria, namely: Kano, Abuja, Lagos and Port Harcourt.

Nnamdi Azikiwe International Airport Abuja

The total number of flight documentation folders prepared by NiMet in October 2024 was 395 out of which 305 were collected, representing 77% collection rate; while 90 were not collected, which represents 23% of the total. (See Figure 24).

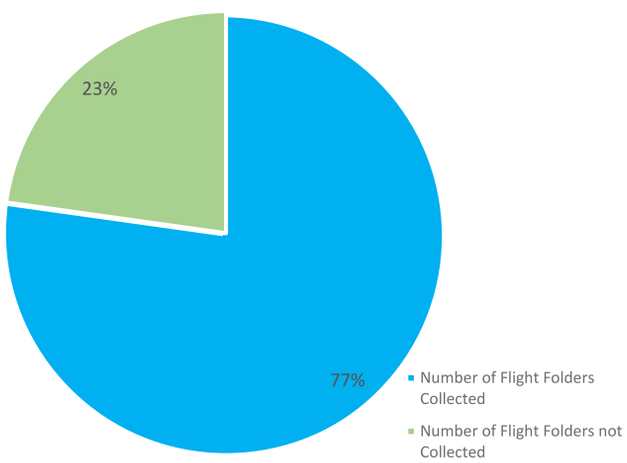


Figure 24: Flight Documentation analysis for Nnamdi Azikiwe International Airport, Abuja for October 2024.

Murtala Muhammed International Airport, Lagos

The total number of flight documentation prepared in October 2024 was 1,358 out of which 1,049 were collected representing 77% collection rate, while 309 were not collected which represents 23% of the total. (See Figure 25).

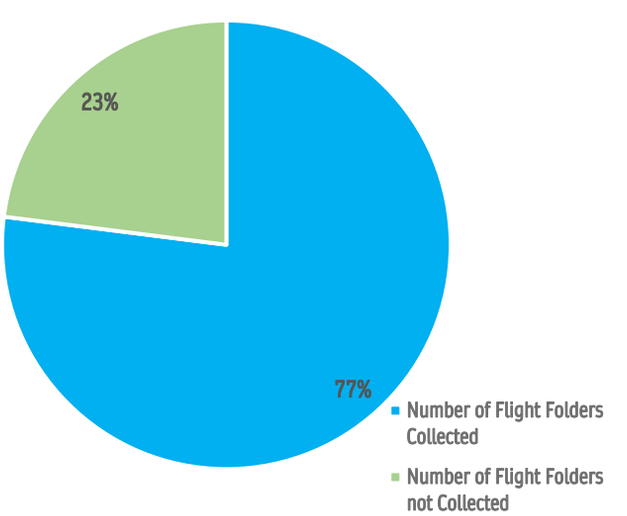


Figure 26: Flight Documentation analysis for Murtala Mohammed International Airport, Lagos October 2024.

Mallam Aminu Kano International Airport, Kano

In October 2024, a total of 170 flight documentation folders were prepared, out of which 109 were collected representing 64% collection rate, while 61 were not collected, which represents 36% of the total. (See Figure 27).

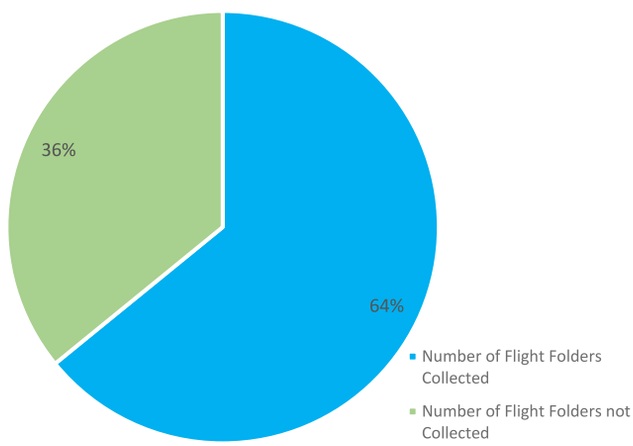


Figure 27: Flight Documentation analysis for Mallam Aminu Kano International Airport Kano for October 2024.

Akanu Ibiam International Airport Enugu

A total of 32 flight documentation folders were prepared, out of which 17 were collected representing 53% collection rate, while 17 were not collected. This represents 47% of the total. (See Figure 28).

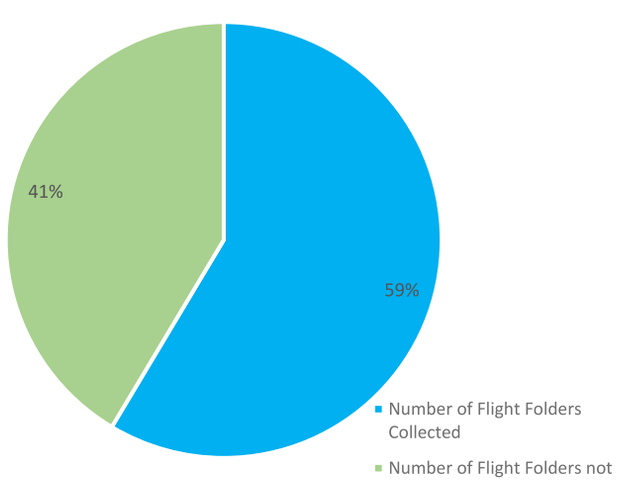


Figure 29 Flight Documentation analysis for Akanu Ibiam International Airport Enugu

Table 1: Summary of Flight Documentation Folder Collection for October 2024

Airport (Station)	Number of Folders Prepared	Number of Folders Collected	Number of Folders not Collected	Collection Rate (%)	Remark
Nnamdi Azikiwe, Abuja	395	305	90	77	
Murtala Muhammed, Lagos	1358	1049	309	77	
Mallam Aminu Kano, Kano	170	109	61	64	
Port Harcourt International Airport	99	58	41	63	
Akanu Ibiam Airport, Enugu	32	17	15	53	

As shown in Table 1, Nnamdi Azikiwe International Airport and Murtala Muhammed International Airport each recorded a collection rate of 77% for the month of October 2024, being the highest, while Akanu Ibiam International Airport in Enugu recorded the lowest collection rate of 53% for the month.

3.1 Daily Rainfall Amount at various Airports in Nigeria in October 2024

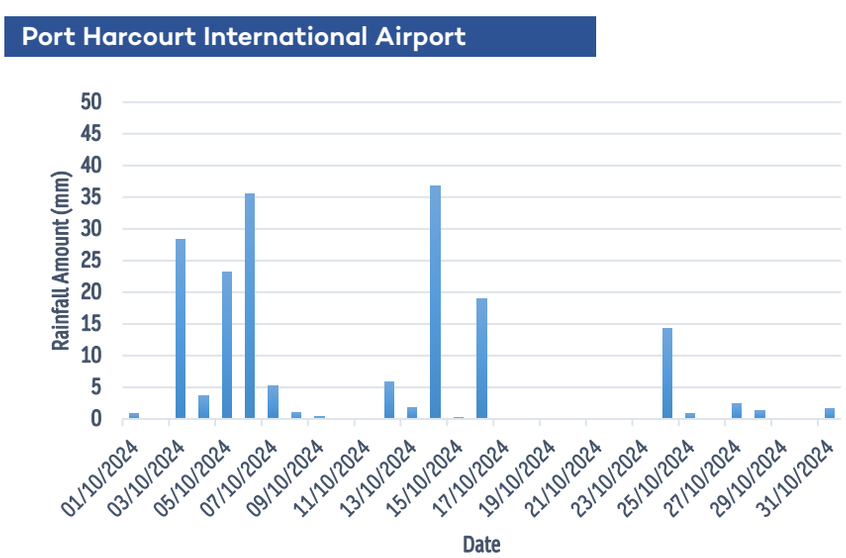


Figure 30: Daily rainfall amount at Port Harcourt International Airport in October 2024

The highest rainfall amount recorded at Port Harcourt airport in October 2024 was 36.8mm. This was recorded on the 14th of the month, while the lowest recorded during the period was 0.8mm on the 1st of the month. The total amount of rainfall for the month was 182.3mm (see Figure 30)

Nnamdi Azikiwe International Airport Abuja

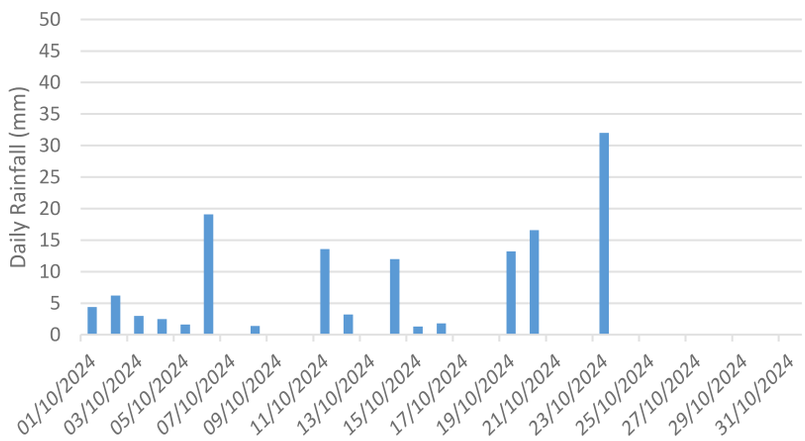


Figure 31: Daily rainfall Nnamdi Azikiwe International Airport Abuja in October 2024

The highest rainfall amount recorded at Abuja airport in October was 32.0mm. This was recorded on the 23rd of the month, while the lowest recorded during the period was 1.6mm on the 5th of the month. The total amount of rainfall for the month was 131.9mm (see Figure 31)

Mallam Aminu Kano International Airport, Kano

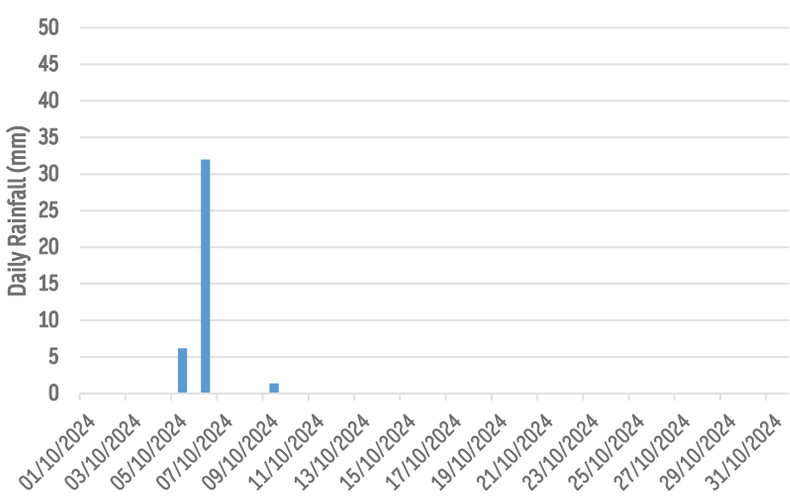


Figure32: Daily rainfall amount at Mallam Aminu Kano International Airport, Kano in October 2024

The highest rainfall amount recorded at Kano airport in October was 32.0mm. This was recorded on the 6th of the month, while the lowest recorded during the period was 1.4mm on the 9th of the month. The total amount of rainfall at Kano airport for the month was 39.6mm (see Figure 32)

Murtala Muhammed International Airport, Lagos

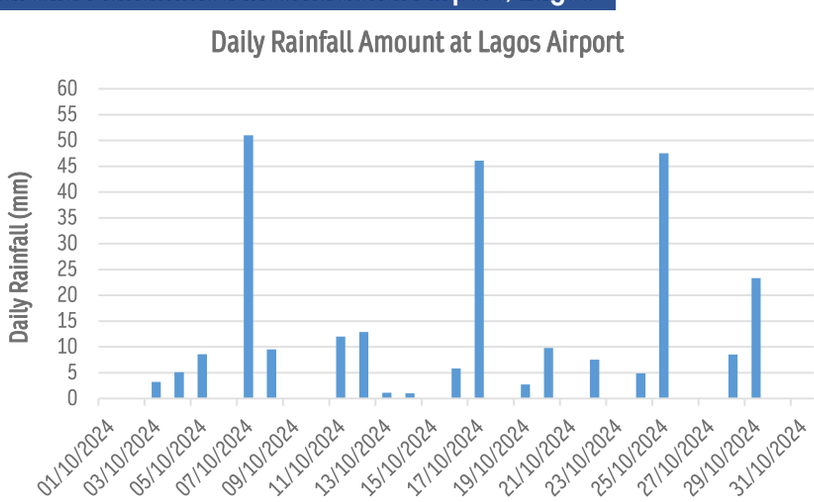


Figure 33: Daily rainfall amount at Murtala Muhammed International Airport, Lagos in October 2024

The highest rainfall amount recorded at Lagos airport in October was 51.0mm. This was recorded on the 7th of the month, while the lowest recorded during the period was 1.1mm on the 13th of the month. The total amount of rainfall for the month was 260.5mm (see Figure 33)

Akanu Ibiam International Airport Enugu

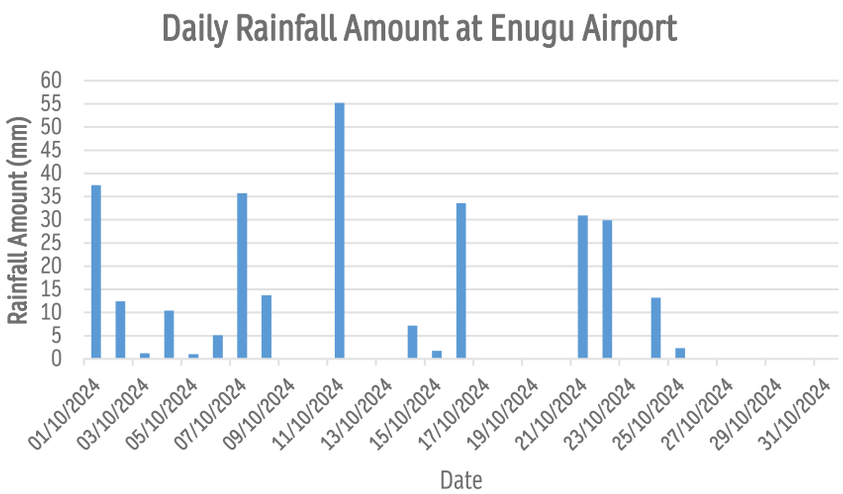


Figure 34: Daily Rainfall at Akanu Ibiam International Airport Enugu

The highest rainfall amount recorded at Enugu airport in October was 55.2mm. This was recorded on the 11th of the month, while the lowest recorded during the period was 1.0mm on the 5th of the month. The total amount of rainfall at Enugu airport for the month was 291.0mm (see Figure 34)

3.2. Daily Observed Thunderstorms occurrence and lightning at the fives international Airports in October 2024

Thunderstorm Occurrence at the Five international airports in October 2024

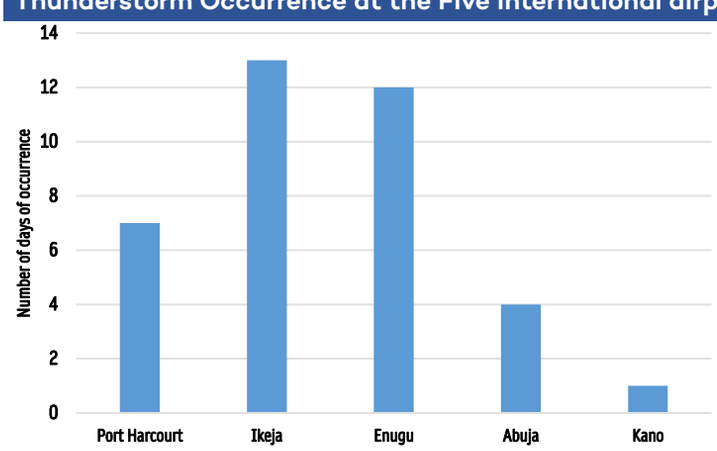


Figure 35: Thunderstorms occurrence at the Five International Airport In October 2024

As shown in Figure 35: Murtala Muhammed International Airport, Lagos recorded the highest thunderstorms occurrence of 13 in October 2024, while Akanu Ibiam International Airport Enugu recorded 12, Port Harcourt International Airport recorded 7, Nnamdi Azikiwe International Airport Abuja recorded 4 and Mallam Aminu Kano International Airport Kano recorded only one (1) thunderstorm during the month.

November 2024

Review of Position of the Inter-Tropical Discontinuity (ITD) and the Weather at the Airport Stations Across Nigeria in November 2024

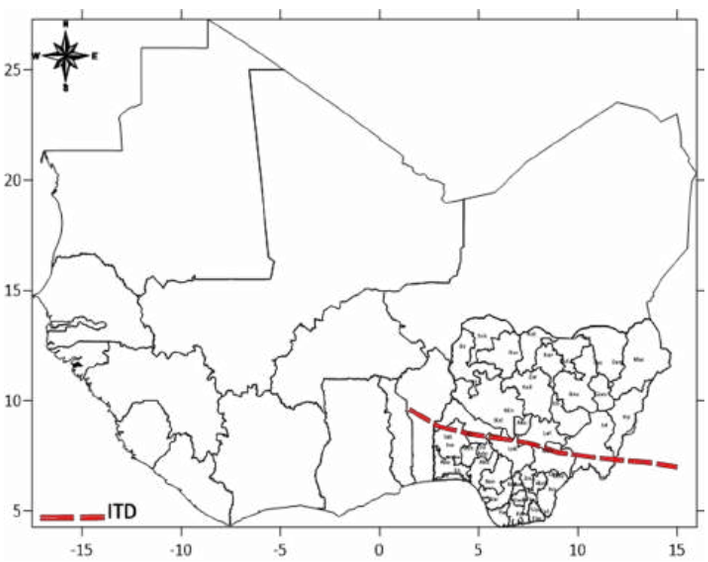


Figure 37: Mean position of the ITD in November, 2024.

In November 2024, there was a southward pull of the ITD to a mean position of approximately 7.8°N to the west and 6.6°N to the east compared to its position in October. The significance of this is that stations North of the ITD experienced dry and dusty weather conditions, while those to the south experienced humid conditions and moderate rainfall. The positions of all the airport stations relative to the ITD during the month under review remained the same as they were in October i.e. Mallam Aminu Kano International Kano and Nnamdi Azikiwe International Airport Abuja were still to the north of the ITD, while Port Harcourt International Airport, Port Harcourt, and Akanu Ibiam International Airport, Enugu remained to the south of the ITD.

Highlights of temperature fluctuations at the five airport stations in November 2024 are as follows:

- During the month under review Abuja had the highest maximum temperature of 37.3°C, while Kano recorded the lowest maximum temperature of 27.5°C.
- Abuja had the highest minimum temperature of 25.6°C, while Kano recorded the lowest minimum temperature of 8.0°C.
- Abuja recorded the highest mean temperature of 29.8°C in November 2024 while Kano recorded the lowest mean temperature of 16.6°C.

4.1 Observed Mean Daily Temperature (Tmean OC) at various Airports in Nigeria in November 2024

Port Harcourt International Airport

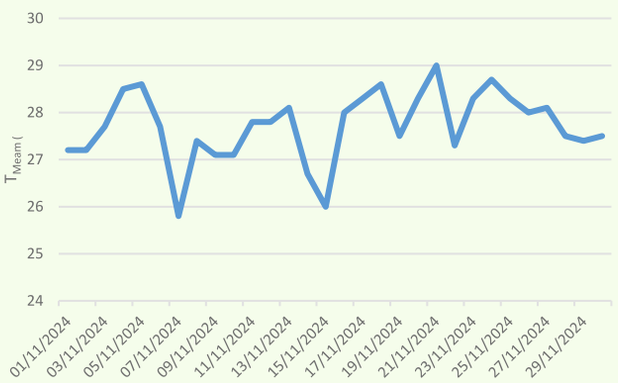


Figure 38: Daily Mean Temperature at Port Harcourt International Airport in November 2024

In November 2024, the highest mean temperature of 29.0°C was recorded at Port Harcourt International Airport on the 21st while the lowest recorded was 25.8°C on the 7th of November 2024.

Nnamdi Azikiwe International Airport Abuja

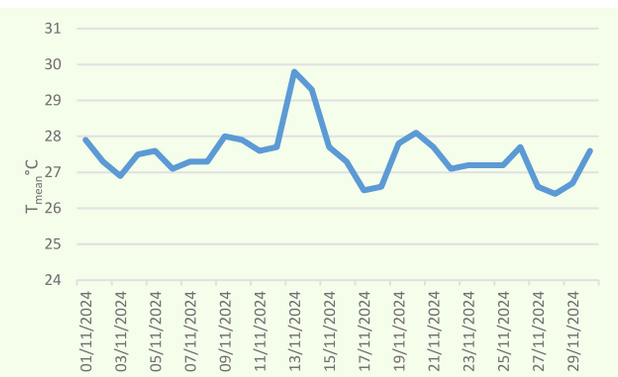


Figure 39: Daily Mean Temperature at Nnamdi Azikiwe International Airport Abuja in November 2024

In November 2024, the highest mean temperature of 29.8°C was observed at Abuja airport on the 30th while the lowest was 26.4°C, recorded on the 8th of the month.

Mallam Aminu Kano International Airport Kano

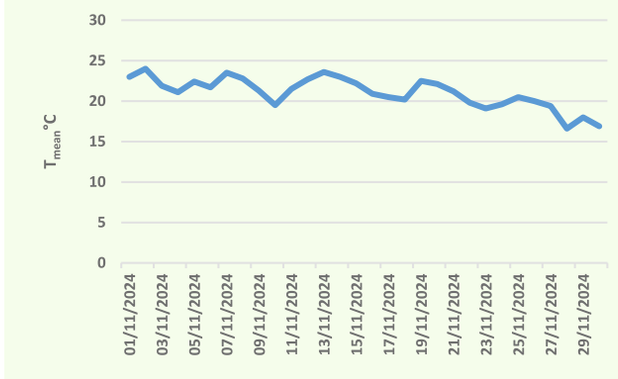


Figure 40: Daily mean Temperature at Mallam Aminu Kano International Airport Kano in November 2024

The highest daily mean temperature recorded at Mallam Aminu Kano International Airport Kano in November 2024 was 23.6°C. This was on 13th of the month. The lowest daily mean temperature of 16.6°C was recorded on 28th of the month. (See Figure 40).

Murtala Muhammed International Airport Lagos

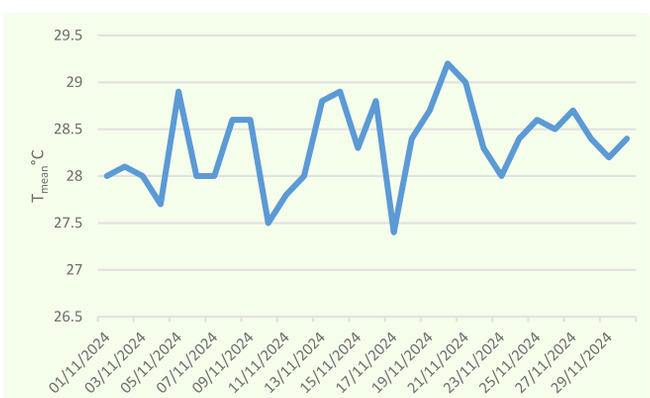


Figure 41: Mean Daily Temperature at Murtala Muhammed International Airport Lagos in November 2024

In November 2024, the highest mean temperature recorded at Murtala Muhammed International Airport, Lagos was 29.2°C. This was observed on the 20th while the lowest was 27.4°C, observed on the 17th of the month.

Akanu Ibiam International Airport Enugu

Figure 42: Mean Daily Temperature at Akanu Ibiam International Airport Enugu in November 2024

The highest mean temperature of 29.8°C was observed on the 13th while the lowest was 26.1°C, observed on the 24th of November.

4.2: Observed Maximum Temperature (Tmax°C) at Various Airports in Nigeria in November 2024

Port Harcourt International Airport

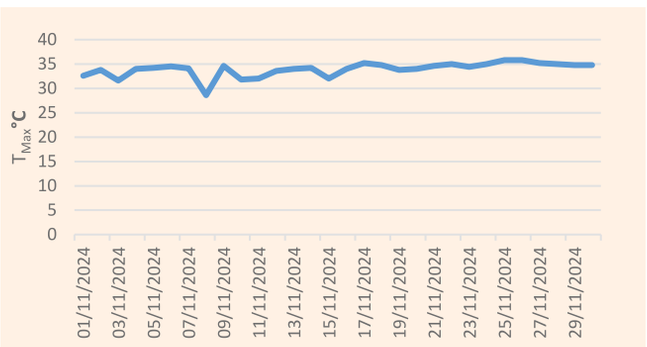


Figure 43: Maximum Temperature at Port Harcourt International Airport in November 2024

As depicted in Figure 43, the highest maximum temperature recorded at Port Harcourt airport was 35.8OC. This was observed on the 25th and 26th, while the lowest recorded was 28.6°C on the 18th of the month.

Nnamdi Azikiwe International Airport, Abuja

Figure 44: Maximum Temperature at Nnamdi Azikiwe International Airport, Abuja in November 2024

As depicted in Figure 44, the highest maximum temperature recorded at Abuja airport was 37.30C. This was on the 15th November 2024, while the lowest recorded was 33.6°C on the 3rd of the month.

Mallam Aminu Kano International Airport, Kano

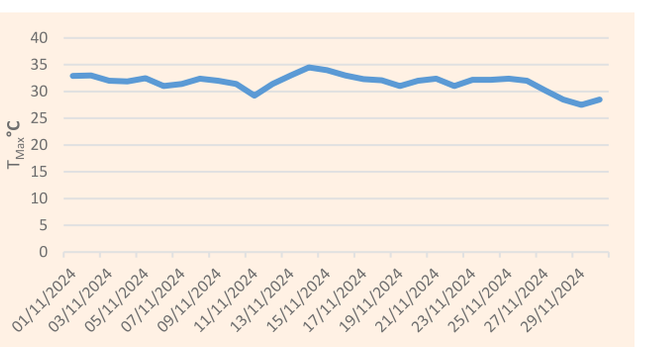


Figure 45: Daily Maximum Temperature at Mallam Aminu Kano International Airport Kano in November 2024

In November 2024, the highest maximum temperature recorded at Kano Airport was 34.50C. This was observed on the 14th, while the lowest recorded was 27.5°C on the 29th of the month

Murtala Muhammed International Airport, Lagos

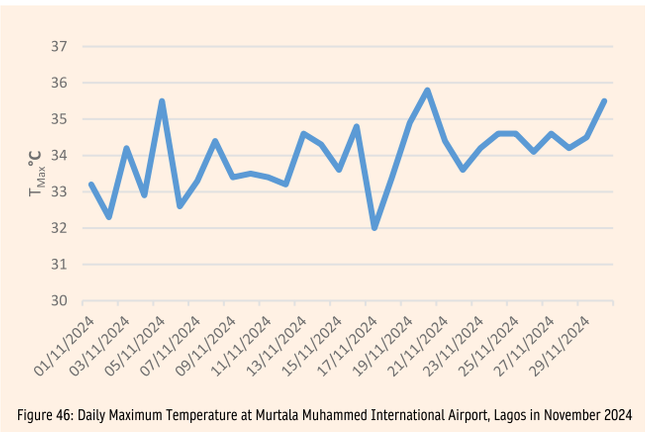


Figure 46: Daily Maximum Temperature at Murtala Muhammed International Airport, Lagos in November 2024

In November 2024, the highest maximum temperature recorded at the Lagos airport was 35.80C, recorded on the 20th, while the lowest was 32.0°C that was recorded on the 17th of the month. (See Figure 46).

Akanu Ibiam Airport, Enugu

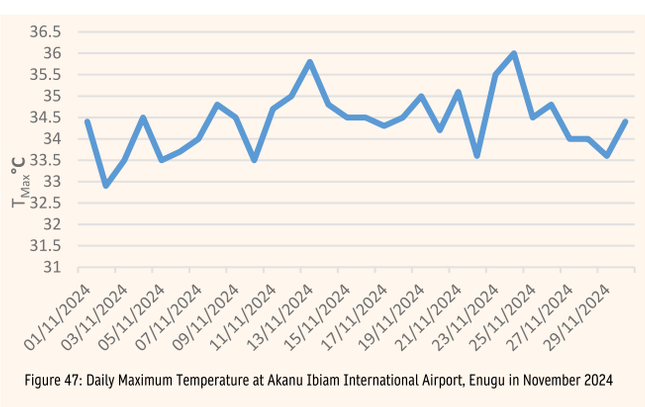


Figure 47: Daily Maximum Temperature at Akanu Ibiam International Airport, Enugu in November 2024

The highest maximum temperature recorded at Enugu airport in November 2024 was 36.00C. This was observed on the 24th while the lowest was 32.9°C, recorded on the 2nd of the month.

4.3: Observed Minimum Temperature (Tmin) °C at the Airports in November 2024

Port Harcourt International Airport

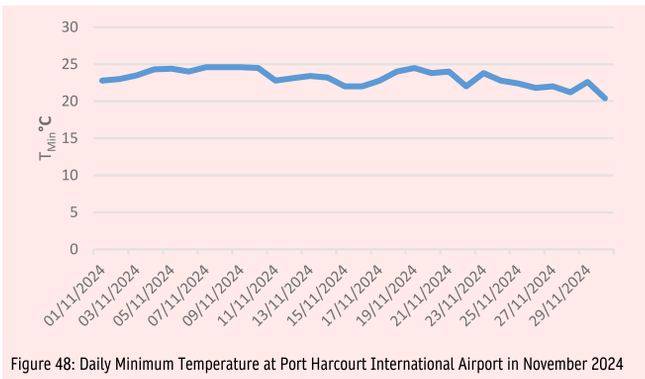


Figure 48: Daily Minimum Temperature at Port Harcourt International Airport in November 2024

The highest minimum temperature recorded at Port Harcourt International Airport in November 2024 was 24.6°C. This was on 7th ,8th and 9th of the month. The lowest minimum temperature of 20.4°C was recorded on 30th of the month. (See Figure 48

Nnamdi Azikiwe International Airport, Abuja

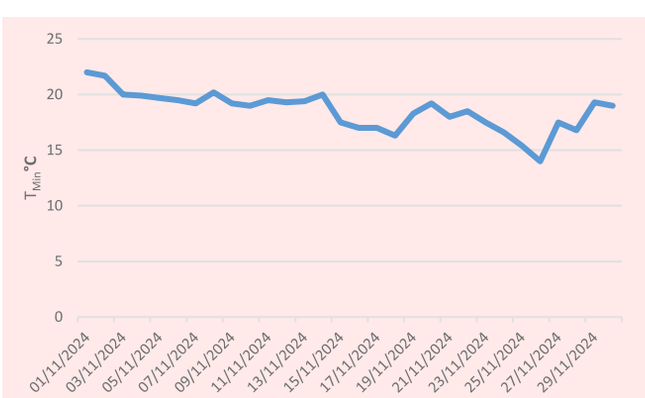


Figure 49: Daily Minimum Temperature at Nnamdi Azikiwe International Airport, Abuja in November 2024

The highest minimum temperature recorded at Nnamdi Azikiwe International Airport, Abuja in November 2024 was 22.0°C. This was on 1st of the month. The lowest minimum temperature of 14.0°C was recorded on 26th of the month. (See Figure 49).

Mallam Aminu Kano International Airport, Kano

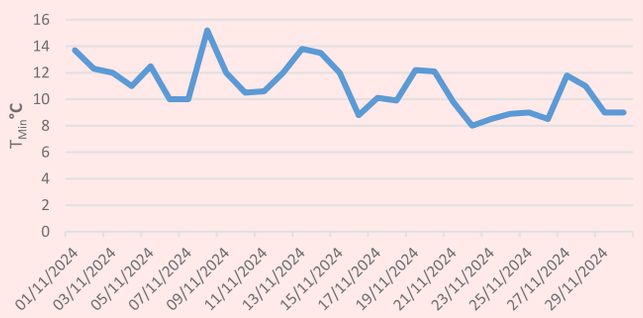


Figure 50: Daily Minimum Temperature at Mallam Aminu Kano International Airport, Kano in November 2024

The highest minimum temperature recorded at Mallam Aminu Kano International Airport; Kano was 15.2°C on the 8th of November 2024 while the lowest recorded was 08.0°C on the 22nd of the month (see Figure50)

Murtala Muhammed International Airport, Lagos Airport

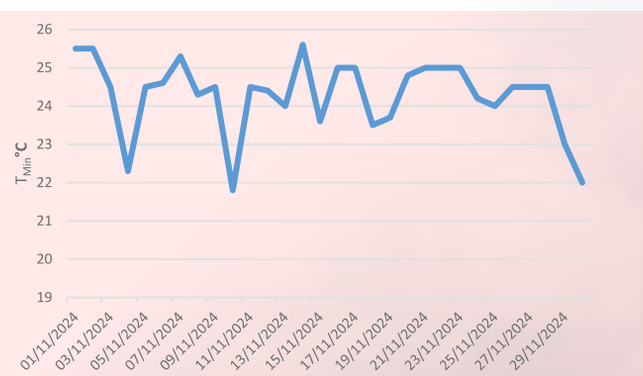


Figure 51 Daily Minimum Temperature at Murtala Muhammed International Airport, Lagos in November 2024

The highest minimum temperature recorded at Murtala Muhammed International Airport; Lagos was 25.6°C on the 14th of November 2024 while the lowest recorded was 21.8°C on the 10th of the month (see Figure51)

Akanu Ibiam International Airport, Enugu

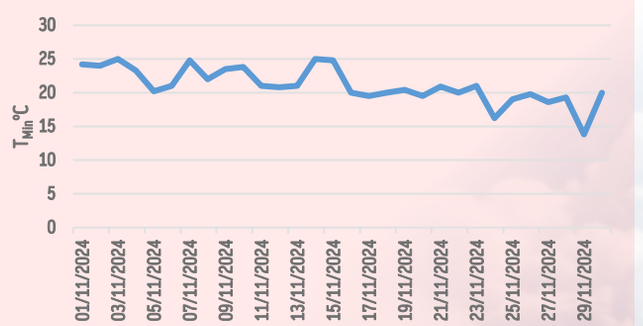


Figure 52: Daily Minimum Temperature at Akanu Ibiam International Airport, Enugu in November 2024

The highest minimum temperature recorded at Akanu Ibiam International Airport, Enugu was 25.0°C on the 3rd and 14th of November 2024 while the lowest recorded was 13.8°C on the 29th of the month (see Figure52)

4.4 Observed Visibility at the Five International Airports in November 2024

Nnamdi Azikiwe International Airport, Abuja

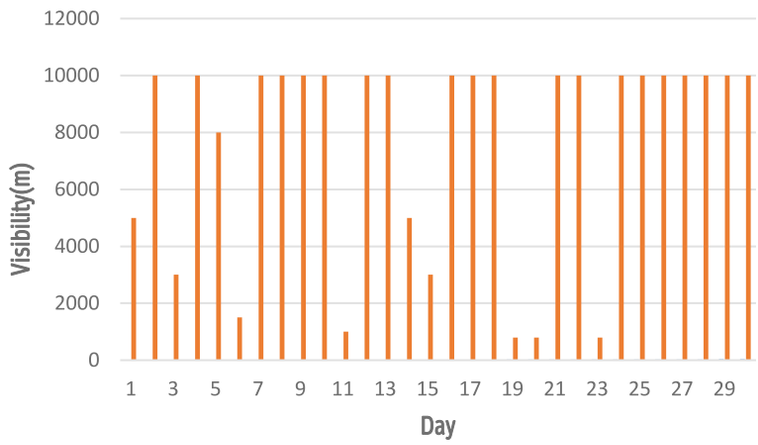


Figure 53: Daily Visibility at Nnamdi Azikiwe Airport, Abuja in November 2024

As shown in Figure 53 visibility of 5000m and below were recorded at Abuja airport in eight (8) non-consecutive days in November 2024, and the lowest was 500m, recorded on 19th, 20th and 23rd of the month.

Akanu Ibiam International Airport, Enugu

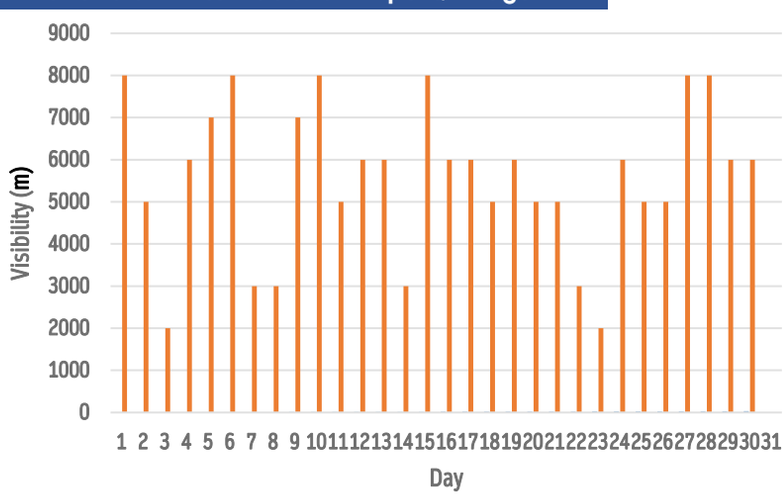


Figure 54: Daily Visibility at Akanu Ibiam International Airport, Enugu in November 2024

Visibility of 5000m and below was recorded at Enugu airport for 13 non-consecutive days in November 2024; the lowest being 2000m on 3rd and 23rd of the month. (See Figure 54).

Murtala Muhammed International Airport, Lagos

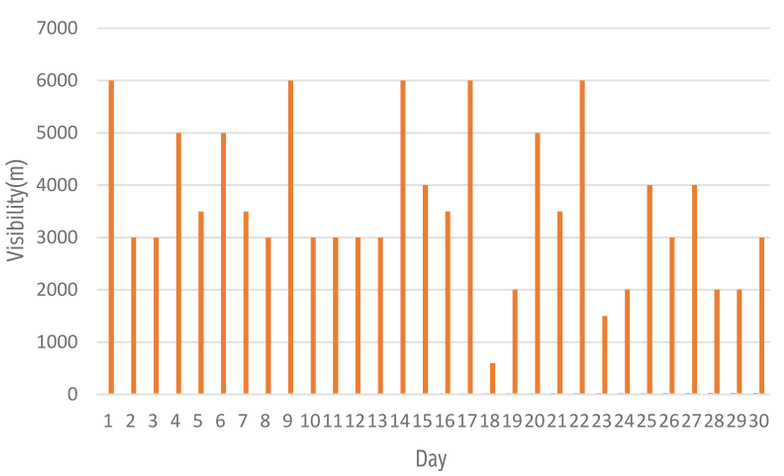


Figure 55: Daily Visibility at Murtala Muhammed International Airport, Lagos in November 2024

As shown in Figure 55 visibility of 5000m and below was recorded at Lagos airport for 25 non-consecutive days in November 2024. The lowest was 600m recorded on 18th of the month.

Mallam Aminu Kano International Airport, Kano

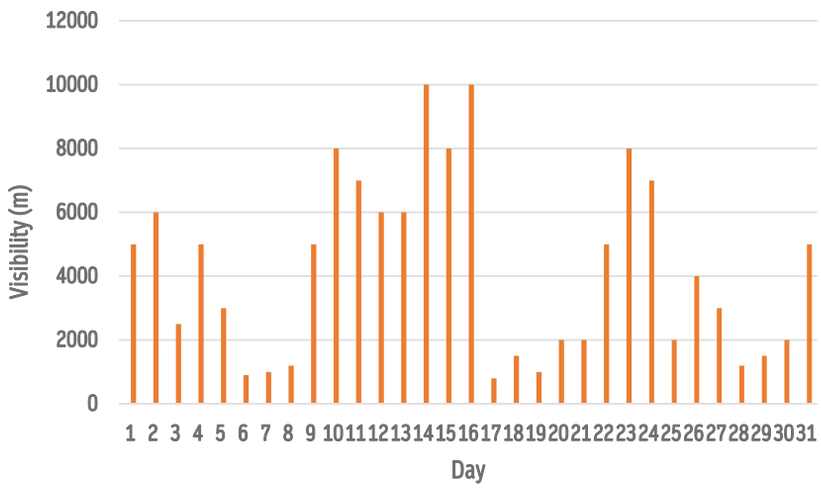


Figure 56: Visibility over Mallam Aminu Kano International Airport, Kano in November 2024

Visibility of 5000m and below was recorded at Kano airport for 23 non-consecutive days in November 2024; the lowest was 800m recorded on 17th of the month. (See Figure 56).

Port Harcourt International Airport

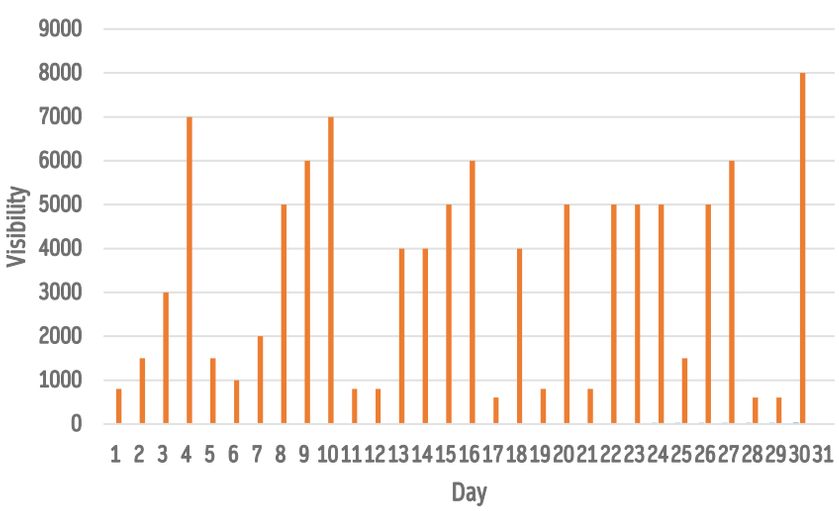


Figure 57: Daily Visibility at Port Harcourt International Airport in November 2024

As shown in Figure 57 visibility of 5000m and below was recorded at Port Harcourt for 24 non-consecutive days in November 2024; the lowest was 600m recorded on 17th, 28th and 29th of the month.

5.0 Production and Collection of Flight Documentation in November 2024

Nnamdi Azikiwe International Airport Abuja

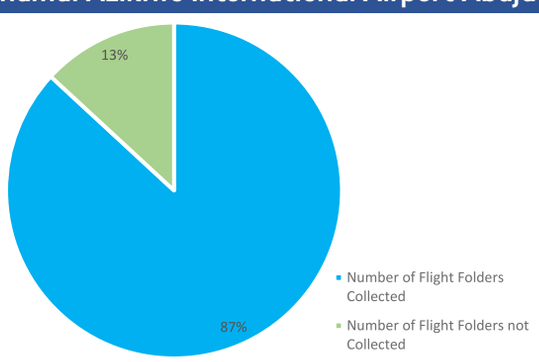


Figure 58: Flight Documentation Analysis for Nnamdi Azikiwe International Airport Abuja in November 2024

The total number of flight documentation (folders) prepared in November was 320, out of which 278 were collected representing 87% collection rate. However, 13% were not collected. (See Figure 58).

Akanu Ibiam International Airport Enugu

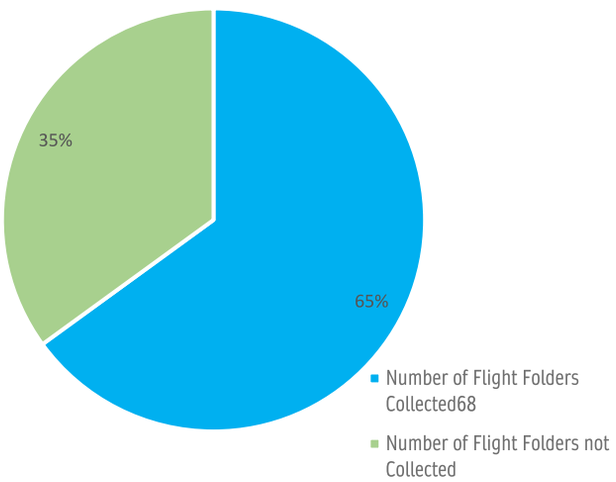


Figure 59: Flight Documentation Analysis for Akanu Ibiam International Airport Enugu in November 2024

215 flight documentation folders were produced at Enugu airport in November 2024. 140 of these folders were collected representing 65% collection rate.

Mallam Aminu Kano International Airport, Kano

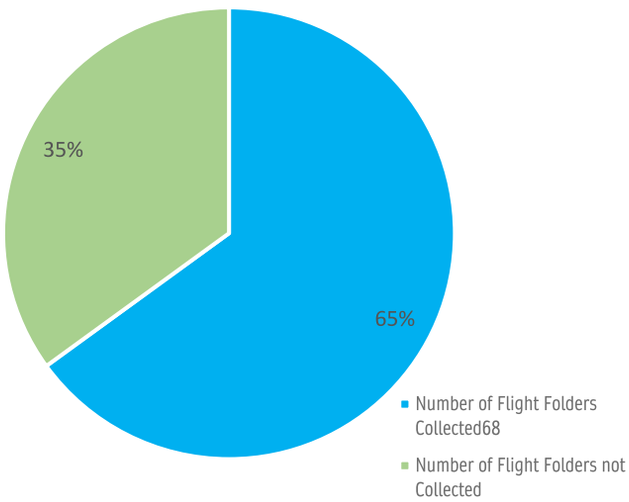


Figure 61 Flight Documentation Analysis for Mallam Aminu Kano International Airport, Kano in November 2024

The total number of flight documentation (folders) prepared in November 2024 at Kano airport was 215 out of which 140 were collected representing 65% collection rate however 35% were not collected.

Murtala Muhammed International Airport, Lagos

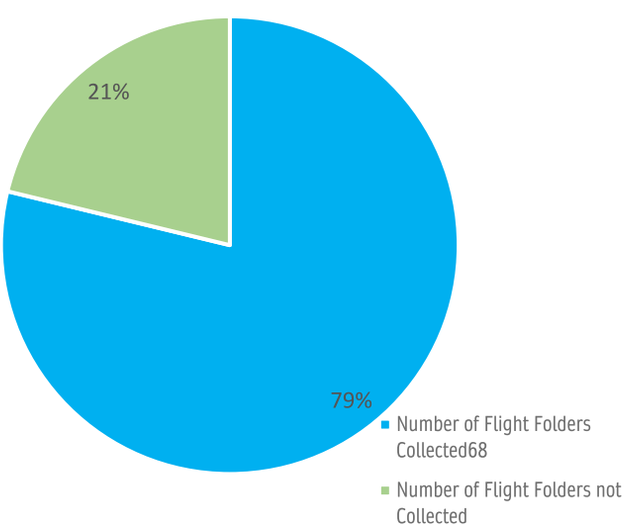


Figure 60: Flight Documentation Analysis for Murtala Muhammed International Airport, Lagos in November 2024

Figure 60: Flight Documentation Analysis for Murtala Muhammed International Airport, Lagos in November 2024

Port Harcourt International Airport

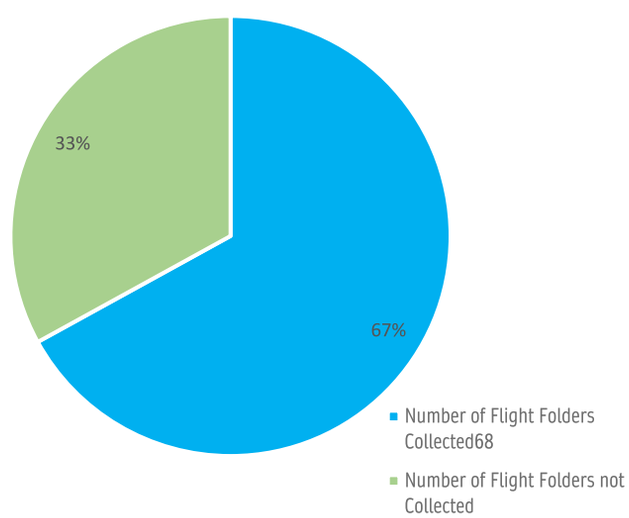


Figure 62: Flight Documentation Analysis for Port Harcourt International in November 2024

In November 2024 85 flight documentation folders were produced at Port Harcourt airport, out of which 57 were collected representing 67% collection rate.

Table 1: Summary of Flight Documentation Folder Collection for November 2024

Airport (Station)	Number of Folders Prepared	Number of Folders Collected	Number of Folders not Collected	Collection Rate (%)	Remark
Nnamdi Azikiwe, International Airport Abuja	320	278	42	87	
Murtala Muhammed, international Airport Lagos	1294	1020	274	79	
Mallam Aminu Kano, international Airport Kano	215	140	75	65	
Port Harcourt International Airport	85	57	28	67	
Akanu Ibiam Airport, Enugu	215	140	75	65	

As shown in Table 1, Nnamdi Azikiwe International Airport, Abuja recorded the highest flight documentation folder collection rate of 87%, while Mallam Aminu Kano International Airport, Kano and Akanu Ibiam International Airport, Enugu each recorded a collection rate of 65% for the month of November 2024. However, Murtala Muhammed International Airport prepared the highest number of folders (1,294) and recorded the highest number of collections (1,020)

5.1 Observed Daily Rainfall at various Airports in Nigeria in November 2024

Port Harcourt International Airport

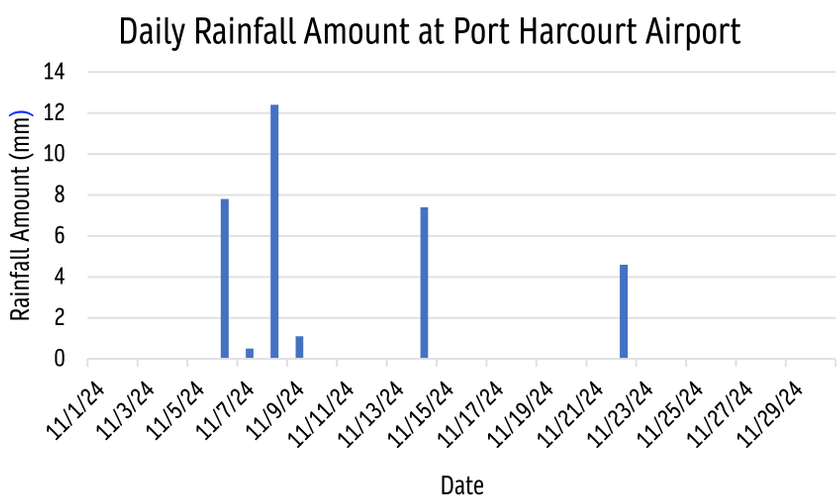


Figure 63: Daily Rainfall at Port Harcourt international Airport in November 2024

The highest rainfall recorded at Port Harcourt airport in November was 12.4mm. This was recorded on the 8th of the month, while the lowest recorded during the period was 0.5mm on the 7th of the month. The total amount of rainfall for the month was 33.8mm (see Figure 63).

Nnamdi Azikiwe International Airport Abuja

There was no rainfall recorded in the month of November at Abuja airport.

Mallam Aminu Kano International Airport, Kano

There was no rainfall recorded in the month of November at Kano airport

Murtala Muhammed International Airport, Lagos

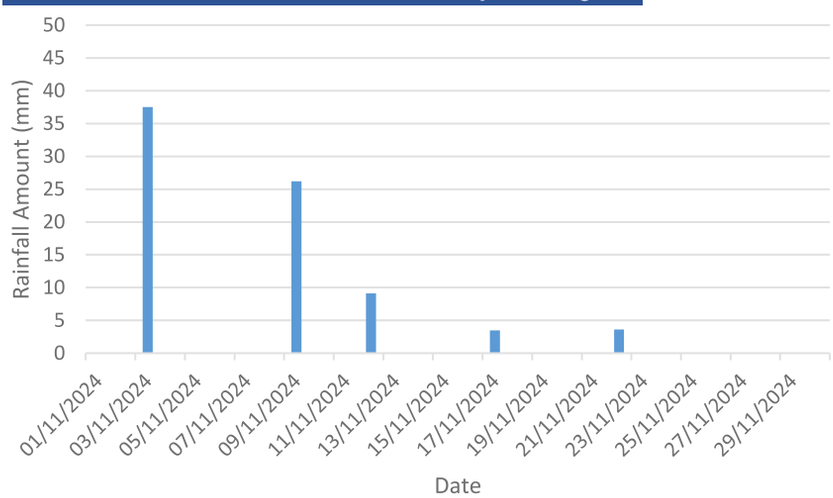


Figure 64 : Daily Rainfall at Murtala Muhammed International Airport, Lagos

The highest rainfall recorded at Lagos airport in November 2024 was 37.5mm. This was recorded on the 3rd of the month, while the lowest recorded during the period was 3.5mm on the 17th of the month The total amount of rainfall for the month was 79.9mm (see Figure 66)

Akanu Ibiam International Airport Enugu

There was no rainfall recorded in the month of November 2024 over Enugu Airport

5.2 Daily Observed Thunderstorms occurrence at the Five International Airports in November 2024

Thunderstorm Occurrence at the Five international airports in November 2024

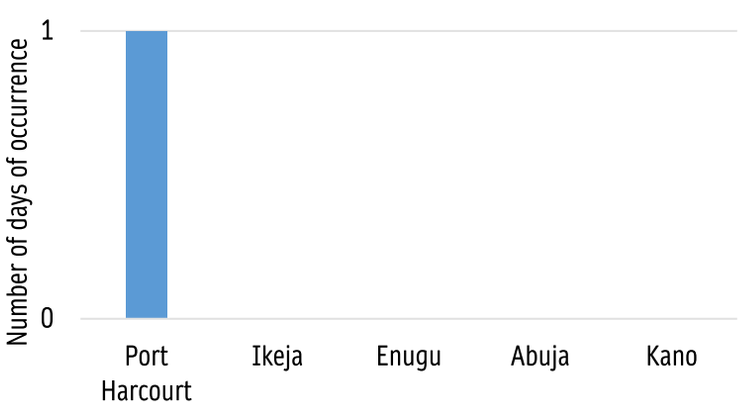


Figure 65: Thunderstorms occurrence at the fives international airport in November 2024

Port Harcourt was the only international airport in Nigeria that recorded thunderstorm in November 2024. (See Figure 67)

December 2024

Review of Position of the Inter-Tropical Discontinuity (ITD) and the Weather at the Airport Stations Across Nigeria in December 2024

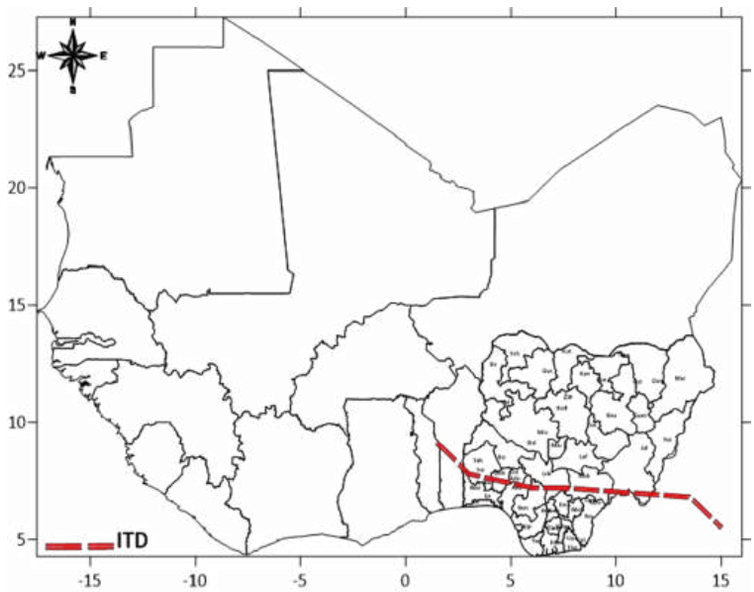


Figure 65: Mean position of ITD for the month of December 2024.

In November 2024, there was a significant southward displacement of the ITD to approximately 7.6°N to the west and 7.0°N to the east compared to its position in October and November. Enugu, Port Harcourt and Lagos remained south of the ITD. resulting in weather activities such as moderate rain and thunderstorm, fog, mist etc in the three airport stations. However, Kano and Abuja continued to experience dry and dusty weather conditions (haze and dust) due to its position being north of the ITD.

Temperature fluctuations at the airport stations in December 2024 are summarized as follows:

- Abuja had the highest maximum temperature in December 2024 with a value of 38.4°C, while Kano recorded the lowest maximum temperature of 25.4°C.
- Abuja and Lagos both recorded the highest minimum temperature in December 2024 with a value of 25.4°C, while Kano recorded the lowest minimum temperature of 06.3°C.
- Lagos recorded the highest mean temperature in December 2024 with a value of 29.2°C, while Kano recorded the lowest mean temperature of 15.9°C.

6.1:Observed Mean Temperature Tmean(°C) at the Airports in December 2024

Port Harcourt International Airport

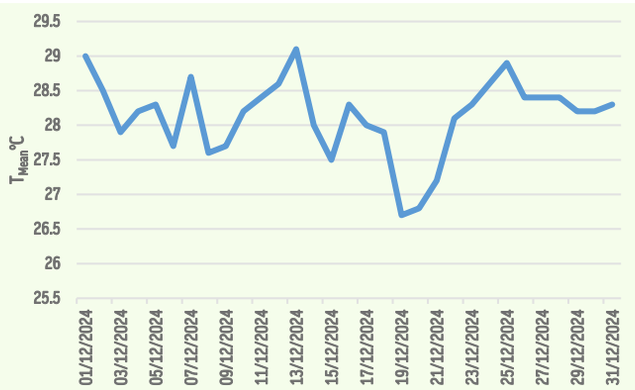


Figure 70: Daily Mean Temperature at Port Harcourt International Airport in December 2024

The highest mean temperature recorded at Port Harcourt airport in December 2024 was 29.10C. This was recorded on 13th December, while the lowest mean temperature was 26.7°C, observed on 19th of the month. (see Figure 70).

Nnamdi Azikiwe International Airport Abuja

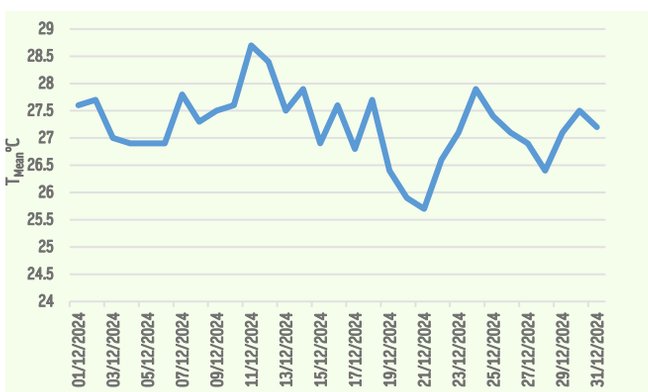


Figure 71: Daily Mean Temperature at Nnamdi Azikiwe International Airport Abuja in December 2024

The highest mean temperature at Abuja airport in December 2024 was 28.70C, recorded on 11th, while the lowest was 25.7°C observed on 21st of the month. (See Figure 71).

Mallam Aminu Kano International Airport Kano

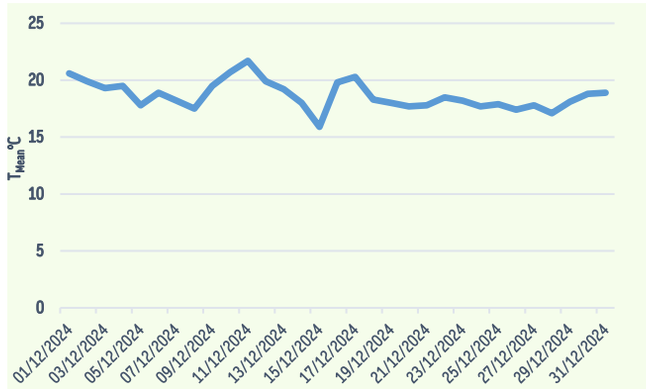


Figure72: Daily MeanTemperature at Mallam Aminu Kano International Airport Kano in December 2024

The highest mean temperature recorded at Mallam Aminu Kano International Airport Kano in December 2024 was 21.7°C. This was on 11th of the month. The lowest maximum temperature of 15.9°C was recorded on 15th of the month (see figure 72)

Murtala Muhammed International Airport Lagos

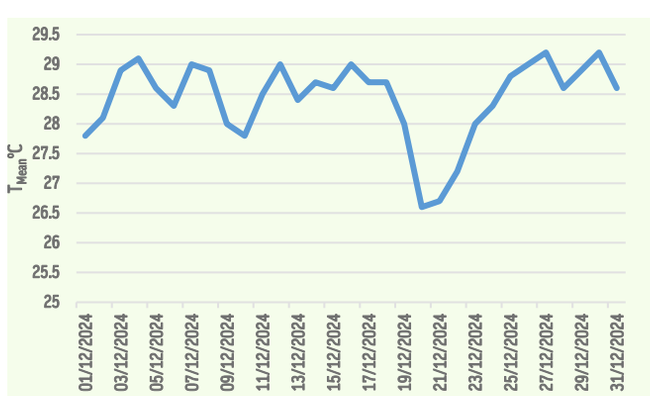


Figure 73: Daily Mean Temperature Murtala Muhammed International Airport Lagos in December 2024

The highest daily mean temperature at Lagos airport in December 2024 was 29.20C. This was observed on 27th and 30th, while the lowest was 26.6°C recorded on 20th of the month. (See Figure 73).

Akanu Ibiam International Airport Enugu

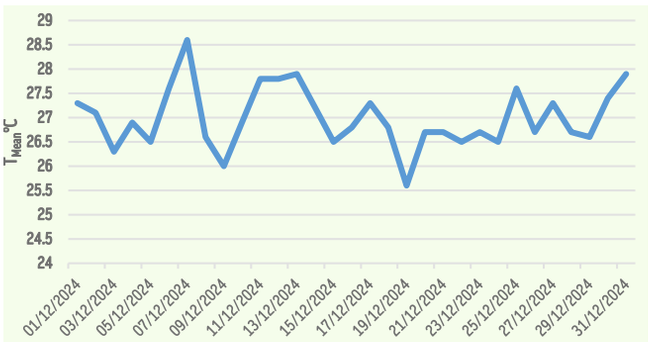


Figure 74: Daily Mean Temperature at Akanu Ibiam International Airport Enugu in December 2024

The highest Daily Mean temperature recorded at Akanu Ibiam International Airport Enugu was 28.6°C on the 7th of December 2024 while the lowest recorded was 25.6°C on the 19th of the month (see Figure74)

6.2 Observed Maximum Temperature at the Airports in December 2024

Port Harcourt International Airport

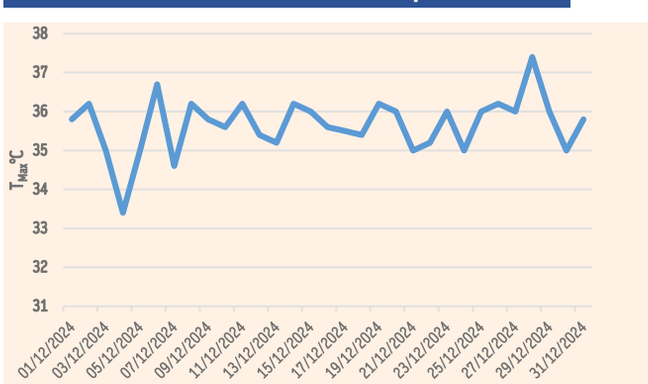


Figure 75: Daily Maximum Temperature at Port Harcourt International Airport in December 2024

In December 2025 Port Harcourt International Airport recorded highest maximum temperature of 37.4°C on the 28th while the lowest was 33.4°C on the 4th of the month (see Figure 75)

Nnamdi Azikiwe International Airport, Abuja

Figure76: Daily Maximum Temperature at Nnamdi Azikiwe International Airport Abuja in December 2024

Nnamdi Azikiwe International Airport Abuja recorded the highest maximum temperature of 38.4°C on the 11th December 2024, while the lowest was 33.5°C on the 22nd of the month (see Figure 76)

Mallam Aminu Kano International Airport, Kano

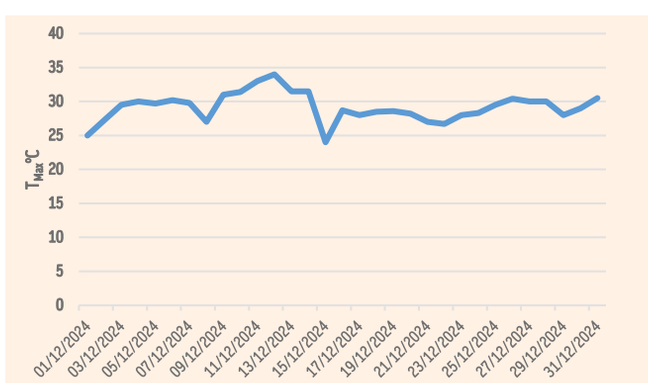


Figure 77: Daily Maximum Temperature at Kano Airport in December 2024

The highest maximum temperature recorded at Mallam Aminu Kano International Airport Kano in December 2024 was 34.0 °C on the 12th while the lowest was 24.0 °C on the 15th of the month (see Figure77).

Murtala Muhammed International Airport, Lagos

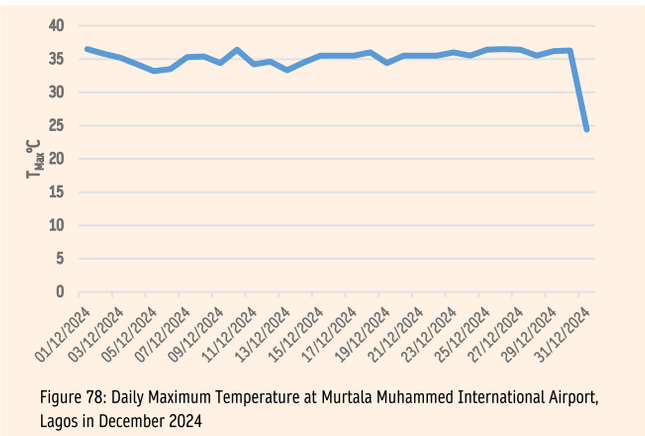


Figure 78: Daily Maximum Temperature at Murtala Muhammed International Airport, Lagos in December 2024

The highest maximum temperature recorded at Murtala Muhammed International Airport in December 2024 was 36.4 °C on the 10th ,25th, and 27th while the lowest was 33.3 °C on the 13th of the month (see Figure78).

Akanu Ibiam Airport, Enugu

Figure 79: Daily Maximum Temperature at Akanu Ibiam Airport, Enugu in December 2024

Akanu Ibiam Airport, Enugu recorded the highest maximum temperature of 37.1°C on the 31st December 2024 while the lowest was 32.5°C on the 9th of the month (see Figure79).

6.3Observed Minimum Temperature at t he Airports in December 2024

Port Harcourt International Airport

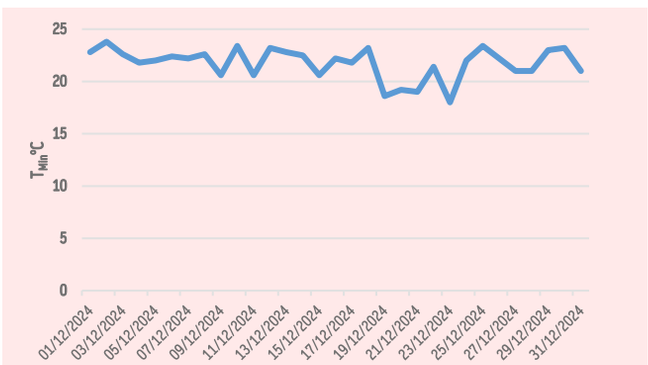


Figure 80: Daily Minimum Temperature at Port Harcourt International Airport in December 2024

In December 2024, the highest minimum temperature at Port Harcourt airport was 23.80C, recorded on the 2nd, while the lowest was 180C. This was observed on 23rd of the month.

Nnamdi Azikiwe International Airport, Abuja

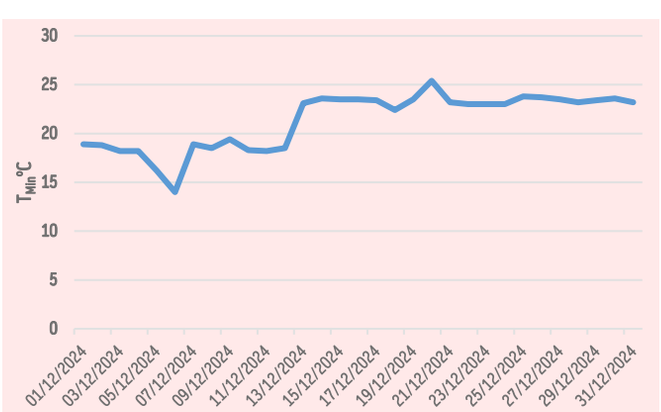


Figure 81: Daily Minimum Temperature at Nnamdi Azikiwe International Airport, Abuja in December 2024

Nnamdi Azikiwe International Airport, Abuja recorded the highest minimum temperature of 25.4°C on the 20th December 2024 while the lowest recorded was 14.0°C on the 6th of the month (see Figure 81)

Mallam Aminu Kano International Airport, Kano

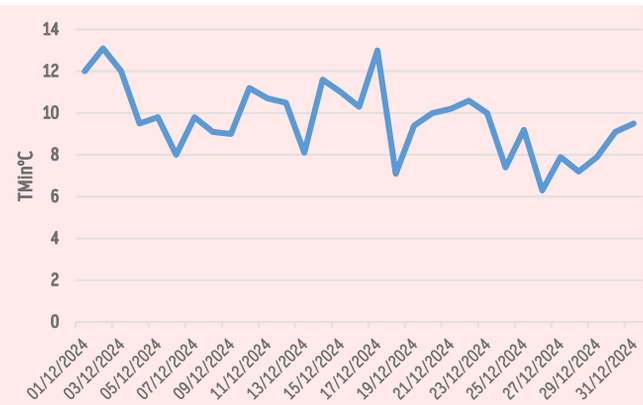


Figure 82: Daily Minimum Temperature at Mallam Aminu Kano International Airport, Kano in December 2024.

Mallam Aminu Kano International Airport, Kano recorded the highest minimum temperature of 13.1°C on the 2nd December while the lowest recorded was 06.3°C on the 26th of the month. (See Figure 82).

Murtala Muhammed International Airport, Lagos Airport

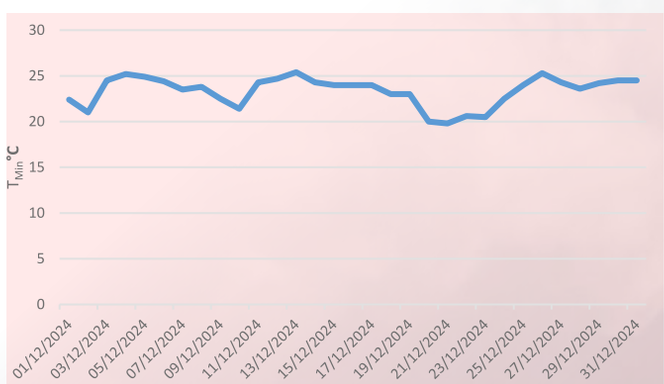


Figure 83: Daily Mean Temperature at Murtala Muhammed International Airport, Lagos in December 2024

In December 2024, the highest minimum temperature observed at Lagos airport was 25.40C. This was on the 13th of the month; while the lowest was 19.8°C recorded on the 21st of the month (see Figure 83).

Akanu Ibiam International Airport, Enugu

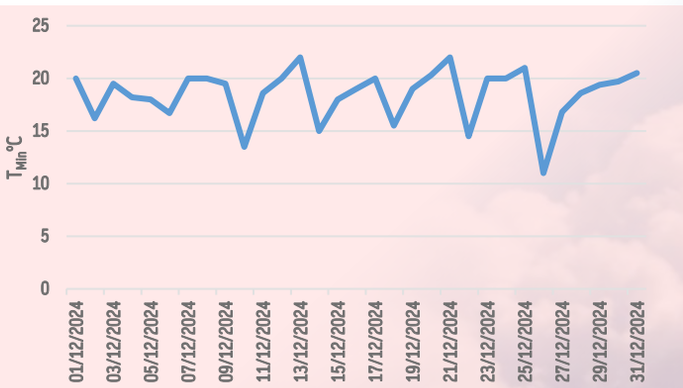


Figure 84: Daily Mean Temperature at Akanu Ibiam International Airport, Enugu in December 2024

Akanu Ibiam International Airport, Enugu recorded the highest minimum temperature of 22.0°C on the 13th and 21st while the lowest was 11.0 °C on the 26th of the month (see Figure 84).

6.4: Observed Minimum Visibility less than or equal to 5000m) in December 2024

Nnamdi Azikiwe International Airport, Abuja

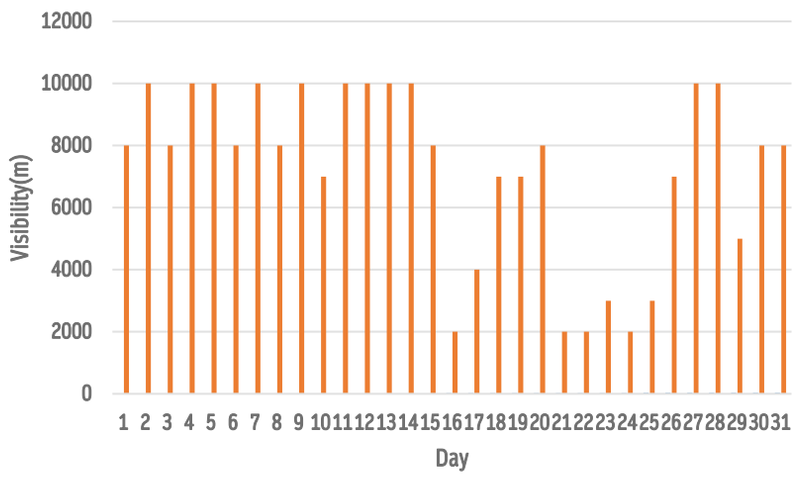


Figure 85: Visibility over Nnamdi Azikiwe International Airport, Abuja in December 2024

Figure 85: shows that visibility of 5000m and below was recorded for 8 non-contiguous days in December 2024; the lowest being 2000m on 16th, 21st, 22nd and 24th of the month.

Akanu Ibiam International Airport, Enugu

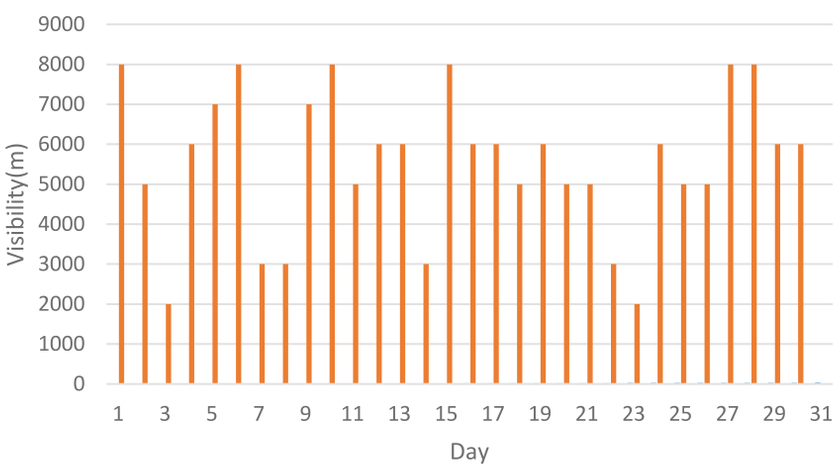


Figure 86: Visibility over Akanu Ibiam International Airport, Enugu in December 2024

Visibility of 5000m and below was recorded for 13 non-contiguous days in December 2024; the lowest being 2000m on 3rd and 23rd of the month. (see figure 86)

Murtala Muhammed International Airport, Lagos

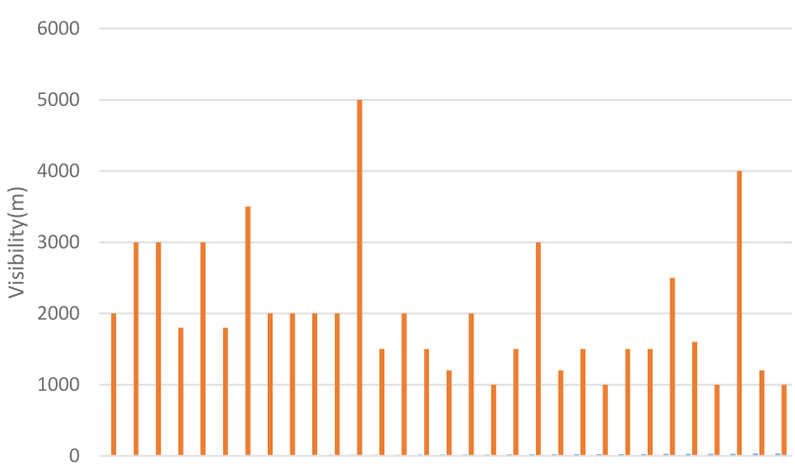


Figure 87: Visibility over Murtala Muhammed International Airport, Lagos December 2024

Figure 87 above depicts the prevalence of poor visibility of 2000m or less in haze in December 2024. The prevalence of poor visibility over Ikeja must have cause flight disruptions

Mallam Aminu Kano International Airport, Kano

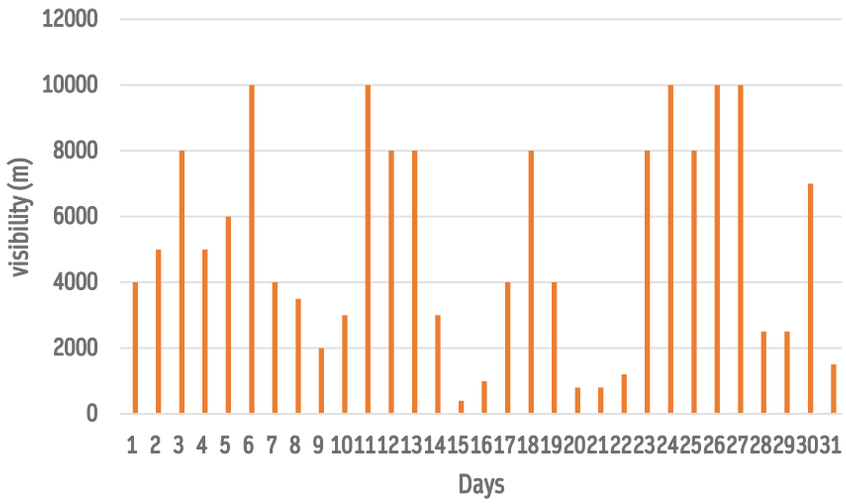


Figure 88: Visibility over Mallam Aminu Kano International Airport, Kano in December 2024

Figure 88 above depicts visibility of 5000m and below was recorded for 18 non-contiguous days and the lowest being 400m on 15th of the month.

Port Harcourt International Airport

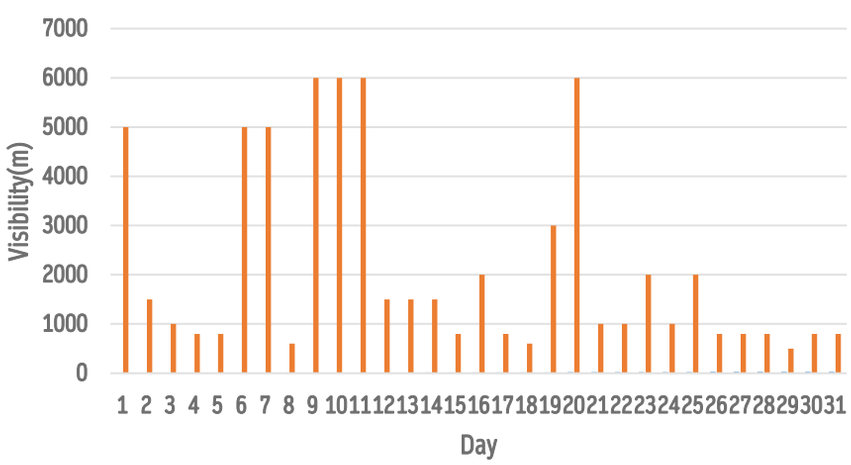
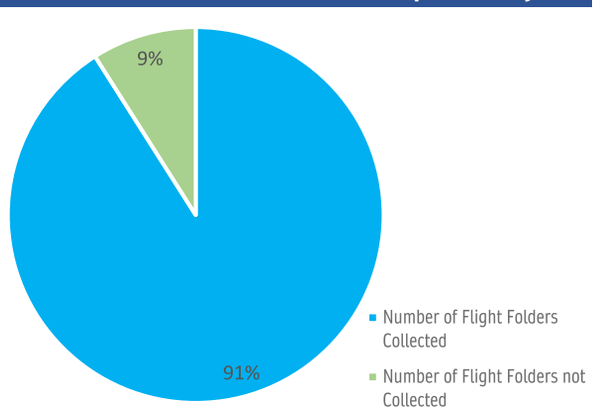


Figure 89: Visibility over Port Harcourt International Airport in December 2024

Figure 89 above depicts visibility of 5000m and below was recorded for 27 non-contiguous days and the lowest being 500m on 29th of the month.

6.5Production and Collection of Flight Documentation in December 2024

Nnamdi Azikiwe International Airport Abuja



In December 2024, NiMet produced 341 flight documentation folders at Abuja airport. Out of this number, 310 of these folders, representing 91%, were collected by the airlines operators.

Akanu Ibiam International Airport Enugu

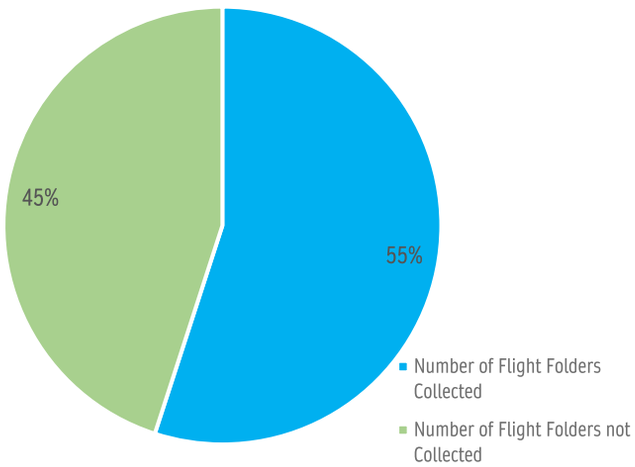


Figure 92: Flight Documentation analysis for Akanu Ibiam International Airport, Enugu in December 2024

NiMet produced a total of 225 flight documentation folders at Enugu airport in December 2025. The airline operators collected 124 of these folders, representing 55%.

Murtala Muhammed International Airport, Lagos

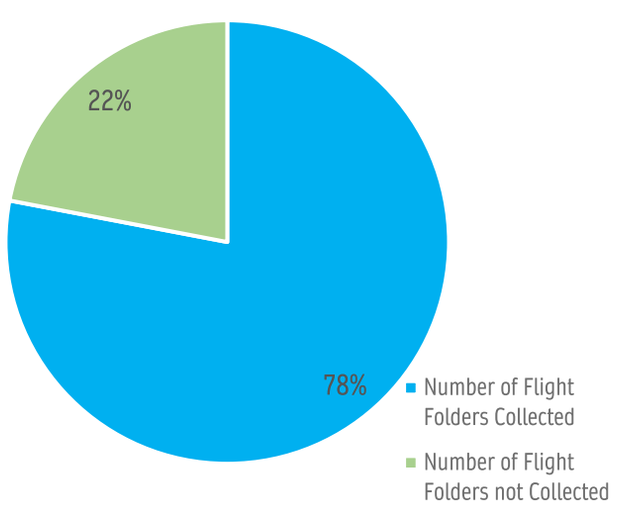
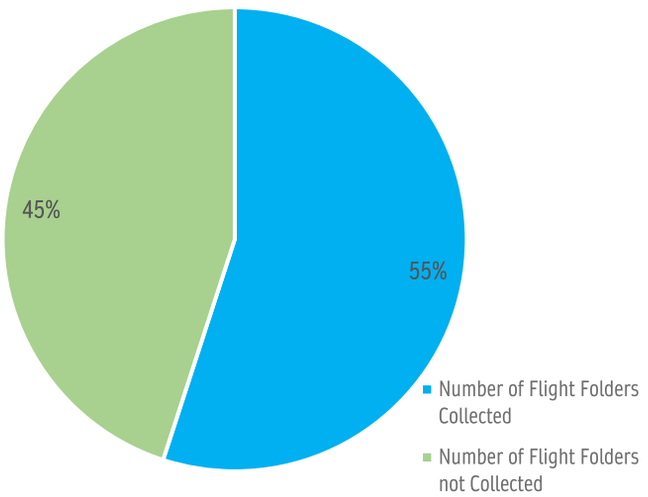


Figure 93: Flight Documentation analysis for Murtala Muhammed International Airport, Lagos in December 2024

In December 2024, NiMet produced 1,322 flight documentation folders at the Lagos airport. 1035 (or 78%) of these were collected by the airline operators.

Mallam Aminu Kano International Airport, Kano



Flight Documentation analysis for Mallam Aminu Kano International Airport, Kano in December2024

In December 2024, NiMet produced 225 flight documentation folders at the Enugu airport. 124 (or 55%) of these were collected by the airline operators.

Port Harcourt International Airport

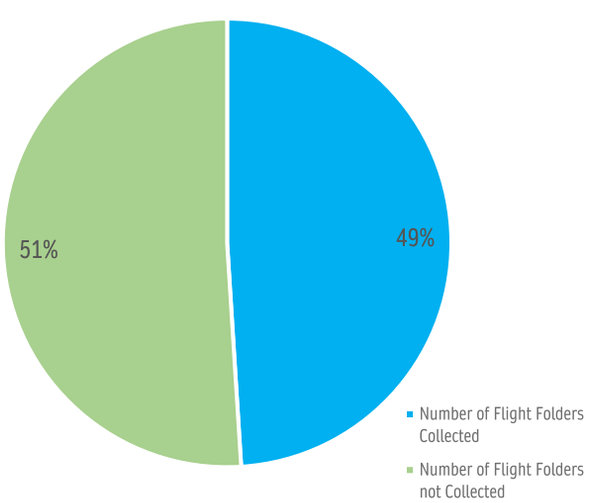


Figure 95: Flight Documentation analysis for Port Harcourt International Airport in December 2024

In December 2024, NiMet produced 100 flight documentation folders at the port Harcourt airport. 49 (or 49%) of these were collected by the airline operators.

Table 3: Summary of Flight Documentation Folder Collection for December 2024

Airport (Station)	Number of Folders Prepared	Number of Folders Collected	Number of Folders not Collected	Collection Rate (%)	Remark
Nnamdi Azikiwe, Abuja	341	310	31	91	
Murtala Muhammed, Lagos	1322	1035	287	78	
Mallam Aminu Kano, Kano	225	124	101	55	
Port Harcourt International Airport	100	49	51	49	
Akanu Ibiam Airport, Enugu	225	124	101	55	

As shown in Table 3 Nnamdi Azikiwe International Airport recorded the highest collection rate of 91% for the month of December 2024, while Akanu Ibiam International Airport in Enugu recorded the lowest collection rate of 55% for the month. However, Murtala Muhammed International Airport prepared the highest number of folders (1,322) and achieved the highest number of collections (1,035).

6.6 Daily Rainfall at various Airports in Nigeria in December 2024

Only Murtala Muhammed International Airport, Lagos recorded 1.3mm of rainfall amount in December 2024.

6.7 Daily Observed Thunderstorms Occurrence at the Five international Airports in December 2024

None of the five international airports recorded thunderstorms in December 2024

Glossary

Flight Level: A standardized altitude of an aircraft expressed in hundreds of feet. It is usually referenced to the standard atmospheric pressure of 1013.25 hPa (hectopascals).

Flight crew member. A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

Flight documentation. Written or printed documents, including charts or forms, containing meteorological information for a flight.

Flight information centre (FIC). A unit established to provide flight information service and alerting service.

Flight information region (FIR). An airspace of defined dimensions within which flight information service and alerting service are provided.

Fog: A cloud that forms at ground level, reducing visibility to less than 1,000 meters (3,280 feet). It can significantly impact flight operations.

Haze: A slight obscuration of the air caused by fine particles or water droplets, reducing visibility but not as severely as fog or mist.

Mist: Similar to fog but with visibility of 1000 to 5000m

METAR: A routine aviation weather report issued at least once an hour, containing data on temperature, dew point, wind speed, visibility, and significant weather phenomena.

Turbulence: Irregular or violent changes in airflow that can cause abrupt changes in altitude or speed, often experienced during flight. It can be caused by various factors, including weather fronts, thunderstorms, and mountainous terrain.

TAF (Terminal Aerodrome Forecast): A weather forecast for a specific airport, usually covering a 30-hour period and updated 6 hourly, detailing expected weather conditions important for flight operations.

Trend Forecast: A trend forecast is a short-term weather forecast that indicates expected changes in weather conditions over a specific period, typically covering the next few hours to a day. It highlights trends such as increasing or decreasing temperatures, changes in wind direction, or the likelihood of precipitation. Trend forecasts are often

based on current weather observations and short-term numerical weather prediction models.

SPECI report is a special weather report issued when there are significant changes in weather conditions that occur between routine METAR reports. It may include updates on sudden changes in visibility, wind, significant weather events (like thunderstorms), or changes in cloud cover. SPECI reports help ensure that pilots and air traffic controllers have the most up-to-date information.

Squall: A sudden, sharp increase in wind speed lasting for a short period, often associated with thunderstorms or frontal systems.

Visibility: The distance at which objects can be clearly seen. In aviation, visibility is crucial for take-off, landing, and navigation.

Temperature: A measure of how hot or cold something is, usually measured in degrees Celsius (°C) or Fahrenheit (°F).

Maximum Temperature: The highest temperature recorded in a specific location during a specified period, typically over a 24-hour day. This value is important for understanding heat extremes and is often used in weather forecasts.

Minimum Temperature: The lowest temperature recorded in a specific location during a specified period, also usually over a 24-hour day. It helps indicate the cooling trends in an area and is crucial for assessing frost risk and other cold-related phenomena.

The average temperature over a specific period, calculated by adding together all temperature readings for that period and then dividing by the number of readings. Mean temperature can be computed daily, monthly, or annually and provides a more comprehensive view of temperature trends over time.

Microburst: A small, concentrated downdraft that results in a powerful burst of wind at or near the ground level, capable of causing significant damage and hazards for aviation.

Jet Stream: A fast-flowing ribbon of air in the upper atmosphere, typically found at altitudes of 20,000 to 50,000 feet. Jet streams can influence weather patterns and are crucial for aviation.

Tailwind: A wind that blows in the same direction as an aircraft is traveling, which can increase its speed and reduce fuel consumption during flight.

Cloud: A visible mass of condensed water vapor floating in the atmosphere, which can vary in type, size, and altitude. Clouds are classified into several types, such as cumulus, stratus, and cirrus.

Crosswind: Wind that blows perpendicular to the direction of an aircraft's flight path, which can affect take-off and landing performance.

Headwind: A wind that blows directly opposite to the direction of an aircraft's travel, which can slow down the aircraft and increase fuel consumption during flight.

Lightning: A sudden electrostatic discharge during a storm, producing a bright flash and a loud sound (thunder). It occurs when

electrical charges build up in clouds.

Windshear: A sudden change in wind speed or direction over a short distance, which can be dangerous during take-off and landing due to its potential to disrupt the airflow over an aircraft's wings.

Dust storm: Severe weather events characterized by strong winds lifting large amounts of dust or sand into the air, reducing visibility and air quality.

Extreme Temperature: Temperatures that are significantly above or below the average for a specific region or time of year, which can have profound effects on weather patterns and living conditions.

Cumulonimbus: A type of cloud that indicates thunderstorms and severe weather.

Dew Point: The temperature at which air becomes saturated with moisture and dew forms.

Humidity: The amount of moisture in the air, expressed as a percentage of the maximum amount of moisture the air can hold at that temperature

Thunderstorm: A localized storm characterized by the presence of thunder and lightning, often accompanied by heavy rain, strong winds, and sometimes hail or tornadoes.

Air Pressure: The force exerted by the weight of air above a given point, typically measured in hectopascals (hPa) or millibars (mb). Air pressure influences weather patterns and is a key factor in meteorology.

Ceiling: The height above the ground of the lowest layer of clouds or the vertical visibility into a cloud. It is important for determining whether VFR (Visual Flight Rules) or IFR (Instrument Flight Rules) can be used.

Turbulence: Irregular or violent movements of air, which can cause changes in altitude and speed. Turbulence can be caused by weather phenomena, terrain, or jet streams.

Temperature Inversion: A layer of the atmosphere where temperature increases with altitude, contrary to the usual decrease. It can trap pollutants and create turbulence.

Pressure System: Areas of high or low atmospheric pressure. High-pressure systems generally bring clear skies, while low-pressure systems are associated with clouds and precipitation.

Convective Activity: Atmospheric processes that involve the vertical movement of air, often leading to thunderstorms. It can create hazardous flying conditions.

Advection: The horizontal movement of air, often bringing changes in temperature or humidity.

Atmospheric Pressure: The weight of the air above a given point, typically measured in millibars (mb) or inches of mercury (inHg).

Low Pressure System: An area where the atmospheric pressure is lower than that surrounding it, often associated with stormy weather.

Precipitation: Any form of water, liquid or solid, that falls from the atmosphere, including rain, snow, sleet, and hail.

Severe Weather: Weather that poses a significant risk to life or property, including thunderstorms, tornadoes, and hurricanes.

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