November 2024

GBON National Gap Analysis

Burkina Faso

Systematic Observations Financing Facility

Weather and climate data for resilience

WEATHER CLIMATE WATER

Systematic Observations Financing Facility

Screening of the National Gap Analysis (NGA) of Burkina Faso

WMO Technical Authority screens the GBON National Gap Analysis to ensure consistency with the GBON regulations and provides feedback for revisions as needed. *The screening of the NGA is conducted according to the SOFF Operational Guidance Handbook, version: 04.07.2023 and the provisions in Decision 5.7 of the SOFF Steering Committee.*

Following iterations with the peer advisor and beneficiary country, WMO Technical Authority confirms that the National Gap Analysis is consistent with GBON regulations.

Date: 13 March 2025

Signature:

Albert Fischer

Director, WIGOS Branch, Infrastructure Department, WMO

GBON National Gap Analysis Report
Burkina Faso

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1. Country information from the GBON Global Gap Analysis

Burkina Faso is a landlocked country belonging to the Sahel ("the shore") transition zone from Sahara to the tropical landscapes. Geographical and climate detailed information is available at Annex 1.
From the WMO GBON Global Gap Analysis dated June 2023 for Burkina Faso, observation needs were focused on 7 surface stations and 2 upper air stations.

Table I. WMO GBON Global Gap Analysis (June 2023). Illustration of the information that the WMO Secretariat provides to each country

A. GBON horizontal resolution requirements	B. Target	C. Reporting (GBON compliant)[1]	D. Gap to improve	E. Gap new	F. Gap total
	[# of stations]				
Surface stations Standard density[2] 200 km	7	2	5	0	5
Upper-air stations over land Standard density[2] 500km	2	0	1	1	2

Below you can find the map with an appropriate distribution for a grid of 200 Km for surface stations and 500 km for upper air stations. Taking in consideration that the locations have also been chosen according to maintenance accessibility and security issues.

[1] The rationale for classifying surface and upper-air stations as reporting is based on the WIGOS Data Quality Monitoring System (WDQMS) for the chosen time period (WMO GBON Global Gap analysis, June 2023). Stations with data availability more than 80% on at least 80% of days, are considered as reporting. Other listed stations are counted as having the possibility to be improved.

[2] For SIDS, for the WMO GBON Global Gap Analysis in June 2023, the EEZ area has been added to the total surface area which is the basis for the target number of stations. The standard density requirements for SIDS have been calculated with 500 km for surface stations and 1000 km for upper-air stations.

Figure 1. Surface stations proposed with 100 km radius circles. Orange is ASECNA managed Bobo Diuolasso and Ouagadougou airports now GBON reporting and yellow are ANAM managed new sites proposed for GBON

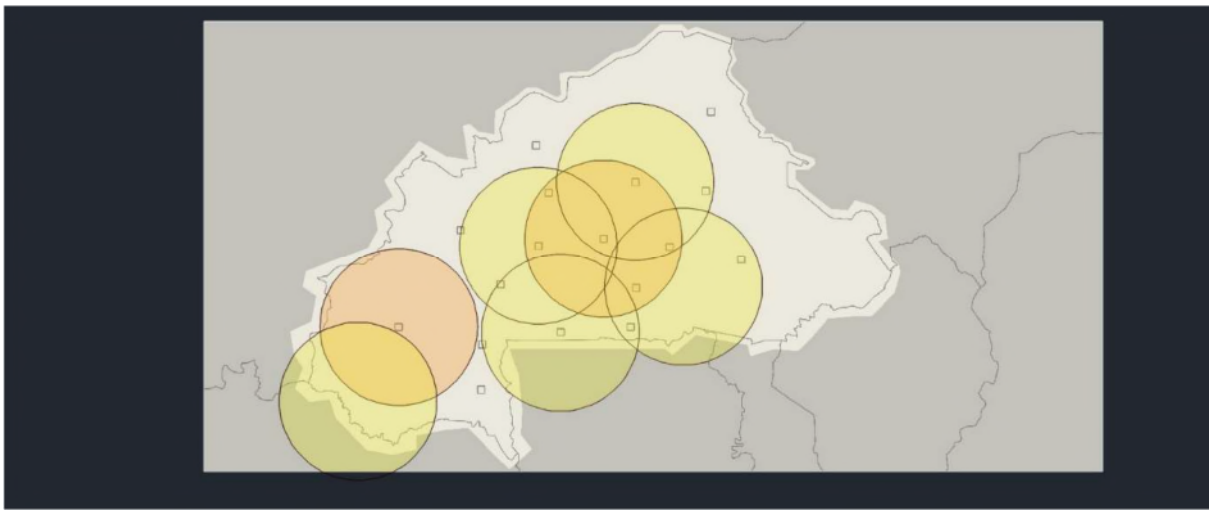
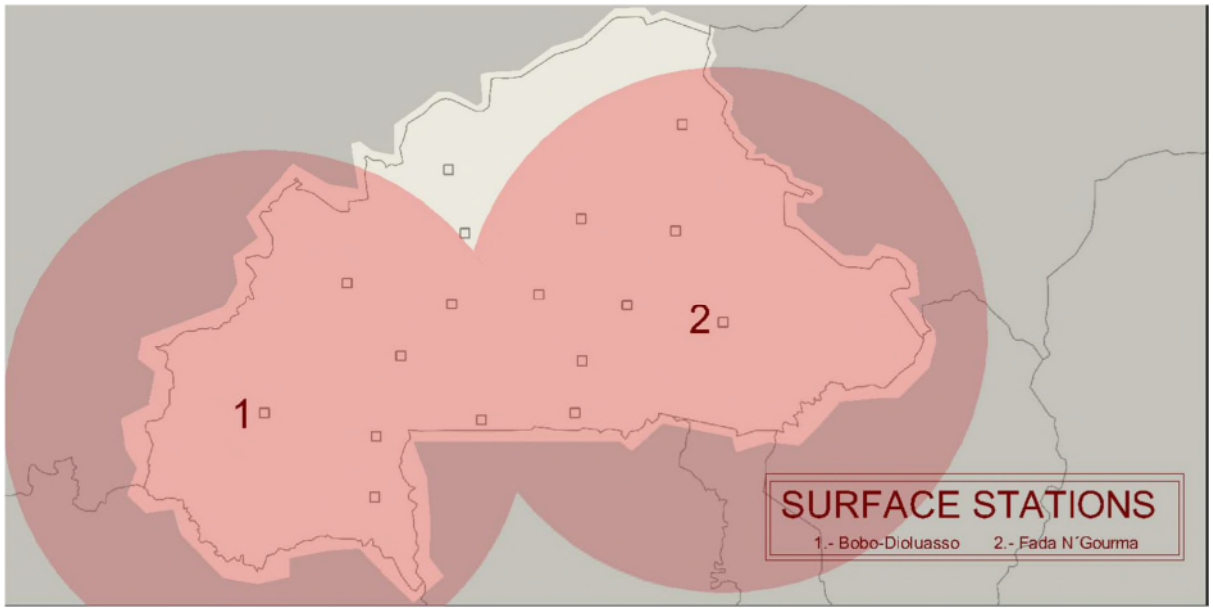


Figure 2. Upper air stations proposed with 250 km radius circles. 1- Bobo Diuolasso for improvement from a pilot sounding. 2- Fada N ´ Gourma for a new radiosonde site



2. Analysis of existing GBON stations and their status against GBON requirements

The Burkina Faso Meteorological Institute (ANAM) operates and maintains 69 nationally deployed automatic meteorological stations (AWS) and 68 manual weather stations. 22 of these AWS are operational, and none reporting internationally. 5 of these surface stations are

designated in the national GBON network under the standard density criterion of 200 Km horizontal resolution. The entire infrastructure of the stations has already been financed by ANAM itself or by international cooperation projects. There also exist 10 stations operated by third parties (International and National ASECNA) designated as GBON, 9 of them irregularly report data internationally via GTS. WIS2.0 was not available in this country at the beginning of the works.

Table II. Assessment of existent stations per their operational status and network ownership

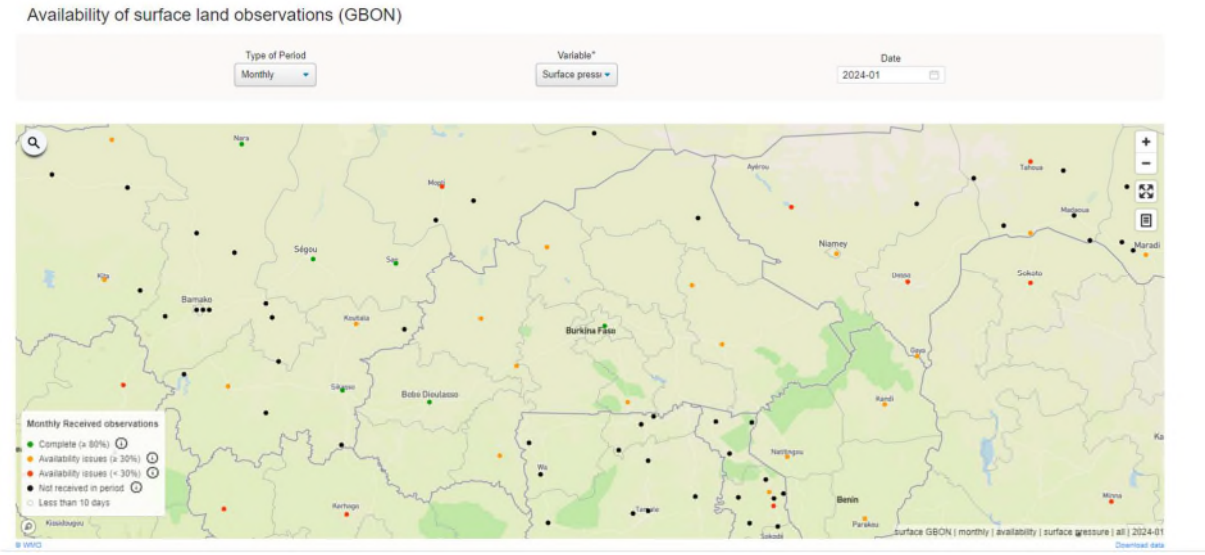
GBON Requirements	Existing observation stations (# of stations)			
	NMHS network		Third-party network	
	Reporting (GBON compliant) [3]	To improve	Reporting (GBON compliant) [3]	To improve
Surface land stations Standard density [4] 200km Variables: SLP, T, H, W, P, SD	**0**	**0**	**9**	**9**
Upper-air stations operated from land Horizontal resolution[4]: 500km Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	**0**	**0**	**0**	**1**

In September 2023 only one Surface land station was reporting according to time/frequency requirements. An screenshot from WDQMS for January 2024 statistics shows an availability of more than 80% GBON requirements for Ouagadougou and Bobo Dioulasso, dropping below for the other 7 stations. For that reason, we propose to keep those two stations in GBON and to improve them to match long-term GBON commitments. It is important to note that both are not truly fully GBON compliant because SYNOP is transmitted by GTS instead WIS 2.0

Figure 3. WDQMS report for January 2024 observations availability for Burkina Faso. Green dots mean compliance.

[3] The rationale for classifying surface and upper-air stations as reporting is based on the WIGOS Data Quality Monitoring System (WDQMS) for the chosen time period during the development of National Gap Analysis Stations with data availability more than 80% on at least 80% of days, are considered as reporting. Other listed stations are counted as having the possibility to be improved.

[4] For SIDS, for the WMO GBON Global Gap Analysis in June 2023, the EEZ area has been added to the total surface area which is the basis for the target number of stations. The standard density requirements for SIDS have been calculated with 500 km for surface stations and 1000 km for upper-air stations.



There is no radiosonde stations in Burkina Faso. Bobo Dioulasso airport host a pilot sounding station with hydrogen generator and one small building to inflate balloons, so it is proposed to use those facilities to host an improved radiosonde station.

Table III. Assessment of existing GBON stations per station characteristics. Station type: S: Surface, UA: Upper-Air; M: Marine; Owner of the station: NMHS or name of third-party; GBON variables: SLP: Atmospheric pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation; SD: Snow depth; SST: Sea surface temperature; Reporting cycle: Number of observation reports exchanged internationally per day (0-24); GBON compliance: whether the station is GBON compliant or not (see GBON guide on compliance criteria).

Station name	Station type (S/UA/ M[5])	Owner (NMHS /3rd party)	Funding source	GBON variable measured							Reporting cycle (obs/day)	GBON Compliant (Y/N)
				SLP	T	H	W	P	SD			
Bobo-Dioulasso	S	3rd party	International ASECNA	X	X	X	X	X			1h/24	N
Bogandé	S	3rd party	National ASECNA	X	X	X	X	X			1h/20	N
Boromo	S	3rd party	National ASECNA	X	X	X	X	X			1h/20	N
Dédougou	S	3rd party	National ASECNA	X	X	X	X	X			1h/20	N
Fada N'Gourma	S	3rd party	National ASECNA	X	X	X	X	X			1h/20	N
Gaoua	S	3rd party	National ASECNA	X	X	X	X	X			1h/20	N
Ouagadougou-airport	S	3rd party	International ASECNA	X	X	X	X	X			1h/24	N

[5] Please see guidance on marine stations in Section 2 on Scope.

Ouahigouya	**S**	**3rd party**	**National ASECNA**	**X**	**X**	**X**	**X**	**X**			**1h/20**	**N**
Pô	**S**	**3rd party**	**National ASECNA**	**X**	**X**	**X**	**X**	**X**			**1h/20**	**N**
Bobo Dioulasso-airport	**UA**	**3rd party**	**International ASECNA**	**-**	**-**	**-**	**X**	**-**			**12h/2**	**N**

Remarks on the stations of the existing GBON network

At all the surface stations, the variables that have an X in the measurements are being taken manually from traditional instrumentation that does not meet the specifications described in the document "TT-GBON Operating Plan Deliverable 6.1 – GBON Tender Specifications for AWS", that is the major reason why they are not compliant. However, in all of them, there is the infrastructure of an automatic station that, for various reasons specified in Annex II, is not reporting data. These stations must be updated to ensure the GBON standards, and take data from the automatic source. The wind in the Bobo Dioulasso upper air stations means that there exists a radiopilot with wind measurements only. Detailed information on the status of each station can be found in Annex II.

3. Results of the GBON National Gap Analysis

The proposal here below is a compromise between observation needs at global level, the need for supporting ANAM as NHMS, mid and long term safety concerns for maintenance staff and national expected contributions from ASECNA.

Table IV. Results of the GBON national gap analysis. SLP: Atmospheric pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation; SD: Snow depth; SST: Sea surface temperature**.**

GBON requirements	Global GBON target	Approved national target	Reporting	Gap	
				To improve	New
	[# of stations]				
Surface land stations	7	7	0	**7**	**0**
Upper-air stations operated from land	2	2	0	**1**	**1**

In the SOFF mission to Burkina Faso carried out between July 31st and August 4th 2023, the team conducted interviews with ANAM and ASECNA personnel, partners of the meteorological

service, to obtain information on the current status of the observation network and international data exchanges. The existing information on the OSCAR and WIGOS pages has been analysed and the existing list of stations has been reviewed. The elements of the communications systems, personnel capacity and maintenance protocols have also been analysed. There was a great deal of activity and concern to achieve stability in the services that ANAM wants to provide.

Two field activities have been carried out in visits to the airport observatories of Ouagadougu and Bobo Dioulasso. Details of the results of the visits and photos are found in Annex III. The conclusions of the evaluation after the mission are the following:

1- It is proposed to keep GBON surface stations in Bobo Dioulasso and Ougadougou airports managed by ASECNA with ANAM support. New AWS should be installed to replace manual observations as SYNOP source but without abandoning them. WIS 2.0 should be provided as a communication tool.
2- Five sites from ANAM network are selected to complete GBON in Burkina Faso. Sites are selected for their safety and long-term maintenance and access considerations. Those five + two surface stations will be the GBON in the country without prejudice that ASECNA national will keep the other 7 surface stations reporting internationally based on manual observations and improve 2 of them: Dedougou and Fada N´Gourma with an AWS.
3- Pilot radio sounding in Bobo Dioulasso should be improved to radiosonde station. Hydrogen generator, trained staff, and building facilities are present
4- Fada N´Gourma is proposed as a new site for radio sounding. Is about 500 km eastwards of Bobo Dioulasso and on the axis of rainfall systems movement from East to West at the summer monsoon season

All proposed surface and upper air stations need to address the following needs to optimize their operation and ensure the continuity of the project in the long term.

a) Sensors and data acquisition units: In surface stations, the existing AWS must be updated, replacing damaged components and installing improved ones that meet the measurement requirements of the GBON network. For all stations, it is necessary to ensure the acquisition of spare parts in the event of breakdowns and/or future updates in the short/medium term to safeguard possible future difficulties in this regard. It is proposed to have a stock of spare parts in Ouagadougou. At upper air stations, consumables (radiosondes, balloons, parachutes) must be financed. The country's ability to obtain supplies on a regular basis is highly vulnerable. This is the first key point for the sustainability of the project.
b) Electrical supply: Renewal and installation of solar panels and batteries in all stations is required as the local power supply is not reliable due to power shortages. It must be taken into account that for upper air stations the energy consumption of the hydrogen generator (≈5KW) is higher. In these places, a small solar energy producing park can be installed. Nevertheless it is essential to have a buck up diesel-powered generator set, which most sites don’t have.

Lightning: It is necessary to incorporate protection in electrical panels against lightning strikes due to the high density of lightning in the area. These measures are essential to avoid the constant loss of sensors, damaged due to this cause. The incorporation of active lightning rods with greater coverage than the passive type is considered as the best option. Figure 4 shows that Burkina Faso is located in a high lightning density region per Km^2 in the world.

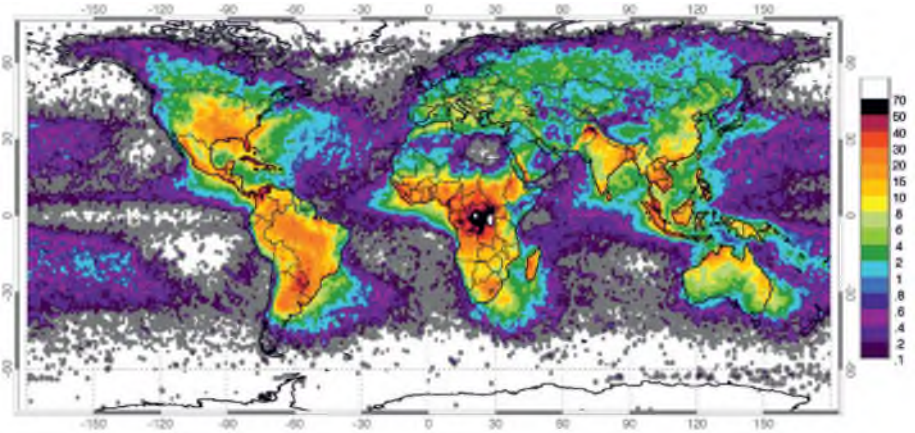


Fig.4. Global distribution of annual lightning density (lightning/km^2, period April 1995 to February 2003) with combined observations from NASA's OTD sensor (up to March 2000) and LIS sensor (since January 1998). Source: GHRCNASA

c) Communications: ASECNA stations have GTS access through the aeronautical network but they need to implement WIS 2.0 box solutions in close coordination with ANAM. GTS should be a backup solution. ANAM stations need to incorporate WIS 2.0 since the beginning. A recent WMO mission to ANAM with support of DMN Morocco ensures a swift progress towards WIS 2.0 standards implementation but this is a key point for National plan and investment proposal.
d) Infrastructure: The construction of facilities to carry out radiosondes in Fada N´Gourma is required, in particular, the sheds to house the hydrogen generators and inflate the balloons. The calibration of the radiosondes could be carried out in the facilities of the ASECNA airport observatory and the reception equipment installed there.
e) Maintenance: There is ASECNA personnel on-site up to 24 hours/day at the stations managed by this entity, who apart from carrying out preventive maintenance, also carry out manual synoptic observation providing complementary data on visibility, clouds, etc... There are volunteer collaborators at ANAM selected locations. These personnel provide support to specialist technicians as a first step and immediate response by carrying out basic checks in the event of failure. Even so, it is necessary to send expert specialists in cases of serious damage, new implementations or calibrations. That is why it is necessary to establish a mechanism that ensures stability and continuous training of ANAM staff. To travel to stations that are at large distances, road security is the main issue, and the essence of the difficulty of the project. The acquisition of vehicles is necessary.
f) Server room: The equipment involved in communications has reached its period of technological obsolescence. It would be advisable to update it, as well as the air conditioning of said room and the acquisition of UPSs.

3.1 Recommended existing surface, upper-air and marine[7] stations to be designated to GBON

Table V. Recommended existing surface, upper-air and marine stations to be designated to GBON.

Station name	Station type (S/UA/M[8])
Kaya	S
Koudougou	S
Leo	S
Tenkodogo	S
Niangoloko	S
Bobo Dioulasso - Airport	S
Ouagadougou-airport	S
Bobo Dioulasso - Airport	UA
Fada N´Gourma	UA

In relation to the GBON, there is agreement on the importance of securing the minimum 7 surface stations but also taking in consideration the possibility of extending the GBON to 9 stations by including other ASECNA weather stations as national contribution.

SOFF should support ANAM on updating 5 AWS sites with new AWS and communications protocols to secure GBON requirements and also provide resources to upgrade Bobo and Ouagadougou weather stations managed by ASECNA. National stakeholders including ASECNA would agree on transforming into operation 7 to 8 additional international reporting stations at national airports.

The stations must carry out automatic measurements and send observations through WIS 2.0 every hour. These stations will represent the climatological diversity of the country and will enrich the capacity of the numerical model prediction. Moreover, 2 radiosonde stations with 2 measurements per day must be secured. These two stations would be priorities for the GBON. Likewise, it would reinforce the activities being carried out at the ANAM and would also improve the visibility of the ANAM in front of national and international partners.

ASECNA International Agency has been operating two double (manual + automatic) surface observing stations, one at Ouagadougou International Airport and the other one at Bobo-Dioulasso International Airport. In addition to these two surface synoptic stations, one upper air station in Ouagadougou (not operational now) and one radiopilot (only wind measures) in Bobo-Dioulasso is operated by this agency.

[6] Although GBON marine stations are not part of initial SOFF scope, peer advisors are encouraged to analyze in this step when considered relevant e.g., SIDS, the need for future GBON marine observations investments according to the GBON requirements.

[7] Although GBON marine stations are not part of initial SOFF scope, peer advisors are encouraged to analyze in this step when considered relevant e.g., SIDS, the need for future GBON marine observations investments according to the GBON requirements.

[8] Please see guidance on marine stations in Section 2 on Scope.

The National Aeronautical Agency of ASECNA has been operating eight synoptic stations (7 now, Dori is not operational due to security reasons), which prepare and report messages for international data exchange.

The data from AWSs installed in the synoptic stations is not used for message preparation and reporting. It was noted that there is no GSM communication from 10 synoptic stations operated by ASECNA, to ASECNA's telecommunication center.

Both International ASECNA and National ASECNA are fully committed to support ANAM and Burkina Faso efforts to provide sustainable elements to the GBON Basic Network. International ASECNA manages the communication center in Ouagadougou Airport. All SYNOPS are collected there and conveyed to the GTS via Niamey-Dakar nodes to Toulouse. International Airport meteorological offices have COROBOR software for collecting messages and exchanges.

The Team made excellent exchanges with International ASECNA staff in Ouagadougou and Bobo Dioulasso. As security reasons prevented a trip by road to Fada N´Gourma, Boromo or Pò, no contacts with National ASECNA teams were made. A remote exchange with some of their staff should be attempted to identify problems and solutions for the national support plan drawing before the national workshop.

The team proposes a minimum network of 7 surface stations but taking in consideration the possibility of adding at least two existing manual stations from national airports and upgrade them by AWS installation as national contribution. That aeronautical network that delivers right now international SYNOPs is not GBON compliant but is required by ASECNA for safe operations in the country plus the climatological representation of the country where rainstorms and harmattan events are frequent.

Careful ground observations to feed numerical are needed to support civil aviation and sectors like transportation and agriculture. A financial plan towards securing a minimum of 7 GBON stations including national contributions would be necessary with the possibility of adding 2 ASECNA airport stations as national contribution: Dedougou and Fada N´Gourma and perhaps others from exiting reporting stations.

The collaboration between ANAM, NIMET and AEMET technical staff was excellent and collaboration from national authorities and experts was superb despite the complex political situation at the Sahelian countries at mission time.

4. Report completion signatures

Peer Advisor signature Firmado por JOSE LUIS CAMACHO RUIZ - DNI ***7687** el día 15/11/2024 con un certificado emitido	Oluwaseun Wilfred IDOWU SOFF Focal Point, Nigerian Meteorological Agency (NiMet) 25/11/2024
Beneficiary Country signature Joël ZOUNGRANA PR BURKINA FASO	
WMO Technical Authority screening signature	

Annex I. Geography and climatology of Burkina Faso

Burkina Faso, is a landlocked country in western Africa with an area of 274,200 km2 (105,900 sq mi), bordered by Mali to the northwest, Niger to the northeast, Benin to the southeast, Togo and Ghana to the south, and the Ivory Coast to the southwest. As of 2021, the country had an estimated population of 20,321,378. The country occupies an extensive plateau, and its geography is characterized by a savanna, that is grassy in the north and gradually gives way to sparse forests in the south. The capital, Ouagadougou, is in the center of the country and lies about 500 miles (800 km) from the Atlantic Ocean. UN categorized Burkina Faso as least developed country.

Fig 1. Annex 1. Political map showing Burkina Faso's boundaries.

Fig 2. Annex 1. Satellite view of Burkina Faso. Vegetation zones are shown.

Burkina Faso is situated on an extensive plateau, which is slightly inclined towards the south. The lateritic (red, leached, iron-bearing) layer of rock that covers the underlying crystalline rocks is deeply incised by the country's three principal rivers—the Black Volta (Mouhoun), the Red Volta (Nazinon), and the White Volta (Nakambé)—all of which converge in Ghana, to the south, to form the Volta River. The Oti, another tributary of the Volta, rises in southeastern Burkina Faso. Great seasonal variation occurs in the flow of the rivers, and some rivers become dry beds during the dry season. In the southwest there are sandstone plateaus bordered by the Banfora Escarpment, which is about 500 feet (150 metres) high and faces southeast.

Burkina Faso has a primarily tropical climate with two very distinct seasons. In the rainy season, the country receives between 600 and 900 mm (23.6 and 35.4 in) of rainfall; in the dry season, the harmattan – a hot dry wind from the Sahara – blows. The rainy season lasts approximately four months, May/June to September, and is shorter in the north of the country. Three climatic zones can be defined: the Sahel, the Sudan-Sahel, and the Sudan-Guinea.

The Sahel in the north typically receives less than 600 mm (23.6 in) of rainfall per year and has high temperatures, 5–47 °C (41–117 °F).

A relatively dry tropical savanna, the Sahel extends beyond the borders of Burkina Faso, from the Horn of Africa to the Atlantic Ocean, and borders the Sahara to its north, and to the fertile region of the Sudan to the south. Situated between 11° 3′ and 13° 5′ north latitude, the Sudan-Sahel region is a transitional zone with regards to rainfall and temperature.

Further to the south, the Sudan-Guinea zone receives more than 900 mm (35.4 in) of rain each year and has cooler average temperatures.

Climate issues

As a Sahelian country, climate variability from year to year is an issue and seasonal rain forecast and precipitation monitoring are crucial for food security and governmental and regional support actions. Inter-annual variations in the length and intensity of the rainy season brings to heavy impacts in agriculture and livestock production unless a good early warning system is in place to minimize impacts by selecting adequate crops and varieties and providing advisories for herd pastures management.

Burkina Faso's wet season is characterized by heavy and often relentless rain that can wreak havoc on the country's poorly constructed informal settlements and degraded landscape, disturb the entire water sector, and destroy or reduce infrastructure services in growing cities. Over the past 30 years, severe flooding has occurred repeatedly especially in the north and center of the country, resulting from successive drought periods. Major events were recorded in 1972/73 and 1983/84, and minor in 1990/91, 1995/96, and 1997/988. In addition to the impact on urban areas and buildings, flooding leads to extensive impacts on farmlands. In 2007, the National Agricultural Statistics and Forecasting Services reported at least 33,000 hectares of farmland completely inundated by floods between August and September. Two years later in 2009, heavy rainfall once again flooded crops and washed away 22,220 hectares of farmland, breaking 15 dams, and destroying 42,000 homes.

The September 2009 flood events caused damages amounting to about FCFA 47billion, i.e., US$105 million, losses amounting to FCFA 15 billion, i.e., US$33 million, and needs for construction, reconstruction and restoration amounting to FCFA119 billions, i.e., US$266 million.

Annex II. Detail of the status and needs of the stations.

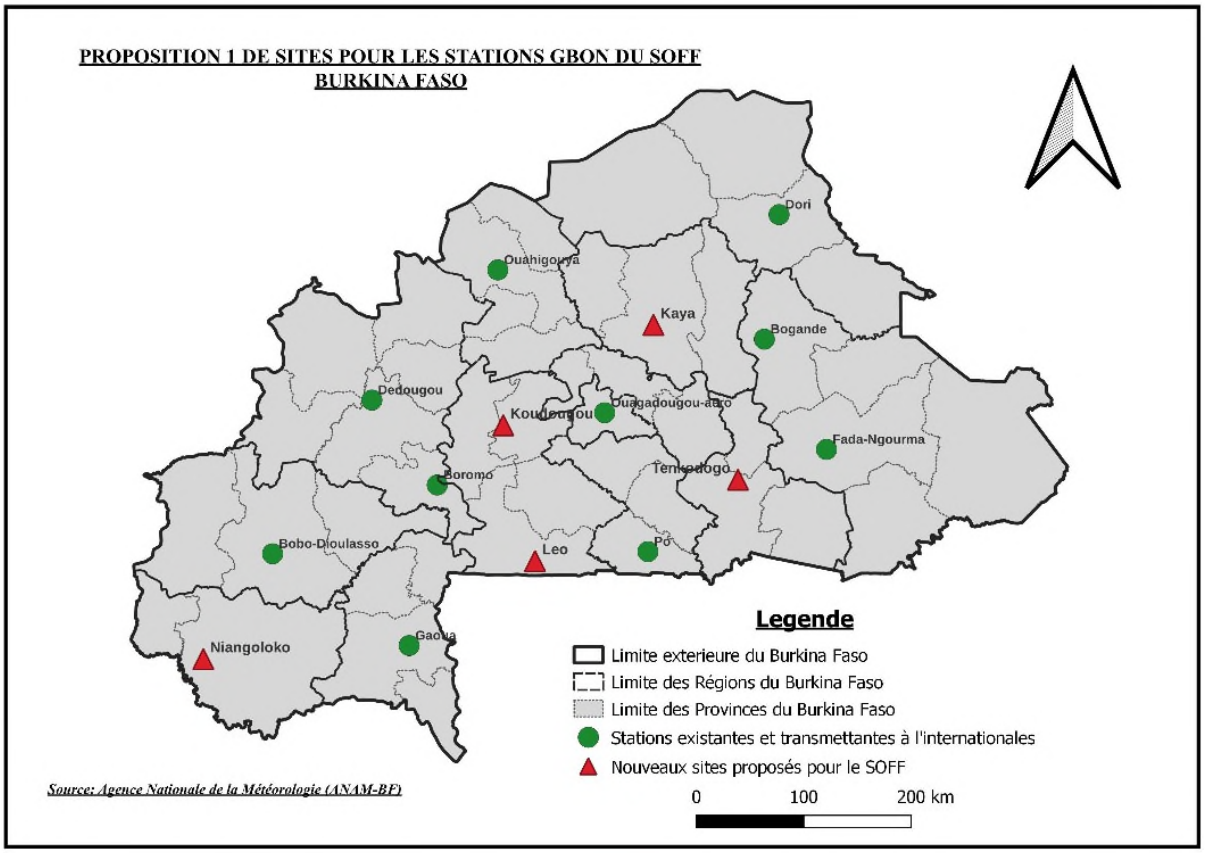


Fig1. Annex 2. Map of new GBON stations proposed plus ASECNA network actually reporting to GBON. Final GBON stations will be the new five in red triangles plus Bobo DIoulasso and Ouagadougou. Additional two GBON stations supported by national contributions could be Dedougou and Fada N´Gourma

Table 1. Annex 2. GBON target (200 km density) from ASECNA and ANAM network

Station name	Station type	NMHS / 3rd party station	Security	Power Supply	GBON variable measured						Reporting cycle
					SLP	T	H	W	P	SD	
Bobo-Dioulasso	Surface	International ASECNA	YES	YES + Back-up generator	YES	Manual*[1]	Manual*[1]	YES*[2]	Manual*[1]	N/A	24h a day, every 1h
Ouagadougou -airport	Surface	International ASECNA	YES	YES + Back-up generator	YES	Manual*[1]	Manual*[1]	YES	Manual*[1]	N/A	24h a day, every 1h
Kaya	Surface	ANAM	YES	Solar + Local Sector	NO	Manual	Manual	NO	Manual	N/A	20h every 1h
Tenkodogo	Surface	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES*[2]	YES*[1]	N/A	24h a day every 15min

Koudougou	Surface	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES	YES*[1]	N/A	24h a day every 15min
Leo	Surface	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES*[2]	YES*[1]	N/A	24h a day every 15min
Niangoloko	Surface	ANAM	YES	Solar + Local Sector	New	New	New	New	New	N/A	NEW
Fada N'Gourma	Upper-air	ANAM	YES	YES	New	New	New	New	New	N/A	NEW
Bobo-Dioulasso	Upper-air	International ASECNA	YES	YES + Back-up generator	YES	NO	NO	YES	N/A	N/A	Twice a day
Comments	*[1] There exists manual instrumentation on site as well. *[2]The wind measure is made at 2m height, not the standard 10m.										
Maintenance Calibration	General maintenance every 6 month (if possible, due to insecurity). No calibrations are made.										
Communications	From the surface station to ANAM Ouagadougou (data processing center) via mobile SIM, every 15 minutes. No international exchange. No communication outside the airport for the upper air stations.										

Subject to financial and security issues a long term final goal for a GBON-RBON national network for Burkina Faso with a spatial density of 100 km will be the following table for 28 surface stations from ASECNA and ANAM networks:

Table 2. Annex 2. Final RBON target (100 km density) from ASECNA network

Station name	**Station type**	**NMHS / 3rd party station**	**Security**	**Power Supply**	**GBON variable measured**						**Reporting cycle (# of observations)**	**GBON Compliance (Yes/No)**
					SLP	**T**	**H**	**W**	**P**	**SD**		
Bobo-Dioulasso	Surface	International ASECNA	YES	YES + Back-up generator	YES	Manual*[1]	Manual*[1]	YES*[2]	Manual*[1]	N/A	24h a day, every 1h	NO
Bogandé	Surface	National ASECNA	YES	YES	YES	YES	Manual*[3]	YES*[2]	Manual*[1]	N/A	20h a day, every 1h	NO
Boromo	Surface	National ASECNA	YES	YES	YES	YES	Manual*[3]	YES*[2]	Manual*[1]	N/A	20h a day, every 1h	NO
Dédougou	Surface	National ASECNA	YES	YES	YES	YES	Manual*[3]	YES*[2]	Manual*[1]	N/A	20h a day, every 1h	NO

Dori	Surface	National ASECNA	NO	USED TO	USED TO	USED TO	USED TO Manual*3	USED TO *2	USED TO Manual*1	N/A	USED TO 20h a day, every 1h	NO
Fada N'Gourma	Surface	National ASECNA	YES	YES	YES	YES	Manual*3	YES*2	Manual*1	N/A	20h a day, every 1h	NO
Gaoua	Surface	National ASECNA	YES	YES	YES	YES	Manual*3	YES*2	Manual*1	N/A	20h a day, every 1h	NO
Ouagadougou-airport	Surface	International ASECNA	YES	YES + Back-up generator	YES	Manual*1	Manual*1	YES	Manual*1	N/A	24h a day, every 1h	NO
Ouahigouya	Surface	National ASECNA	YES	YES	YES	YES	Manual*3	YES*2	Manual*1	N/A	20h a day, every 1h	NO
Pô	Surface	National ASECNA	YES	YES	YES	YES	Manual*3	YES*2	Manual*1	N/A	20h a day, every 1h	NO
Ouagadougou-airport	Upper air	International ASECNA	YES	USED TO	USED TO	USED TO	USED TO	USED TO	N/A	N/A	USED TO, twice a day	NO
Comments	*1There exists digital instrumentation on site. *2No max wind gust data available. *3Calculated from dry and wet digital thermometer data.											
Maintenance Calibration	General maintenance every 3/6 month (international/national ASECNA). Calibration only of the Barometers every 6 months.											
Communications	The data is sent through ASECNA's channels and goes from the station to Ouagadougou, Niamey, Dakar and finally Toulouse (data processing center). No real time data exchange to WIS but it should be the preferred option											

Table 3. Annex 2. Final RBON target (100 km density) from ANAM network

Station name	Station type and Model	NMHS / 3rd party station	Security	Power Supply	GBON variable measured						Reporting cycle (# of observations)	GBON Compliance (Yes/No)
					SLP	T	H	W	P	SD		
Diapaga	Surface Synop ADCON	ANAM	NO	Solar + Local Sector	YES	YES	YES	YES	YES*1	N/A	24h a day every 15min	NO
Diebougou	Surface Synop ADCON	ANAM	YES	Solar + Local Sector	YES	YES*1	YES*1	YES*2	YES*1	N/A	24h a day every 15min	NO
Djibo	Surface Synop ADCON	ANAM	NO	Solar + Local Sector	YES	YES*1	YES*1	YES*2	YES*1	N/A	24h a day every 15min	NO
Kaya	Surface TermPluvio Campbell	ANAM	YES	Solar + Local Sector	NO	Manual	Manual	NO	Manual	N/A	20h every 1h	NO
Koudougou	Surface Synop ADCON	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES	YES*1	N/A	24h a day every 15min	NO
Leo	Surface Agro ADCON	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES*2	YES*1	N/A	24h a day every 15min	NO
Tenkodogo	Surface Agro PULSONIC	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES*2	YES*1	N/A	24h a day every 15min	NO
Yako	Surface Synop ADCON	ANAM	YES	Solar + Local Sector	YES	YES*1	YES*1	YES	YES*1	N/A	24h a day every 15min	NO
Tougan	Surface Agro PULSONIC	ANAM	NO	Solar + Local Sector	YES	YES	YES	YES*2	YES	N/A	24h a day every 15min	NO
Manga	Surface Synop ADCON	ANAM	YES	Solar + Local Sector	YES	YES*1	YES*1	YES	YES*1	N/A	24h a day every 15min	NO
Pama	Surface Synop ADCON	ANAM	NO	Solar + Local Sector	YES	YES	YES	YES	YES*1	N/A	24h a day	NO

											every 15min	
Markoye	Surface Agro ADCON	ANAM	NO	Solar + Local Sector	NO	YES	YES	NO	YES*[1]	N/A	24h a day every 15min	NO
Gayeri	Surface Agro ADCON	ANAM	NO	Solar + Local Sector	YES	YES	YES	YES*[2]	YES	N/A	24h a day every 15min	NO
Mangodara	Surface Templuvio CAMPBELL	ANAM	NO	Solar + Local Sector	NO	YES	YES	NO	YES*[1]	N/A	24h a day every 15min	NO
Kouka	Surface Agro ADCON	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES*[2]	YES*[1]	N/A	24h a day every 15min	NO
Zorgho	Surface Termpluvio CAMPBELL	ANAM	YES	Solar + Local Sector	YES	YES	YES	YES*[2]	YES*[1]	N/A	24h a day every 15min	NO
Djibasso	Surface	ANAM	NO	Solar + Local Sector	NO	YES	YES	NO	YES	N/A	24h a day every 15min	NO
Fada N'Gourma	Upper air	National ASECNA	YES	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NO
Comments	*[1] There exists manual instrumentation on site as well. *[2]The wind measure is made at 2m height, not the standard 10m.											
Maintenance Calibration	General maintenance every 6 months (if possible, due to insecurity). No calibrations are made.											
Communications	From the surface station to ANAM Ouagadougou (data processing center) via mobile SIM, every 15 minutes. No WIS link. No international exchange. No communication outside the airport for the upper air stations.											

Annex III. Visits and activities.

Burkina Faso synoptic stations are at the international and national airports managed by ASECNA. The mission envisaged a visit to the three main airports: Ouagadougou, Bobo Dioulasso and Fada N´Gourma. The team visited Bobo Dioulasso on 31st July, flying from Ouagadougou forth and back, to inspect the airport weather station, radiosonde facilities, and having exchanges with the observers' team, maintenance, and communications experts.

On the 1st of August, the team perform a complete visit to Ouagadougou airport to check airport weather station, radiosonde facilities and having wide exchanges with observers, forecasters, maintenance, communication experts and ASECNA managers.

It was expected to travel on the 3rd of August to Fada N´Gourma by plane but the lack of regular air links and the stormy weather advised not to fly. It is important to note that there is international agreement from several countries' foreign travelers' advisories advising NOT to travel by road outside Ouagadougou for international workers and visitors. The team considered performing visits to some local airports where there are synoptic stations such as Boromo travelling by road, but we finally decided to follow that advice.

The team spent two days working at ANAM HQ in interviews with staff from data management, climatology, equipment maintenance and managers. There were also meetings for settling administrative procedures between ANAM and AEMET.

An informative session was organized by ANAM on 2nd July to provide SOFF and GBON background to main stakeholders in Burkina Faso. It was noticeable the size of ASECNA participation meeting again many of the technical managers and experts to provide more information about the SOFF goals and why GBON minimum requirements are important for international cooperation, including regional civil aviation. There were participants also from Hydrology General Directorate, agriculture and transport. A good representation of ANAM

technicians was present and that gave way for fruitful exchanges afterwards between SOFF mission and them before leaving the country. There was an excellent working atmosphere between ANAM, NIMET and AEMET staff