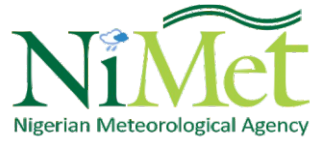


AERONAUTICAL METEOROLOGICAL BULLETIN

A PUBLICATION OF NIGERIAN METEOROLOGICAL AGENCY

MAIDEN EDITION





Aerometeorological Bulletin

Maiden Edition

A publication of Nigerian Meteorological Agency

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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...

Editorial

PUBLISHER

Professor Charles Anosike

Director General/Chief Executive Officer, and Permanent Representative of Nigeria with World Meteorological Organization (WMO)

Chief Editor

Professor Vincent Weli

Director, Weather Forecasting Services

EDITORIAL TEAM

Mr Asaniyan Taiwo

Mr Oluwaseun Wilfred Idowu

Mr Musa Usman Bio

Mr Nicholas Jacob Eigege

Mr Umoh Ephraim Essien

Mr Shehu Muhammad Bashir

Mss Maria Titilayo Akinjute

Mr Elioenai Anzizi



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Executive Summary



The Nigerian Meteorological Agency (NiMet) as part of its mandates provides 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. 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, on-ground, and enroute operations of aircraft depends on the prevailing weather phenomenon. Aircraft designs take into consideration climatology of weather information.

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.

Generally, dusty and hazy conditions brought about by the northeast trade winds prevailed during the period under review. The predominant northeasterly winds, which sweep across the Sahara Desert characteristically push cold, dry and dusty air into locations north of the Inter-Tropical Discontinuity (ITD) while south of the ITD reported isolated cases of showers, thunderstorms, mist and fog. During this period, low temperatures were recorded, and horizontal visibility was reduced significantly. While the former favoured aircraft performance, the latter caused disruptions to flight operation due to visibility reduction below various aerodrome minima as influenced by dust haze.

January 2024

In January, the ITD position was located over the southern axis of the country at approximately 7.6°N. Indicating that the parts of the country lying north of the ITD experienced dry and dusty weather conditions while places south of it experienced humid and less dusty weather phenomenon. The presence of dust haze is

often associated with low visibility, making it difficult for pilots to see runways, other aircraft, and obstacles, especially during low-altitude flight, take-off, and landing.

January marked the peak of the Harmattan season, particularly in the northern parts of Nigeria. Northern cities like Kano, experienced very dry and cool conditions in the mornings and evenings, with daytime temperatures ranging between 25°C and 41°C. In southern cities like Lagos, Enugu and Port Harcourt, temperatures ranged from 23°C to 32°C, with generally comfortable conditions.

February 2024

February saw a slight northward pull of the ITD to approximately 7.9°N compared to its position in January. The significance of this is that places North of the ITD experienced dry and dusty weather conditions while those to the south experienced humid and less dusty weather phenomena. Kano and Abuja were north of ITD, while Port Harcourt, Enugu and Lagos were south of the ITD in February.

March 2024

A significant northward displacement of the ITD to approximately 10.4°N occurred compared to its position in January and February. This indicated more moisture influx inland resulting in weather activities such as rain, thunderstorms, fog, mist, etc. in the locations south of the ITD (Enugu, Port-Harcourt, Lagos and Abuja). However, Kano experienced dry and dusty weather conditions (haze and Dust) due to its position being north of the ITD. Climatologically, this month marks the

beginning of the rainy season in the southern regions of the country. Though rainfall remain relatively light at this time, they are usually accompanied by strong winds and frequent showers, often in the form of afternoon thunderstorms.

The Management of the Agency in its drive to provide more insight into the activities, products and services, particularly in the aviation sector, embarked on the production and publication of this maiden edition of the Quarterly Aeronautical Meteorology Bulletin. The bulletin 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 academia and other weather enthusiasts.

Professor Charles Anosike

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



The Nigerian Meteorological Agency (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 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. According to the International Air Transport Association, adverse weather, particularly wind, wind shear, gusty wind and thunderstorms were most often cited as contributing factor in 20% of the accidents in 2023¹.

The frequency and severity of extreme weather events have been increasing globally due to climate change and this has accentuated 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. In order to generate accurate and timely

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 ITD determines the weather zones and seasons over Nigeria. The weather information, NiMet observes weather parameters across Nigeria, and these are used to generate the aeronautical meteorological products for the aviation in Nigeria. In this bulletin, some of the weather parameters at five (5) airport stations in Nigeria during the first quarter of 2024 are reviewed. The weather parameters reviewed are:

- Maximum Temperature.
- Minimum temperature.
- Mean temperature.
- Minimum visibility from 5000m and below.
- Monthly Inter-Tropical Discontinuity (ITD) position.
- Dust and Visibility

The review of the other weather parameters, namely wind, thunderstorm, fog and mist will be covered in subsequent editions of this bulletin

humidity, and wind direction. The oscillatory movement of 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). ITD plays a crucial role in the onset, cessation of the rainy season and distribution of rainfall across West Africa

¹International Air Transport Association (2024), IATA Annual Safety Report Executive Summary and Safety Overview – 60th Edition.

during the rainy season, as well the harmattan dust haze during the dry season. As the ITD moves northward during the summer months, it allows the inflow of moisture-laden air from the south, which leads to the development of rainfall. In 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 Impact of Dust on Air Navigation

Dust haze refers to airborne particles, often dust or sand, that are suspended in the atmosphere and reduce visibility; and could be caused by various factors, including strong winds, storms, or human activities. Low visibility due to dust haze can create hazardous conditions for aviation and to flight operations. Dust haze can significantly affect aviation in several ways, particularly in terms of visibility, navigation, and safety as follows.

- **Reduced Visibility:** Dust haze significantly lowers visibility, making it difficult for pilots to see runways, other aircraft, and obstacles, especially during low-altitude flight, take-off, and landing.
- **Navigation Challenges:** Pilots may face difficulties in visual navigation and rely more heavily on instruments, which could increase the likelihood of errors or confusion, especially in unfamiliar

regions or complex airspaces.

- **Aircraft and ATC Operations:** Dust haze can interfere with aircraft systems and weather radar, which may complicate flight operations and increase the workload for air traffic controllers. Communication with ATC becomes even more critical.
- **Flight Planning Adjustments:** Flight routes may be adjusted, or flights may be delayed or cancelled due to poor visibility.
- **Health and Maintenance Issues:** Dust haze can cause adverse health implications on the passenger, crew, and operators. It also leads to increased maintenance needs for the operating aircraft.

“Widespread dust (DU): The reduction of horizontal visibility to 5000 m or less caused by the suspension in the air of small particles of dust raised from the ground²”

²World Meteorological Organisation (2019). *Aerodrome Reports and Forecasts*. WMO No. 782 p. 71

1.4 Summary of Weather Conditions in Nigeria in the First Quarter of 2024

Dusty and hazy weather conditions brought about by the northeast trade winds prevailed over most parts of the country during the period under review. The northeasterly winds, which comes from the Sahara Desert characteristically push cold, dry and dusty air into parts of Nigeria that are north of the ITD. On the other hand, those areas that are to the south of the ITD usually experience isolated thunderstorms, mist and fog. The ITD attained its southern-most position in January. During this period, low temperatures were recorded and horizontal visibility reduced significantly. While the former favours aircraft performance, the latter leads to disruption of flight operations.

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

- During the quarter under review (January, February and March 2024) the ITD

position varied between 7.6°N and 10.4°N. Most parts of the country were therefore predominantly under the influence of the dust-laden northeasterly winds. Dust was a significant weather at most of the airports in the country.

- The observed horizontal visibility varied from 5000m to 0100m. The lowest visibility during the period was observed at Port Harcourt on 3rd February 2024.
- The lowest minimum temperature (Tmin) of 10.2°C was observed at Kano on 19th January 2024, while the highest minimum temperature of 28°C occurred at Port Harcourt on 21st January 2024.
- The lowest maximum temperature (Tmax) of 25.2°C was observed at Kano on 28th January 2024 while the highest maximum temperature of 41.5°C also occurred at Kano on 15th March 2024.

1.5 Summary of NiMet's AEROMET Products Disseminated in the First Quarter of 2024

- NiMet produced a total of 5,640 Flight Documentation folders during the quarter under review and 4,557 representing 80.8% were collected by the airlines.
- NiMet produced and transmitted a total of 20,774 METAR during the quarter under review.
- NiMet produced and transmitted a total of 360 TAF during the quarter under review and 360, representing 100% were collected by the airlines.
- Total number of 117 aerodrome warnings were issued and transmitted to users during the period under review.



The weather in Nigeria during the first quarter of 2024 followed the usual seasonal patterns of the climate of the country. However, some specific conditions and trends were notable during the period. The weather trends: temperature, precipitation, and other weather events are reviewed in this section. January was marked by the peak of the Harmattan season, particularly in the northern parts of Nigeria. Cities in northern Nigeria experienced very dry and cool weather conditions in the mornings and evenings, with daytime temperatures ranging between 25°C and 41°C. In the southern parts of the country, Lagos, Enugu and Port Harcourt, temperatures during the quarter ranged from 23°C to 32°C.

Dusty and hazy conditions brought about by the flow of the northeast trade winds prevailed over most of the country during the period under review. The northeasterly winds,

which sweep across the Sahara Desert characteristically advect cold, dry and dusty air into areas north of the ITD. The ITD attained its southern-most position in January.

During this period, low temperatures were recorded, and horizontal visibility was reduced significantly. March marked the beginning of the rainy season in the southern parts of Nigeria though rainfall was still relatively light. Port Harcourt began receiving more frequent showers, often accompanied by thunderstorms in the afternoons.

The states in the southwest and southeast recorded a few short, intense rain showers. However, the northern states remained dry. In the southern part of Nigeria, March 2024 saw an increase in humidity and the occasional downpour, marking the onset of the rainy season.

January 2024

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

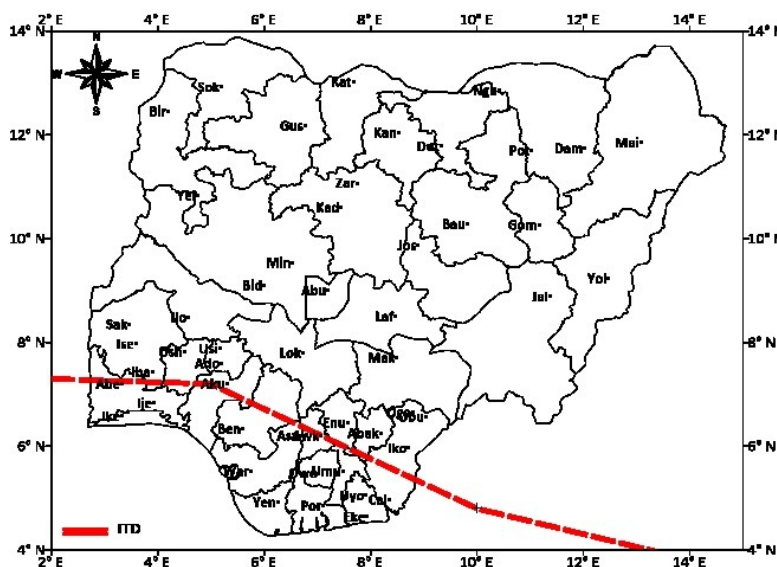


Figure 1: Mean Position of the ITD in January, 2024.

In January 2024, the ITD position over the country remained relatively stable, located over the southern axis of the country at approximately 7.6°N to the west and 5.1°N to the east. The significance of this is that stations North of the ITD experienced dry and dusty weather condition while those to the south experienced humid and less dusty

weather. The airports that are located north of the ITD during the month are Mallam Aminu Kano International Airport, Kano and Nnamdi Azikiwe International Airport, Abuja, while to the South are Port Harcourt International Airport, Port Harcourt, Akanu Ibiam International Airport, Enugu and Murtala Mohammed International Airport, Lagos.

2.2 Temperature fluctuations in January 2024

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

- Abuja had the highest maximum temperature of 37.4°C in January 2024 while Kano recorded the lowest

maximum temperature of 25.2°C.

- Port Harcourt had the highest minimum temperature of 28.0°C in January 2024 while Kano recorded the lowest minimum temperature of 10.2°C.
- Port Harcourt had the highest mean temperature of 32.6°C in January 2024 while Kano recorded the lowest mean temperature of 19.5°C.

2.3 Observed Maximum Temperature (Tmax) °C at various Airports in Nigeria in January 2024

Abuja Airport

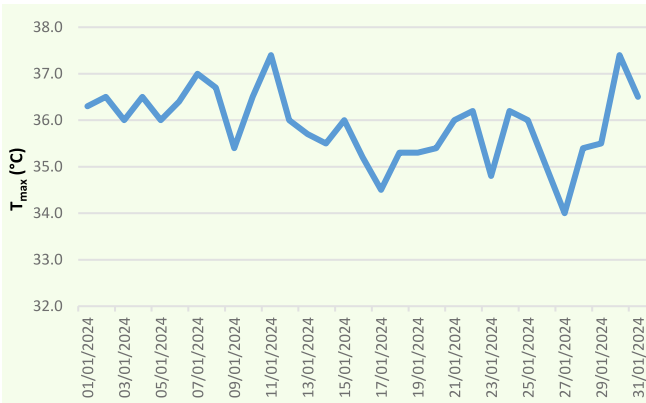


Figure 2: Daily Maximum Temperature at Abuja in January 2024

The highest maximum temperature of 37.4°C was observed on the 11th and 30th while the lowest was 34.0°C on the 27th of January 2024 (See Figure 2).

Lagos Airport

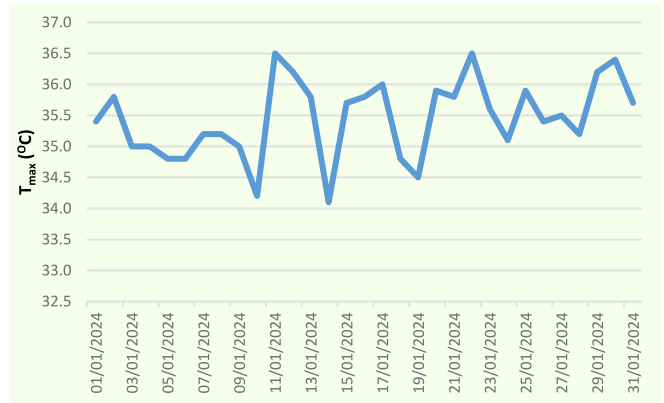


Figure 4: Daily Maximum Temperature at Lagos in January 2024

In Lagos, the highest maximum temperature of 36.5°C was observed on the 11th and 22nd while the lowest was 34.1°C was recorded on the 14th of January 2024. (See Figure 4)

Enugu Airport

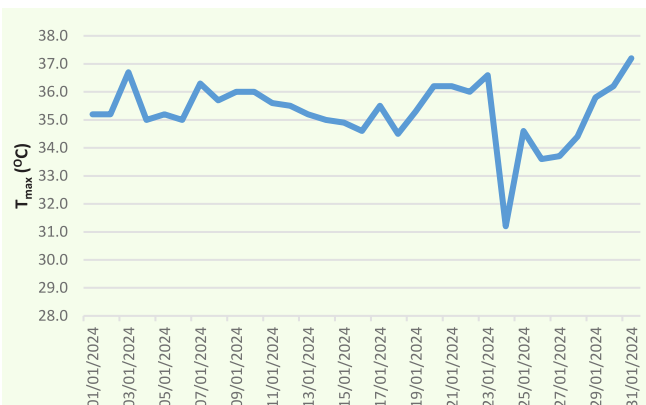


Figure 3: Daily Maximum Temperature at Enugu in January 2024

In Enugu, the highest maximum temperature of 37.2°C was recorded on the 31st, while the lowest was 31.2°C on the 24th of January 2024. (See Figure 3)

Kano Airport

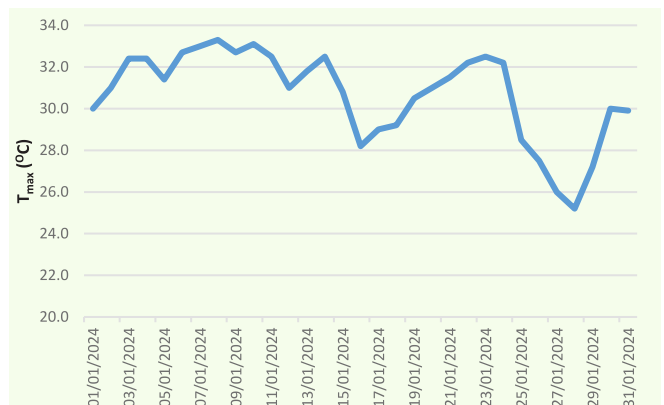


Figure 5: Daily Maximum Temperature at Kano in January 2024

As depicted in Figure 5, the highest maximum temperature in Kano in January 2024 was 33.3°C. This was recorded on the 8th while the lowest was 25.2°C, observed on the 28th.

Port Harcourt Airport

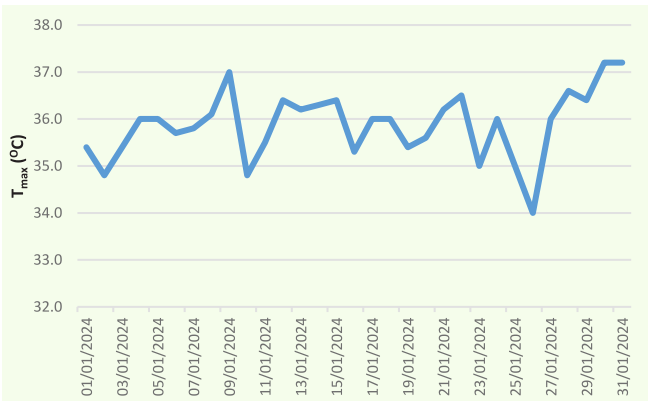


Figure 6: Daily Maximum Temperature at Port-Harcourt in January 2024

The highest maximum temperature of 37.4°C was observed on the 11th and 30th while the lowest was 34.0°C on the 27th of January 2024 (See Figure 2).

Enugu Airport



Figure 8: Daily Minimum Temperature at Enugu in January 2024

The lowest minimum temperature recorded in Enugu in January 2024 was 15.0°C. This was on the 17th while the highest was 24.0°C, recorded on the 3rd and 6th. (See Figure 8).

2.4 Observed Minimum Temperature (Tmin) °C at various Airports in Nigeria in January 2024

Abuja Airport

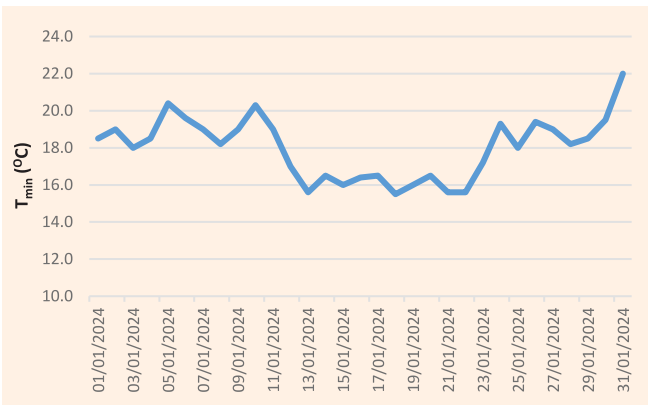


Figure 7: Daily Minimum Temperature at Abuja in January 2024

The lowest minimum temperature recorded in Abuja in January 2024 was 15.6°C. This occurred on the 13th, 21st and 22nd, while the highest was 22.0°C, recorded on the 31st of January 2024. (See Figure 7).

Lagos Airport

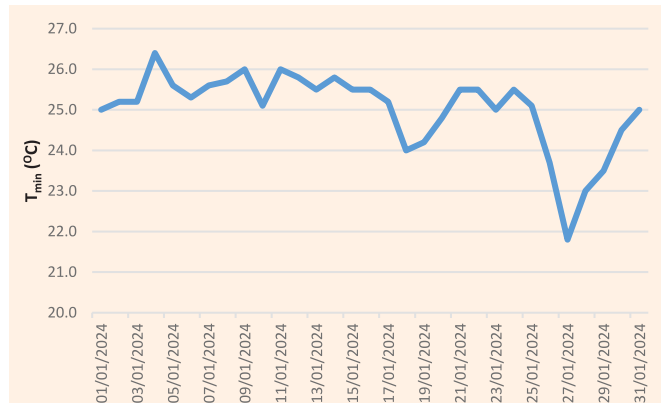


Figure 8: Daily Minimum Temperature at Lagos in January 2024

During the month under review, the lowest minimum temperature of 21.8°C was recorded in Lagos on the 27th while the highest was 26.4°C. This was observed on the 4th. (See Figure 8)

Kano Airport



Figure 10: Daily Minimum Temperature at Kano in January 2024

In January 2024 the lowest minimum temperature recorded at Kano was 10.2°C. This was on the 19th, while the highest was 15.8°C on the 27th and 31st. (See Figure 10).

Port Harcourt Airport



Figure 11: Daily Minimum Temperature at Port-Harcourt in January 2024

The lowest minimum temperature recorded in Port Harcourt in January 2024 was 16.0°C. This was observed on the 16th, while the highest was 28.0°C on the 31st. (See Figure 11).

2.5 Observed Mean Temperature (T_{mean}) °C at Various Airports in January 2024

Abuja Airport

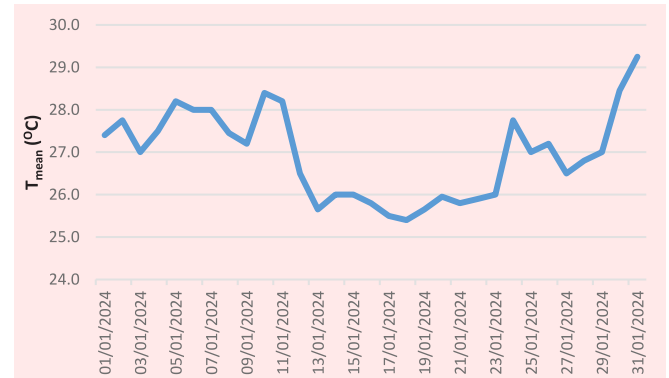


Figure 12: Mean Temperature at Abuja in January 2024

In January 2024, the recorded highest mean temperature at Abuja was 29.3°C. This was recorded on the 31st, while the lowest was 25.4°C observed on the 18th. (See Figure 12).

Enugu Airport



Figure 13: Mean Temperature at Enugu in January 2024

As depicted in Figure 13 the highest mean temperature of 30.4°C was observed at Enugu on the 3rd and 31st January, while the lowest was 25.3°C on the 17th of the month.

Lagos Airport

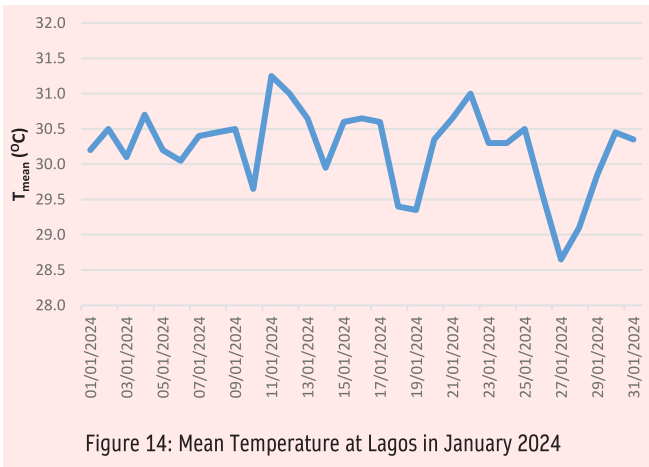


Figure 14: Mean Temperature at Lagos in January 2024

In January 2024, the highest mean temperature of 31.3°C was recorded at Lagos on the 11th, while the lowest was 28.7°C recorded on the 27th. (See Figure 14).

Port Harcourt Airport

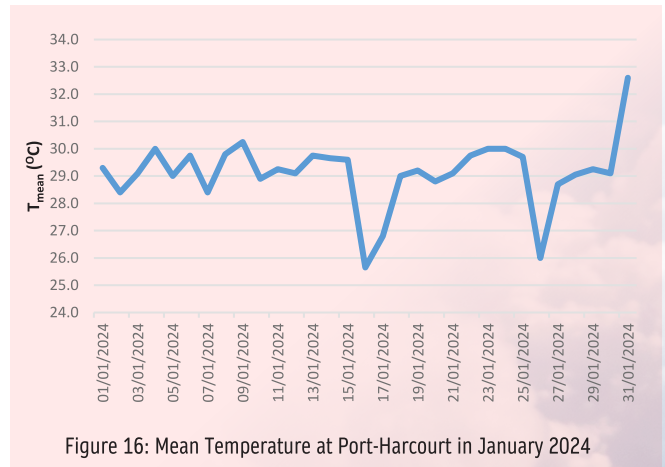


Figure 16: Mean Temperature at Port-Harcourt in January 2024

In January 2024, the highest mean temperature recorded at Port Harcourt airport was 32.6°C. This was recorded on the 31st while the lowest was 25.7°C on 16th January. These are shown in Figure 16.

Kano Airport

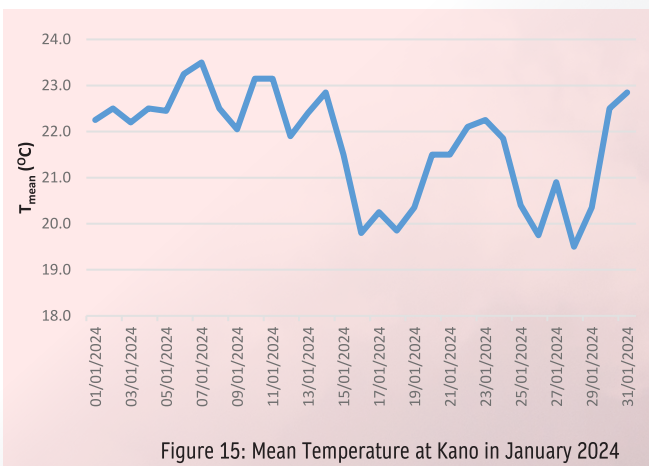


Figure 15: Mean Temperature at Kano in January 2024

As depicted in Figure 15, the highest mean temperature recorded at Kano in January 2024 was 23.5°C. This was recorded on the 7th of January, while the lowest was 19.5°C on the 28th of the month.

2.6 Observed Minimum Visibility Less than or Equal to 5000m at Nigerian Airports in January 2024

Abuja Airport

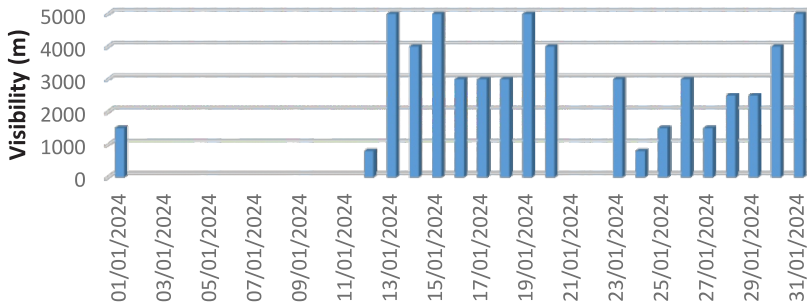


Figure 17: Visibility over Abuja in January 2024

In January 2024, visibility of 5000m and below were recorded for 19 non-consecutive days at Abuja airport, and the lowest was 800m on 12th and 24th of the month. (See Figure 17).

Enugu Airport

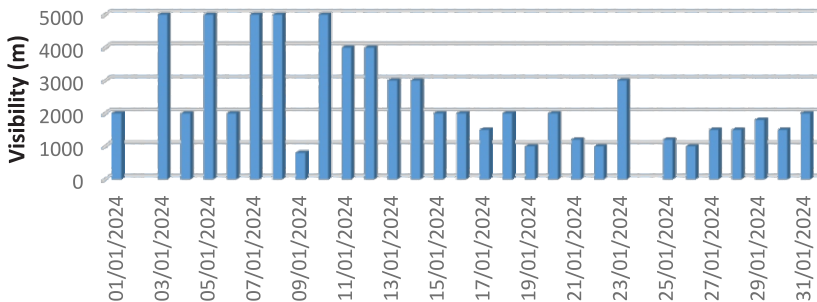


Figure 18: Visibility over Enugu in January 2024

In January 2024 visibility of 5000m and below was recorded for 29 non-consecutive days at Enugu airport and the lowest was 800m on 9th of January 2024. (See Figure 18).

Lagos Airport

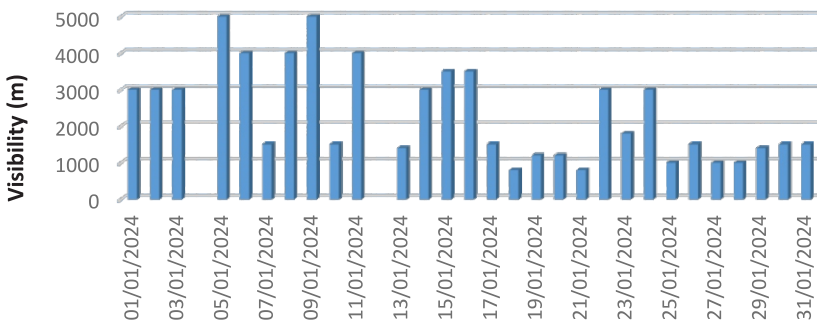


Figure 19: Visibility at Lagos Airport in January 2024

Visibility of 5000m and below was recorded for 29 non-consecutive days at Lagos airport in January 2024; the lowest being 800m on 18th and 21st of the month. (See Figure 19).

Kano Airport

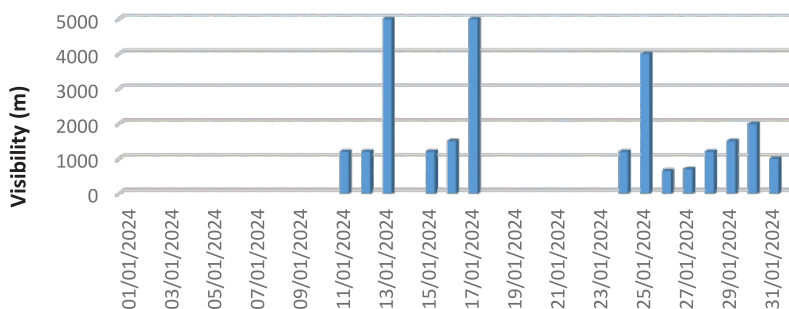


Figure 20: Visibility at Kano Airport in January 2024

Visibility of 5000m and below was recorded at Kano airport for 14 non - consecutive days in January 2024. The lowest visibility of 650m was recorded on 26th of the month. (See Figure 20).

Port Harcourt Airport

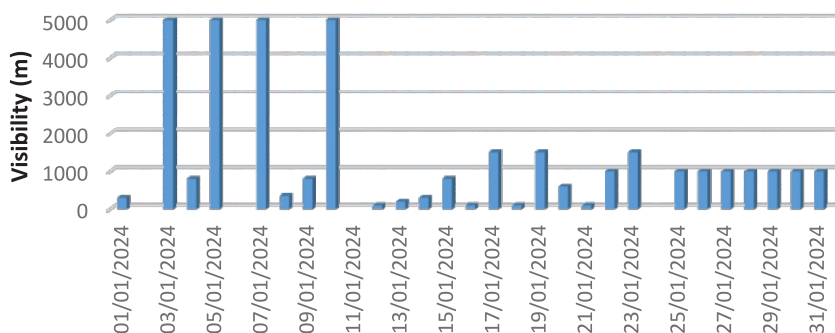


Figure 21: Visibility over Port-Harcourt in January 2024

As shown in Figure 20, visibility of 5000m and below was recorded for 27 non - consecutive days at Port Harcourt airport in January 2024. and the lowest being 100m occurred on 12th, 16th, 18th and 21st of the month.

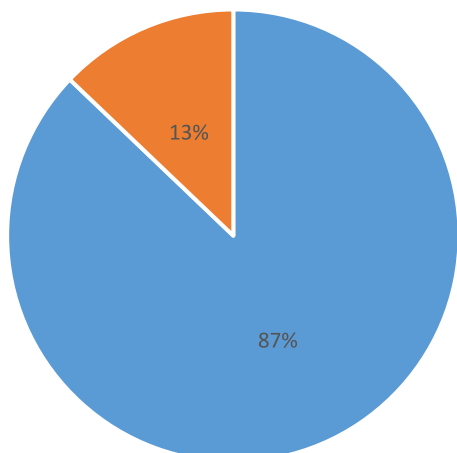
3.0 Production and Collection of Flight Documentation in January 2024

Flight documentation is a weather information 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, en-route 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.

Abuja Airport

The total number of flight documentation (folders) prepared was 373 out of which 325 were collected, representing 87% collection rate; while 48 were not collected, which represents 13% of the total. (See Figure 22).

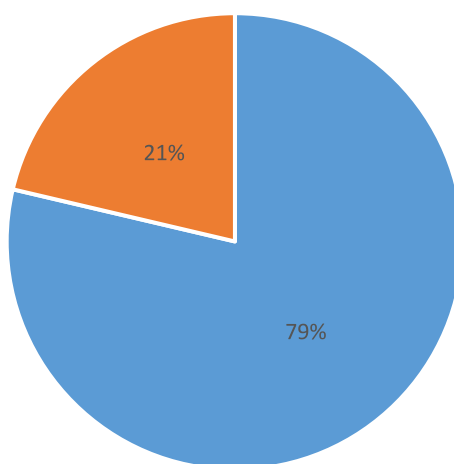


■ No. of Folders Collected ■ No. of Folders not Collected

Figure 22: Flight Documentation analysis for Nnamdi Azikiwe International Airport, Abuja for January 2024.

Kano Airport

Total number of 211 flight documentation folders were prepared, out of which 166 were collected representing 79% collection rate, while 45 were not collected which represent 21% of the total. (See Figure 24).

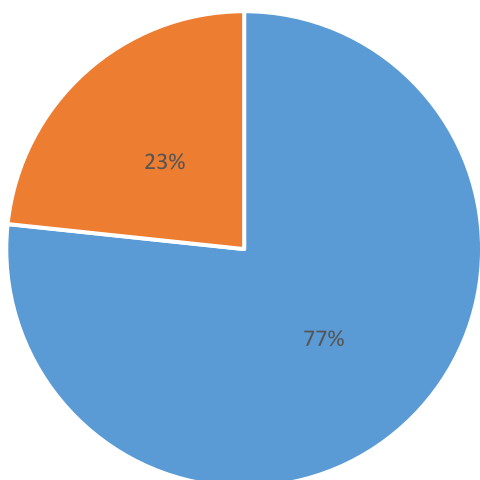


■ No. of Folders Collected ■ No. of Folders not Collected

Figure 24: Flight Documentation analysis for Mallam Aminu Kano International Airport Kano for January 2024

Lagos Airport

The total number of flight documentation prepared was 1,252 out of which 960 were collected representing 77% collection rate, while 292 were not collected which represents 23% of the total. (See Figure 23)

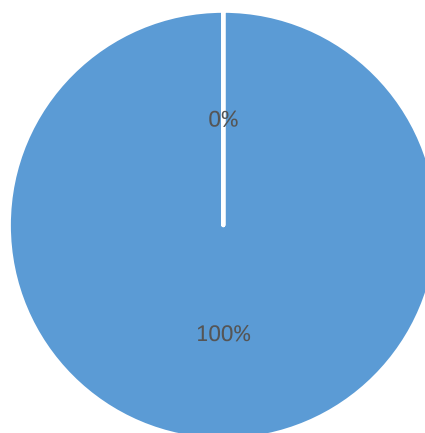


■ No. of Folders Collected ■ No. of Folders Not Collected

Figure 23: Flight Documentation analysis for Murtala Mohammed International Airport, Lagos in January 2024.

Port Harcourt Airport

The total number of flight documentation folders prepared was 30 and 100% collection rate was recorded. (See Figure 25).



■ No. of Folders Collected ■ No. of Folders not Collected

Figure 25: Flight Documentation analysis for Port Harcourt International Airport.

February 2024

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

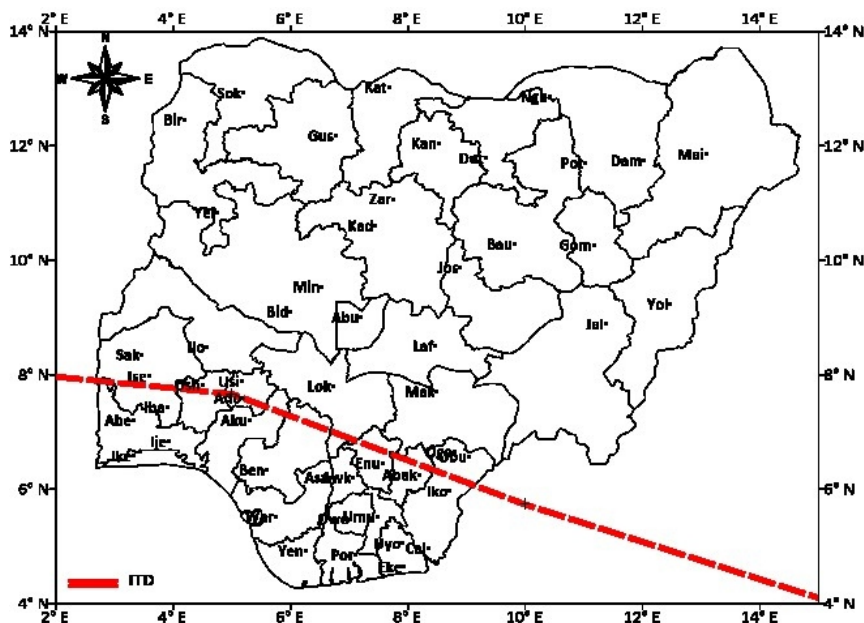


Figure 26: Mean position of the ITD in February, 2024.

In February 2024, there was a slight northward pull of the ITD to a mean position of approximately 7.9°N to the west and 6.0°N to the east compared to its position in January. The significance of this is that stations North of the ITD experienced dry and dusty weather condition while those to the south experienced humid and less dusty weather phenomenon. The positions of all the airport stations relative to the ITD during the month under review remained the same as they were in January, i.e. Kano and Abuja were still to the north of the ITD, while Port Harcourt, Enugu and Lagos remained to the south. Highlights of the weather at the five airport

stations in February 2024 are as follows:

- Abuja had the highest maximum temperature in February 2024 with a value of 41.5°C. While Kano recorded the lowest maximum temperature of 25.8°C.
- Abuja also had the highest minimum temperature in February 2024 with of 33.3°C, while Kano recorded the lowest minimum temperature value of 9.0°C.
- Port Harcourt recorded the highest mean temperature of 33.8°C in February 2024 , while Kano recorded the lowest mean temperature of 17.4°C.

4.1: Observed Maximum Temperature (Tmax) °C at Various Airports in Nigeria in February 2024

Abuja Airport



Figure 27: Daily Maximum Temperature at Abuja Airport in February 2024

In February 2024, the highest maximum temperature of 41.8°C was recorded at Abuja airport on the 15th while the lowest value was 34.2°C on the 23rd. (See Figure 26)

Lagos Airport

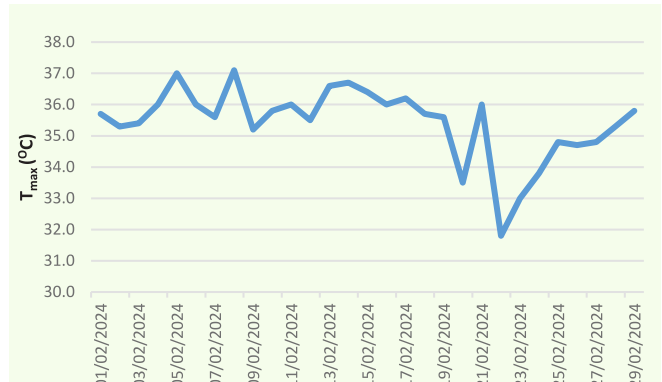


Figure 29: Daily Maximum Temperature at Lagos Airport in February 2024

In February 2024, the highest maximum temperature of 37.1°C was recorded at Lagos airport on the 18th while the lowest maximum temperature was 31.8°C. This was recorded on the 22nd of the month under review. (See Figure 29).

Enugu Airport



Figure 28: Daily Maximum Temperature at Enugu Airport in February 2024

In February 2024, the highest maximum temperature at Enugu airport was 40.5°C. This was recorded on the 13th while the lowest was 29.6°C, observed on the 22nd. (See Figure 28).

Kano Airport

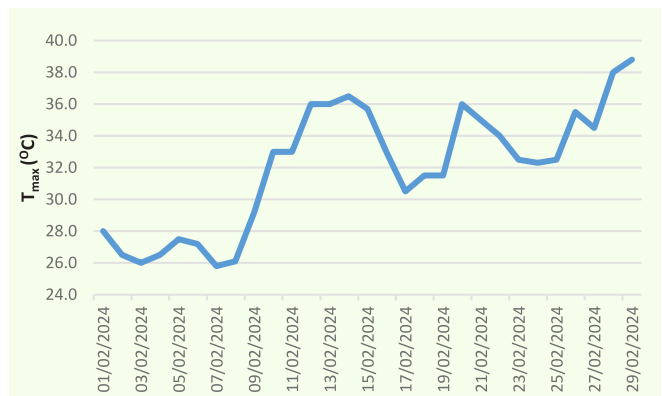


Figure 30: Daily Maximum Temperature at Kano Airport in February 2024

Figure 30 shows the daily maximum temperature recorded at Kano airport in February 2024. The highest maximum temperature of 38.8°C was observed on the 29th, while the lowest, 25.8°C was recorded on the 7th of the month

Port Harcourt Airport

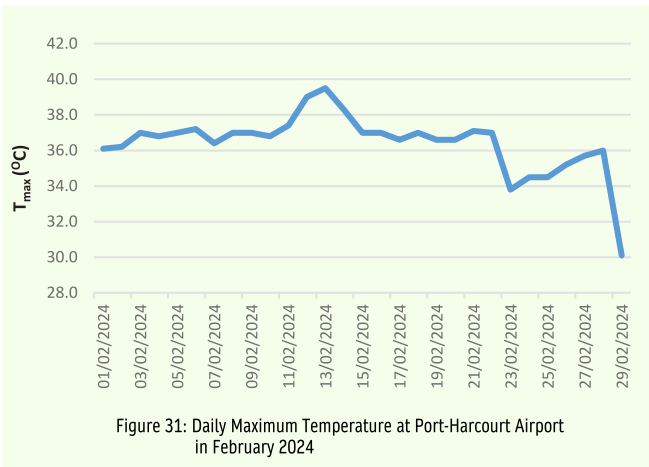


Figure 31: Daily Maximum Temperature at Port-Harcourt Airport in February 2024

The highest maximum temperature of 39.5°C was recorded at Port Harcourt airport on 13th February 2024, while the recorded lowest temperature of 30.1°C was observed on the 29th of the month. (See Figure 31).

Enugu Airport

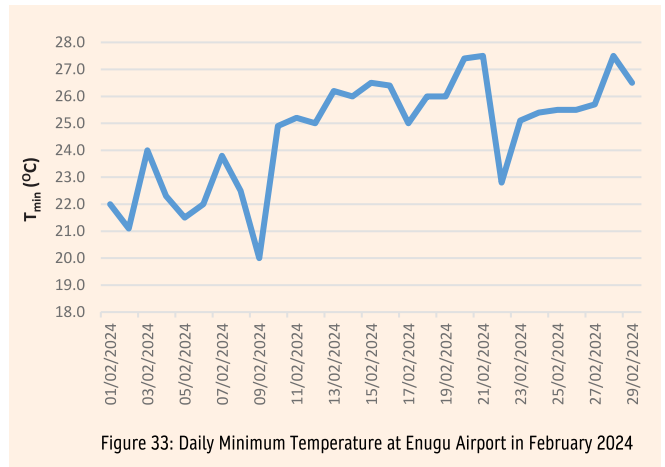


Figure 33: Daily Minimum Temperature at Enugu Airport in February 2024

The lowest minimum temperature of 20.0°C was observed at Enugu airport on the 9th of February 2024 while the highest was 27.5°C on the 21st and 28th of the month. (See Figure 33).

4.2: Observed Minimum Temperature (Tmin) °C at the Airports in February 2024

Abuja Airport

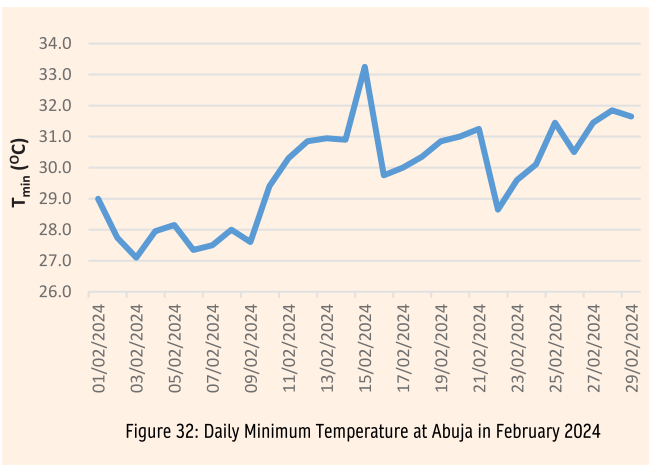


Figure 32: Daily Minimum Temperature at Abuja in February 2024

In February 2024 the lowest minimum temperature that was recorded at Abuja airport was 27.1°C, on the 3rd while the highest was 33.3°C on the 15th of the month. (See Figure 31).

Lagos Airport

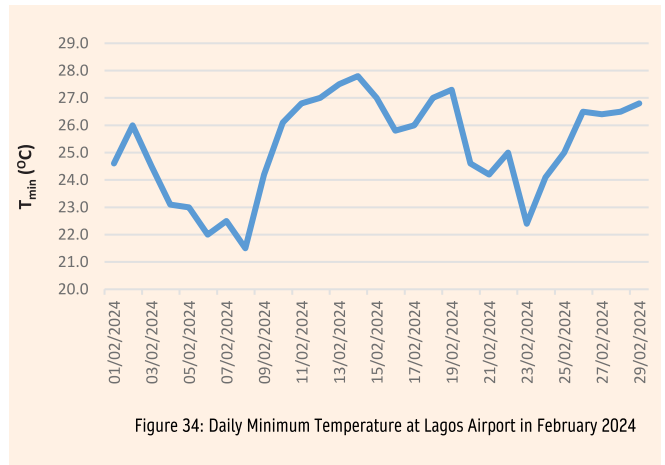


Figure 34: Daily Minimum Temperature at Lagos Airport in February 2024

Figure 34 shows the recorded daily minimum temperature at Lagos airport in February 2024. The lowest minimum temperature of 21.5°C was recorded at the station on the 8th while the highest was 27.8°C on the 14th of the month.

Kano Airport

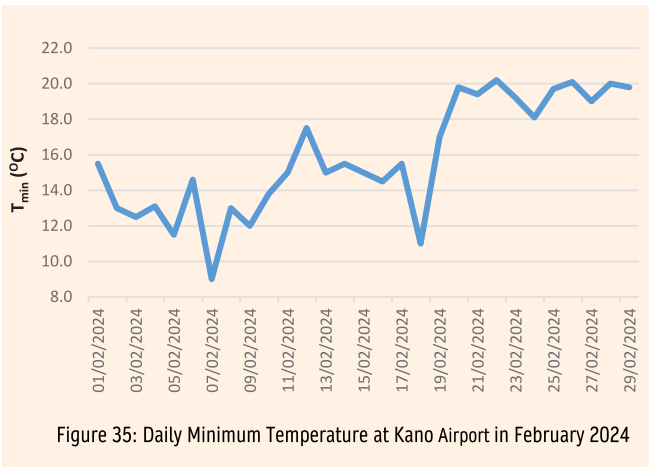


Figure 35: Daily Minimum Temperature at Kano Airport in February 2024

In February 2024, lowest minimum temperature of 09.0°C was recorded at Kano airport on the 7th while the highest value was 20.5°C, recorded on the 22nd of the month. (See Figure 35).

Port Harcourt Airport

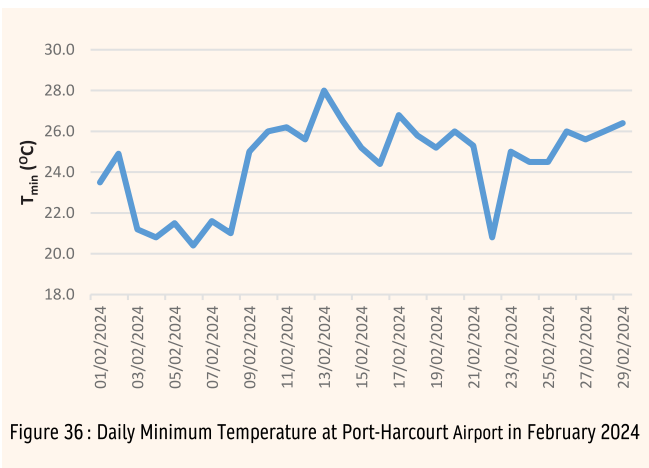


Figure 36 : Daily Minimum Temperature at Port-Harcourt Airport in February 2024

In February 2024, the lowest minimum temperature of 20.4°C was recorded at Port Harcourt airport on the 6th while the highest was 28.0°C. This was recorded on the 13th of the month. These are shown in Figure 36.

4.3 Observed Mean Temperature T_{mean}(°C) at the Airports in February 2024

Abuja Airport

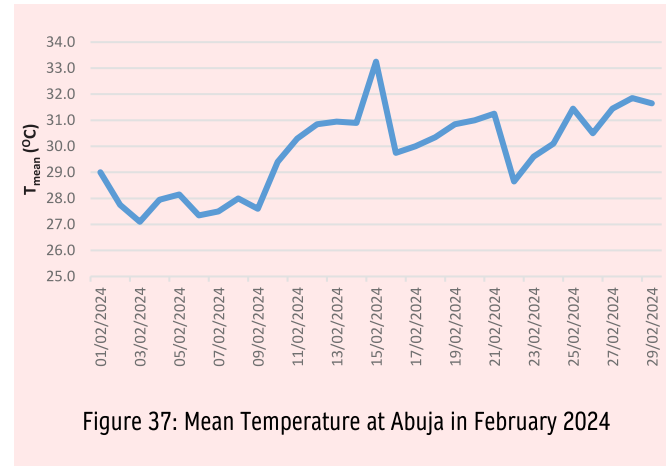


Figure 37: Mean Temperature at Abuja in February 2024

In February 2024, highest mean temperature of 33.3°C was recorded at Abuja on the 15th, while the lowest was 27.1°C, recorded on the 3rd of the month. These are depicted in Figure 37.

Enugu Airport

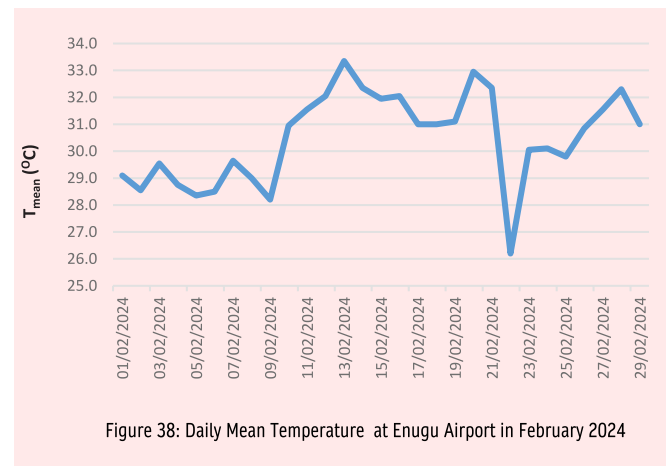


Figure 38: Daily Mean Temperature at Enugu Airport in February 2024

As depicted in figure 38, the highest mean temperature of 33.4°C was recorded at Enugu airport on the 13th of February while the lowest was 26.2°C, recorded on the 22nd of the month.

Lagos Airport

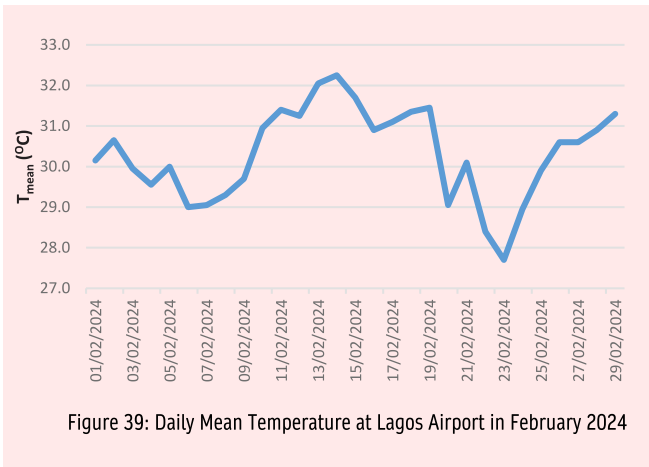


Figure 39: Daily Mean Temperature at Lagos Airport in February 2024

In February 2024, the highest mean temperature of 32.3°C was recorded at Lagos airport on the 14th while the lowest recorded was 27.7°C on the 23rd of the month. (See Figure 39).

Port Harcourt Airport

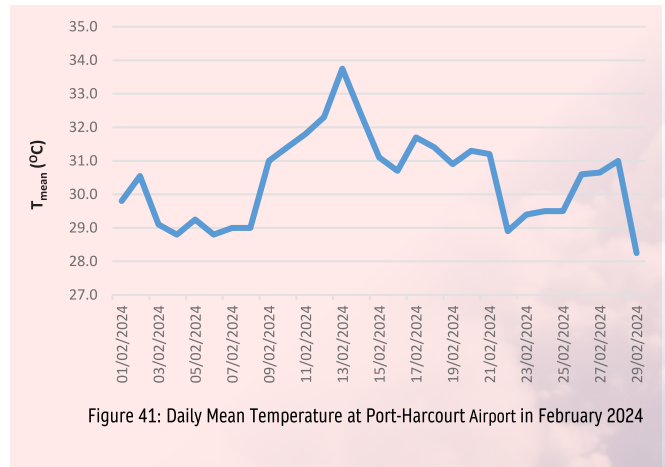


Figure 41: Daily Mean Temperature at Port-Harcourt Airport in February 2024

The highest mean temperature recorded at Port Harcourt airport in February 2024 was 33.8°C. This was on the 13th, while the lowest was 28.3°C recorded on the 29th of the month. These are depicted in Figure 41.

Kano Airport

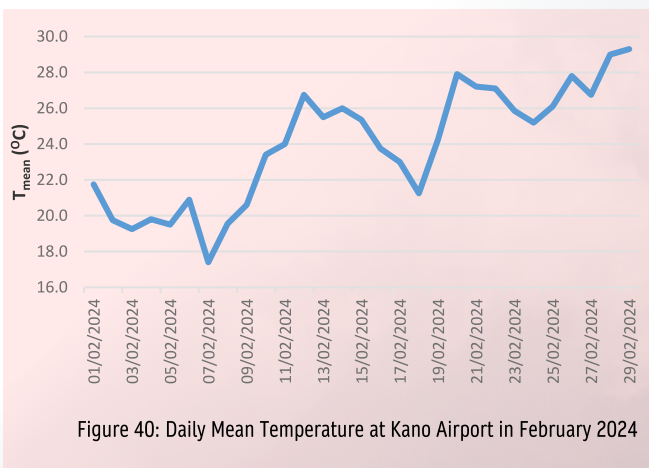


Figure 40: Daily Mean Temperature at Kano Airport in February 2024

In February 2024, the highest mean temperature recorded at Kano airport was 29.3°C on the 19th while the lowest was 17.4°C recorded on the 7th of the month. (See Figure 40).

4.4 Observed Minimum Visibility (From 5000m and Below) in February 2024

Abuja Airport

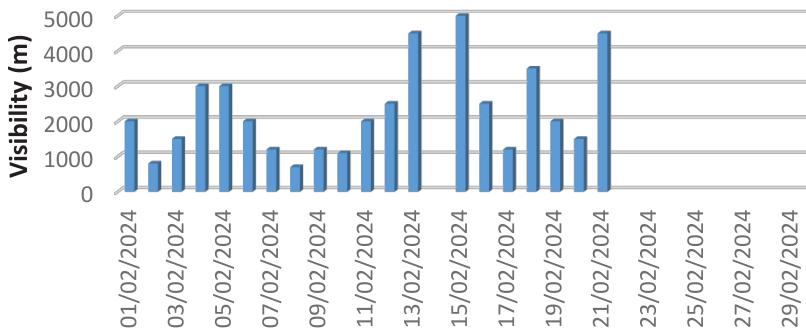


Figure 42: Visibility over Abuja Airport in February 2024

As shown in Figure 42, visibility of 5000m and below were recorded at Abuja airport for 20 non-consecutive days in February 2024, and the lowest was 700m, recorded on 8th of the month.

Enugu Airport

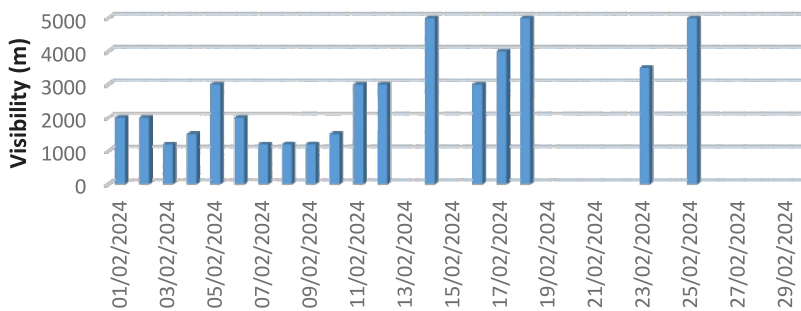


Figure 43: Visibility over Enugu Airport in February 2024

Visibility of 5000m and below was recorded at Enugu airport for 18 non-consecutive days in February 2024 and the lowest being 1200m on 3rd, 7th, 8th and 9th of the month. (See Figure 43).

Lagos Airport

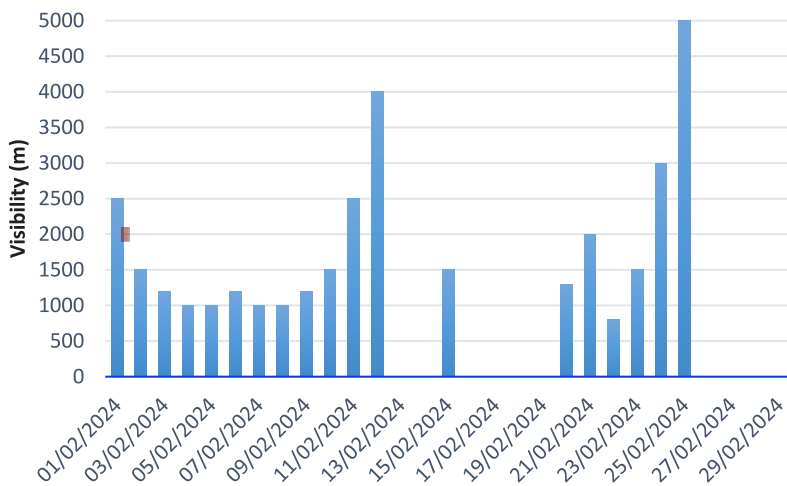


Figure 44: Visibility over Lagos Airport in February 2024

As shown in Figure 44 , visibility of 5000m and below was recorded at Lagos airport for 22 non-consecutive days in February 2024. The lowest visibility during the period was 800m. This was recorded on 22nd of the month.

Kano Airport

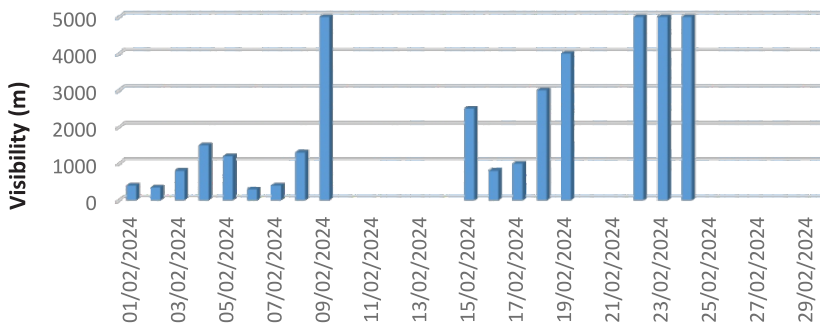


Figure 45: Visibility over Kano Airport in February 2024

Visibility of 5000m and below was recorded at Kano airport for 17 non-consecutive days in February 2024; the lowest was 300m recorded on 6th of the month. (See Figure 45).

Port Harcourt Airport

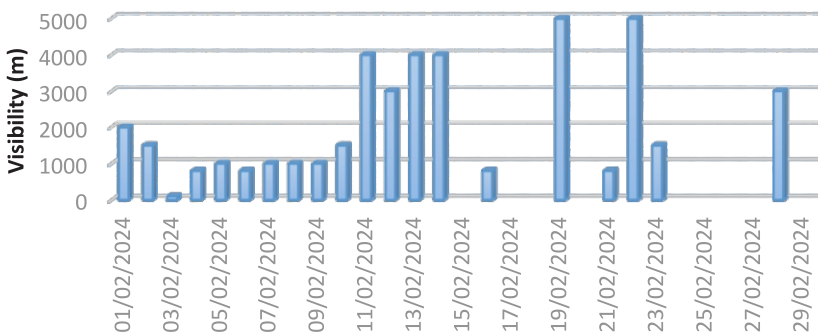
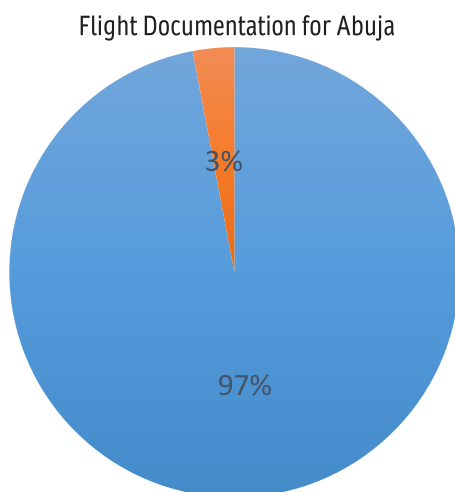


Figure 46: Visibility over Port-Harcourt Airport in February 2024

As shown in Figure 46 visibility of 5000m and below was recorded at Port Harcourt for 20 non-consecutive days in February 2024. The lowest was 100m recorded on 3rd of the month.

5.0 Production and Collection of Flight Documentation in February 2024

Abuja Airport



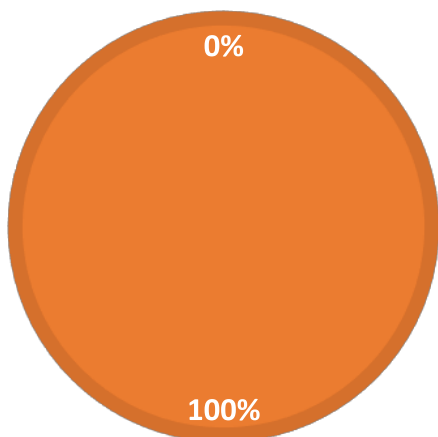
■ No. of Folders Collected ■ No. of Folders not Collected

Figure 47: Flight Documentation Analysis for Abuja Airport in February 2024

The total number of flight documentation (folders) prepared at Abuja airport was 336 out of which 326 were collected representing 97% collection rate however 3% were not collected. (See Figure 47).

Enugu Airport

Flight Documentation for Enugu



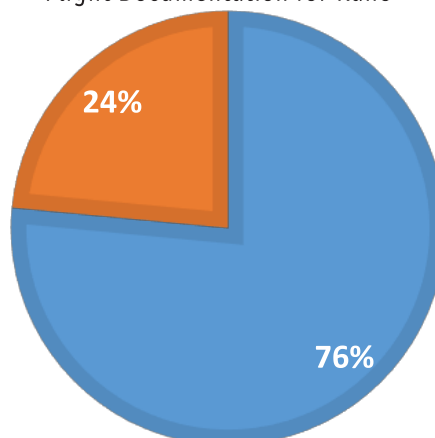
■ No. of folders collected ■ No. of folders not collected

Figure 48: Flight Documentation Analysis for Enugu Airport in February 2024

The total number of flight documentation (folders) prepared at Enugu airport in February 2024 was 15 out of which none was collected representing 0% collection rate.

Kano Airport

Flight Documentation for Kano



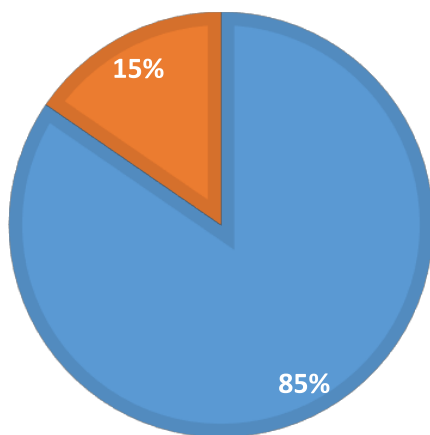
■ No. of folders collected ■ No. of folders not collected

Figure 50: Flight Documentation Analysis for Kano Airport in February 2024

The total number of flight documentation (folders) prepared at Kano airport in February 2024 was 200 out of which 153 were collected representing 76% collection rate however 24% were not collected.

Lagos Airport

Flight Documentation For Lagos



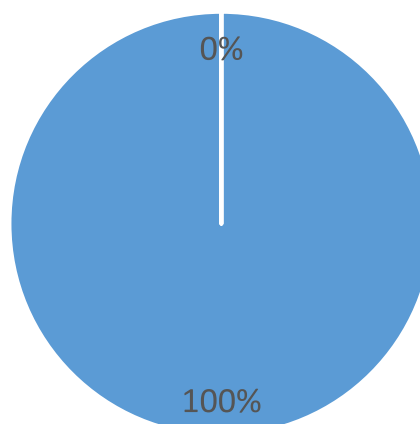
■ No. of folders collected ■ No. of folders not collected

Figure 49: Flight Documentation Analysis for Lagos Airport in February 2024

The total number of flight documentation (folders) prepared at Lagos airport in February 2024 was 1270 out of which 1074 were collected representing 85% collection rate; however 15% were not collected.

Port Harcourt Airport

Flight Documentation For Port-Harcourt



■ No. of folders collected ■ No. of folders not collected

Figure 51: Flight Documentation Analysis for Port Harcourt in February 2024

In February 2024, the total number of flight documentation (folders) prepared was 24 and 100% collection rate were recorded at Port Harcourt airport.

March 2024

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

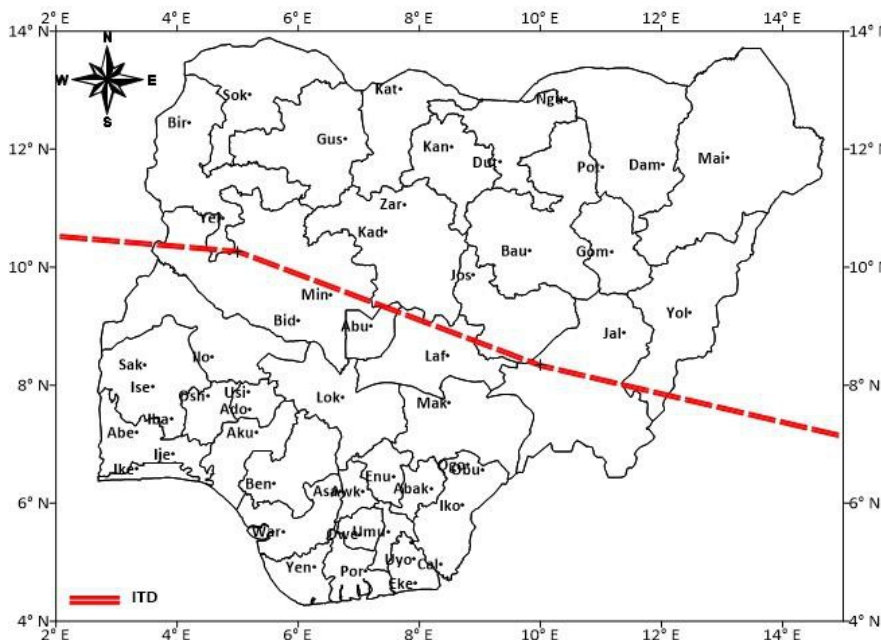


Figure 52: Mean position of ITD for the month of March 2024.

As depicted in Figure 52, there was a significant northward displacement of the ITD to approximately 10.4°N to the west and 8.0°N to the east compared to its position in January and February. Abuja, Enugu, Port Harcourt and Lagos are now south of the ITD. This is indicative of more moisture influx inland resulting in weather activities such as rain, thunderstorm, fog, mist etc in those stations. However, Kano continued to experience dry and dusty weather conditions (haze and dust) due to its position being north of the ITD.

The weather across the airport stations in March 2024 are summarized as follows:

- Kano had the highest maximum temperature in March 2024 with a value of 42.5°C, while Port Harcourt recorded the lowest maximum temperature of 29.3°C.
- Enugu had the highest minimum temperature in March 2024 with a value of 28.5°C, while Kano recorded the lowest minimum temperature of 18.4°C.
- Kano recorded the highest mean/average temperature in March 2024 with a value of 34.0°C, while Kano recorded the lowest mean/average temperature of 26.8°C.

Observed Maximum Temperature (Tmax) °C at Various Airports in Nigeria in March 2024

Abuja Airport

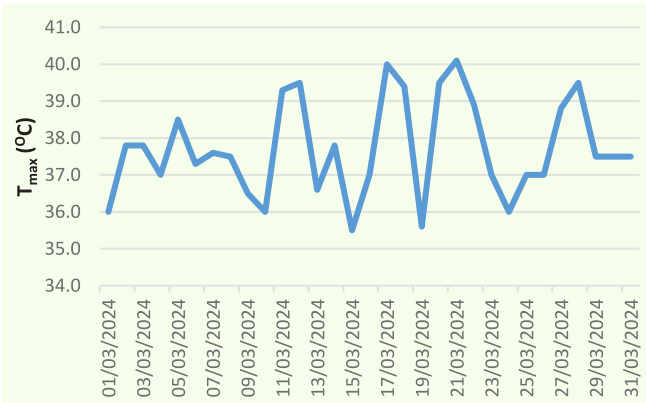


Figure 53: Daily Maximum Temperature at Abuja in March 2024

In March 2024, the highest maximum temperature at Abuja airport was 40.1°C on 21st of the month, while the lowest maximum temperature of 35.5°C, recorded on 15th March.

Enugu Airport

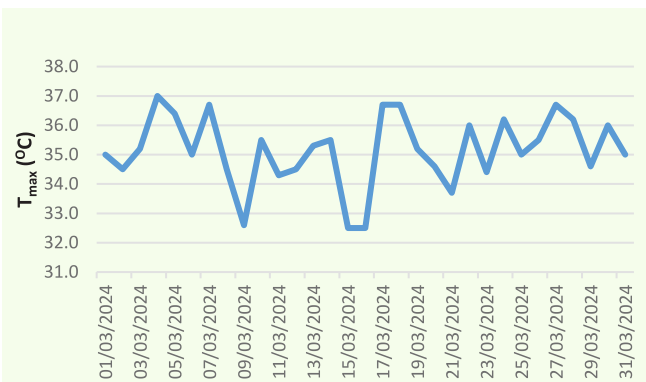


Figure 54: Daily Maximum Temperature at Enugu Airport in March 2024

Figure 54 shows the daily maximum temperature at Enugu airport in March 2024. The highest maximum temperature of 37.0°C was recorded on the 4th, while the lowest was 32.5°C recorded on the 15th and 16th.

Lagos Airport



Figure 55: Daily Maximum Temperature at Lagos Airport in March 2024

In March 2024, the highest maximum temperature of 42.5°C was recorded at Lagos airport on the 11th while the lowest was 32.5°C recorded on the 17th of the month. These are depicted in Figure 55.

Kano Airport

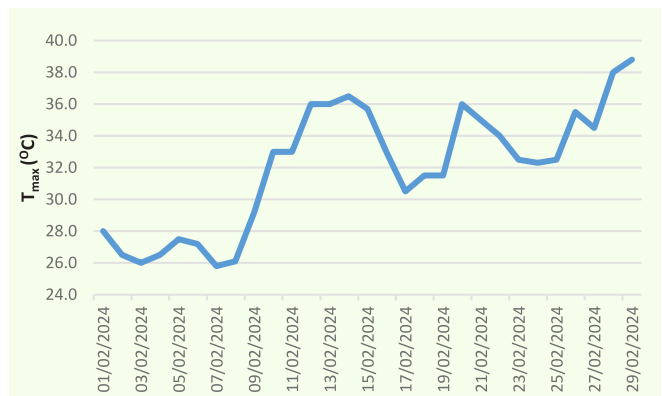


Figure 30: Daily Maximum Temperature at Kano Airport in February 2024

As shown in Figure 56 the highest maximum temperature recorded at Kano airport in March 2024 was 42.5°C on the 11th, while the lowest was 32.5°C recorded on the 18th of the month.

Port Harcourt Airport

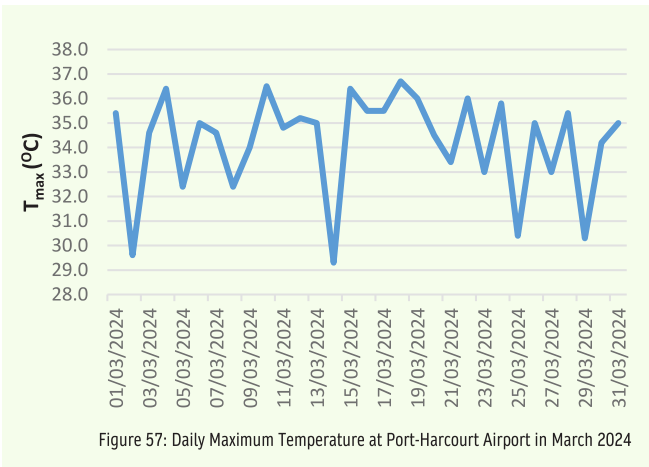


Figure 57: Daily Maximum Temperature at Port-Harcourt Airport in March 2024

In March 2024, the highest maximum temperature recorded at Port Harcourt was 36.7°C. This was on the 18th. On the other hand, the lowest maximum temperature was 29.3°C recorded on 14th of the month. (See Figure 57).

Enugu Airport

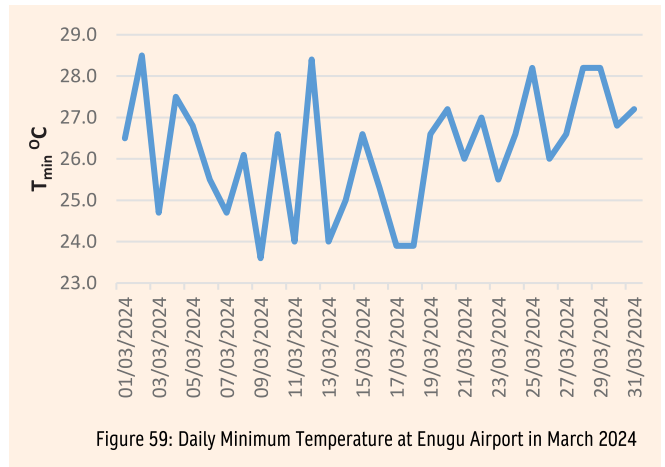


Figure 59: Daily Minimum Temperature at Enugu Airport in March 2024

In March 2024, the minimum temperature observed at Enugu airport varied between 23.6°C (the lowest) and 28.5°C (the highest). These were recorded on the 9th and 2nd March, respectively. (See Figure 59).

6.2: Observed Minimum Temperature (Tmin °C) at the Airports in March 2024

Abuja Airport

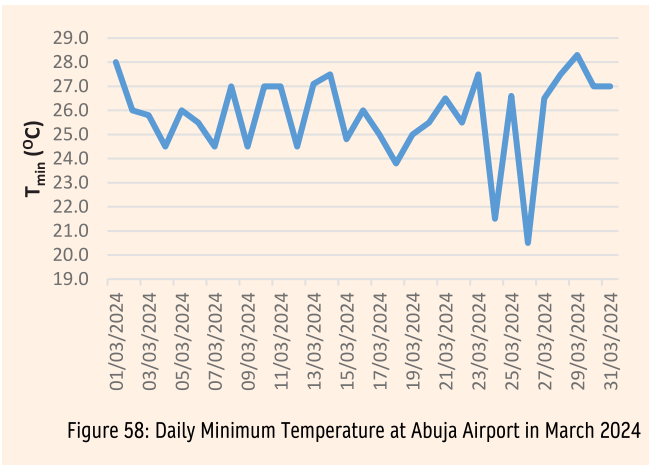


Figure 58: Daily Minimum Temperature at Abuja Airport in March 2024

The lowest minimum temperature recorded at Abuja airport in March 2024 was 20.5°C on 26th, while the highest was 28.3°C on 29th of the month. These are depicted in Figure 58.

Lagos Airport

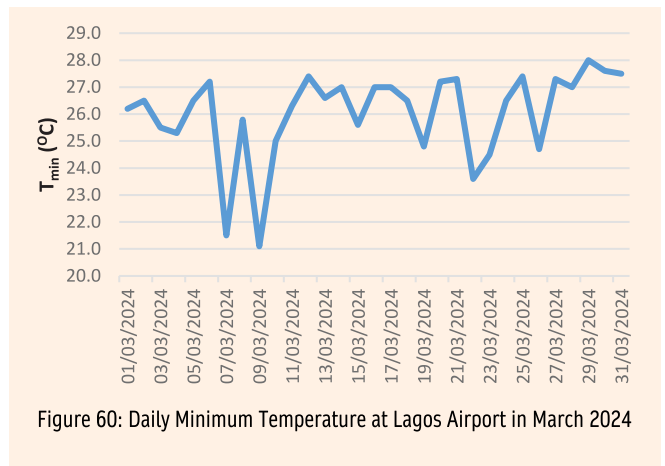


Figure 60: Daily Minimum Temperature at Lagos Airport in March 2024

In March 2024, the lowest minimum temperature of 21.1°C was recorded at Lagos airport on the 9th, while the highest was 28.0°C and was recorded on the 29th of the month. These are depicted in Figure 60.

Kano Airport



Figure 61: Daily Minimum Temperature at Kano Airport in March 2024

The lowest minimum temperature recorded at Kano airport in March 2024 was 18.4°C on 25th, while the highest was 27.0°C. This was observed on the 8th of the month. (See Figure 61)

Port Harcourt Airport

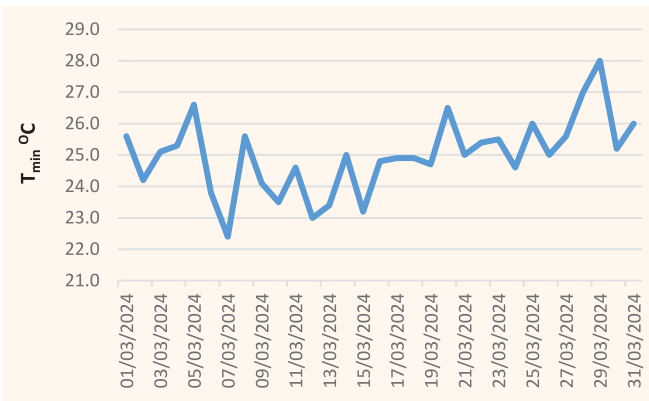


Figure 62: Minimum Temperature at Port-Harcourt in March 2024

The minimum temperature of 22.4°C recorded on the 7th of March 2024 was the lowest at Port Harcourt airport for the month, while the highest was 28.0°C observed on the 28th of the month.

6.3: Observed Mean Temperature (Tmean °C) at the Airports in March 2024

Abuja Airport

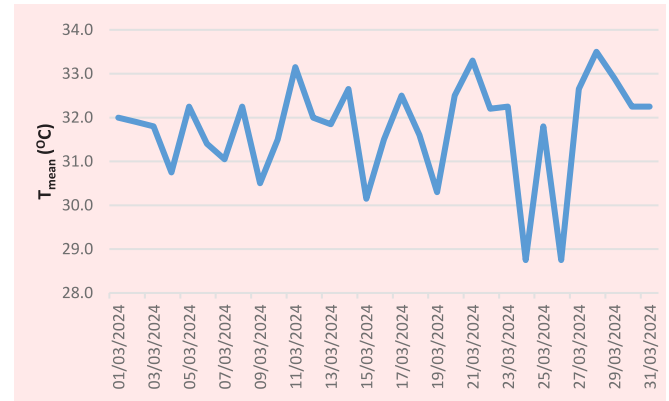


Figure 63: Mean Temperature at Abuja in March 2024

Figure 63 depicts recorded highest mean temperature value of 33.5°C on the 28th while the lowest value was 28.8°C on the 24th and 26th.

Enugu Airport

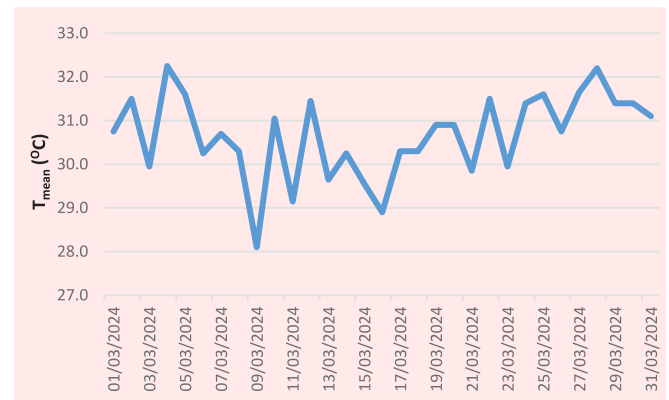


Figure 64: Mean Temperature at Enugu in March 2024

Figure 64 depicts recorded highest mean temperature value of 32.3°C on the 4th while the lowest value was 28.1°C on the 9th.

Lagos Airport

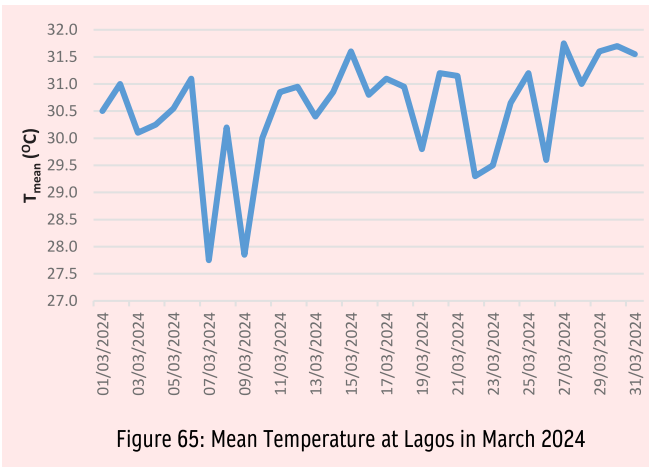


Figure 65: Mean Temperature at Lagos in March 2024

Figure 65 depicts recorded highest mean temperature value of 31.8°C on the 27th while the lowest value was 27.8°C on the 7th.

Port Harcourt Airport

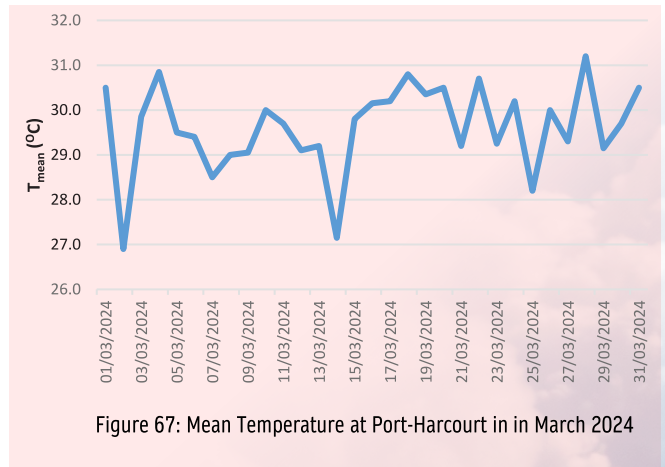


Figure 67: Mean Temperature at Port-Harcourt in March 2024

Figure 67 depicts recorded highest mean temperature value of 31.2°C on the 28th while the lowest value was 26.9°C on the 2nd.

Kano Airport

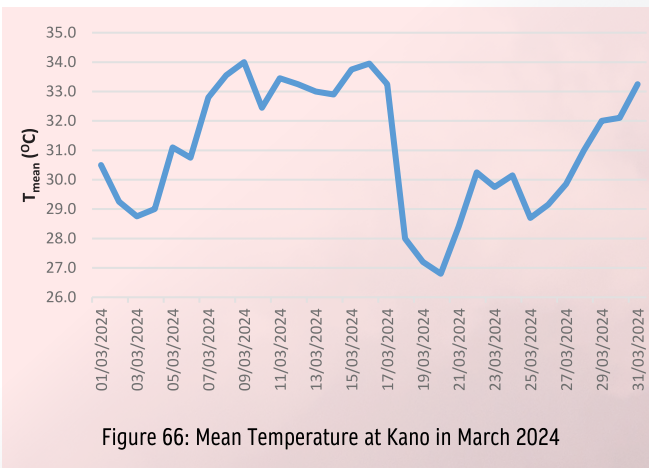


Figure 66: Mean Temperature at Kano in March 2024

Figure 66 depicts recorded highest mean temperature value of 34.0°C on the 9th and 16th while the lowest value was 26.8°C on the 20th.

6.4: Observed Minimum Visibility (From 5000m and Below) in March 2024

Abuja Airport

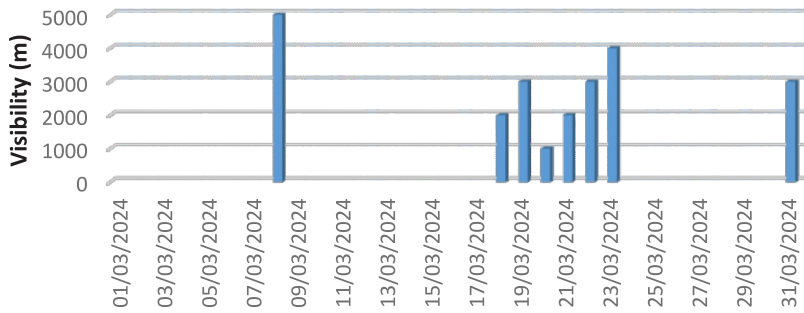


Figure 68: Visibility over Abuja in March 2024

Figure 68 above shows that visibility of 5000m and below was recorded for 8 non-contiguous days and the lowest being 0800m on 20th of the month.

Enugu Airport

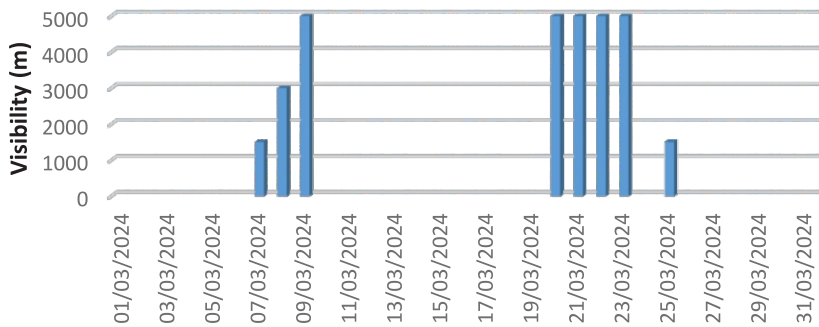


Figure 69: Visibility over Enugu in March 2024

Figure 69 above shows that visibility of 5000m and below was recorded for 8 non-contiguous days and the lowest being 1500m on 7th and 25th of the month.

Lagos Airport

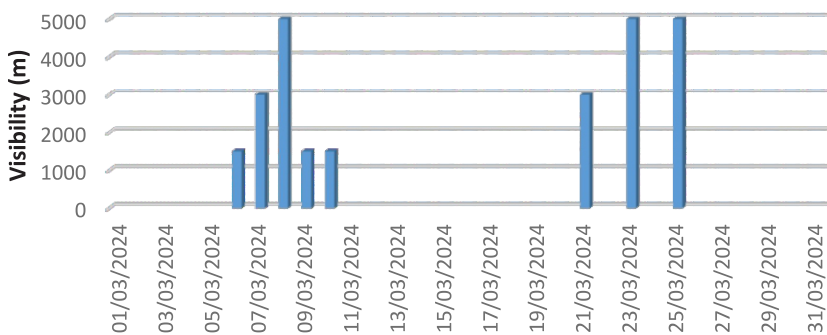


Figure 70: Visibility over Lagos in March 2024

Figure 70 above shows that visibility of 5000m and below was recorded for 8 non-contiguous days and the lowest being 1500m on 6th, 9th and 10th of the month.

Kano Airport

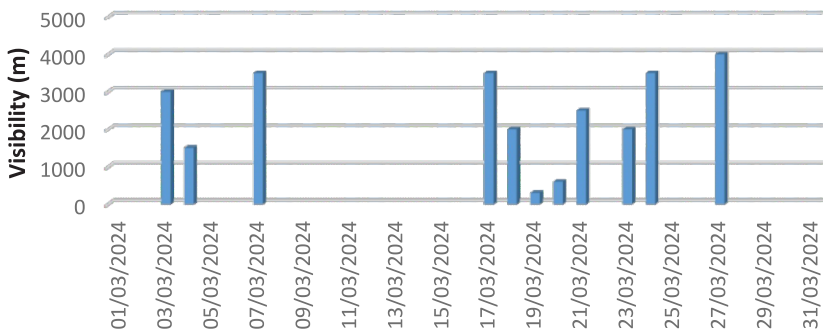


Figure 71: Visibility over Kano in March 2024

Figure 71 above shows that visibility of 5000m and below was recorded for 11 non-contiguous days and the lowest being 300m on 19th of the month.

Port Harcourt Airport

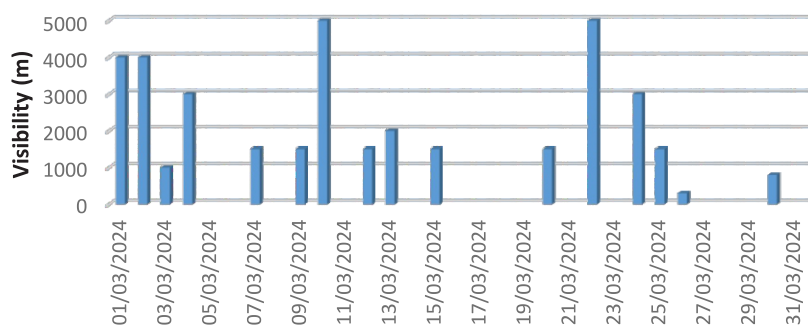
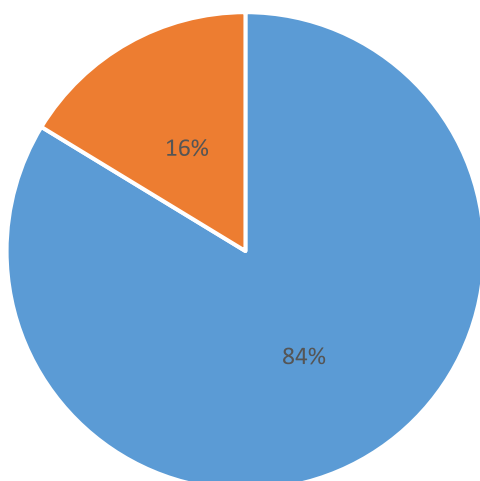


Figure 72: Visibility over Port Harcourt in March 2024

Figure 72 above shows that visibility of 5000m and below was recorded for 16 non-contiguous days and the lowest being 300m on 26th of the month.

6.5 Production and Collection of Flight Documentation in March 2024

Abuja Airport



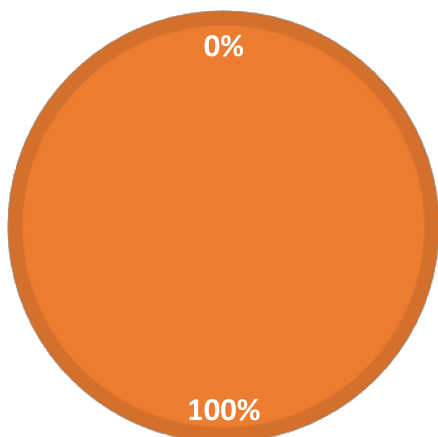
The total number of flight documentation (folders) prepared was 368 out of which 308 were collected representing 84% collection rate however 16% were not collected.

■ No. of Folders Collected ■ No. of Folders not Collected

Figure 74: Flight Documentation analysis for Abuja in March 2024

Enugu Airport

Flight Documentation for Enugu

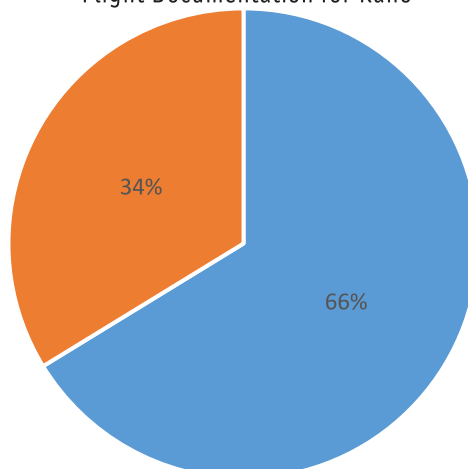


■ No. of folders collected ■ No. of Folders not collected
Figure 75: Flight Documentation analysis for Enugu in March 2024

The total number of flight documentation (folders) prepared was 19 out of which none was collected representing 0% collection rate.

Kano Airport

Flight Documentation for Kano

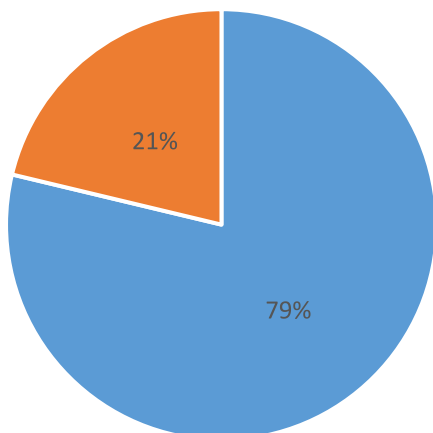


■ No. of Folders Collected ■ No. of Folders not Collected
Figure 77: Flight Documentation analysis for Kano in March 2024

The total number of flight documentation (folders) prepared was 163 out of which 108 were collected representing 66% collection rate however 34% were not collected.

Lagos Airport

Flight Documentation For Lagos

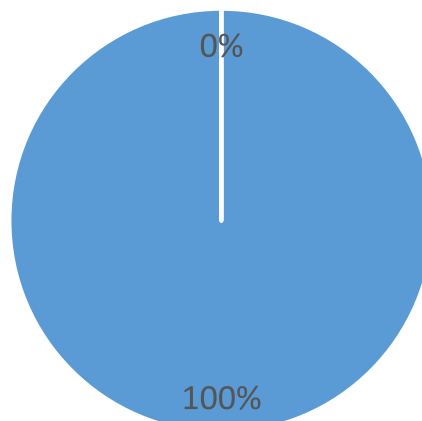


■ No. of Folders Collected ■ No. of Folders Not Collected
Figure 76: Flight Documentation analysis for Lagos in March 2024

The total number of flight documentation (folders) prepared was 1336 out of which 1052 were collected representing 79% collection rate however 21% were not collected.

Port Harcourt Airport

Flight Documentation For Port-Harcourt



■ No. of Folders Collected ■ No. of Folders not Collected
Figure 78: Flight Documentation analysis for Port Harcourt in March 2024

The total number of flight documentation (folders) prepared was 31 and 100% collection rate were recorded.



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 overtime.

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.

National Weather Forecasting and Climate Research Centre
Nnamdi Azikiwe International Airport, Abuja
info@nimet.gov.ng
www.nimet.gov.ng



@nimetnigeria



@Nigerian Meteorological Agency



@officialnimetng