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May 2024

# GBON National Gap Analysis

Barbados

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Systematic Observation  
Financing Facility

**Weather  
and climate  
data for  
resilience**





## Screening of the National Gap Analysis (NGA) of Barbados

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 November 2024

Signature:

Albert Fischer

Director, WIGOS Branch, Infrastructure Department, WMO

# GBON Gap Analysis Report

## Barbados

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<b>Peer Advisor Focal Point and Institute</b>	Anni Karttunen, FMI
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### 1. WMO Global Gap Analysis (June 2023)

**Table 1. WMO Global GBON Gap Analysis June 2023**

GBON horizontal resolution requirements	GBON target	Reporting	Gap improve	Gap new	Gap total
<b>Surface stations</b> <b>Horizontal resolution:</b> 200km	1	1	0	0	0
<b>Upper-air stations</b> <b>Horizontal resolution:</b> 500km	1	1	0	0	0

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

Barbados operates a network of 70 surface observation stations from which 1 station is GBON compliant and transmitting observation data to GTS/WIS on the required hourly basis to the WDQMS database. A big part of the network consists of 3D printed stations of WMO substandard quality. The station network is fully automatized, and the data is delivered in near-real-time to the BMS. Data transfer is fully WIS2.0 compliant utilizing the WIS2BOX solution. The registered GBON surface observation station reports all GBON parameters excluding snow-depth.

BMS is currently expanding the national observation network to cover more marine observations. Increasing these observations is essential in the area for hurricane forecasting and the services provided for tourism and fishing. Marine observations should be considered for funding support through SOFF at the appropriate stage.

**Table 2. Assessment of existing GBON stations per operational status and network ownership.**

GBON Requirements	Existing observation stations (# of stations)			
	NMHS network		Third-party network	
	Reporting	Improve	Reporting	Improve

<b>Surface stations</b> Horizontal resolution: 200km Variables: SLP, T, H, W, P, SD	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Upper-air stations</b> Horizontal resolution: 500km Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>

The upper-air sounding station operated by the Barbados Meteorological Services is part of the Cooperative Hurricane Upper Air Station network and therefore supported by NOAA / US National Weather Service (NWS). NWS has provided the sounding equipment and consumables for twice a day sounding. BMS provides the premises and housing for the station and the human resources for the operation. The current sounding operations are fully compliant with the GBON requirements.

**Table 3. Assessment of existing GBON stations per station characteristics.**

Station name	Station type (S/UA)	Owner (NMHS/t hird-party)	Funding source	GBON variable measured						Reporting cycle	GBON Compliance (Y/N)
				SLP	T	H	W	P	SD		
<b>Grantley Adams</b>	S	NMHS	NMHS	x	x	x	x	x	-	Hourly	Y
<b>Grantley Adams</b>	UA	NOAA	NOAA	-	x	x	x	-	-	Twice a day	Y

**Notes: Assessment of existing GBON stations per station characteristics.** Station type: S: Surface, UA: Upper-Air; Owner of the station: NMHS or name of third-party; GBON variables: SLP: Sea-level pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation; SD: Snow depth; 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).

### 3. Results of the GBON National Gap Analysis

BMS is compliant with the GBON requirements for the surface weather network although the WIS2.0 compliant data-transmission is still under development. Currently BMS is also fully compliant with the GBON requirements for the sounding operations. BMS is recommended to prioritize the development of automatized WIS2.0 compliant data-transmission and to strengthen quality control of sensors. BMS is also recommended to strengthen GBON compliance by focusing on establishing modern quality control processes and to continue the successful collaboration with NWS on the upper-air systems.

For the future BMS is looking to transition from manual sounding operations into fully automatic sounding operations. This is supported by the cost of human resources needed for the manual

operation (supported also by the World Bank report Charting a Course for Sustainable Hydrological and Meteorological Observation Networks in Developing Countries) and the difficulty of hiring technical staff and the more value added tasks for them, as well as to support operations in cases when the site is not accessible due to flooding on the access road. BMS will need to in detail look into funding an automatic sounding station for Barbados. There will also be further opportunities to help support other global initiatives like the implementation plan for the Global Greenhouse Gas Watch (G3W). In such an instance there is a call for more global observations in the upper atmosphere on Greenhouse Gases. It is against that background the BMS envisions contributing to this initiative and others by adding additional or new sensors to the upper air soundings. It is important to understand, that SIDS, do not carry the financial clout and large pool of human resources as most developed countries, therefore grasping onto improved technologies enables NMHS like the BMS to keep up with the many new global initiatives. We must look beyond just the initial requirements, and look more at the sustainability and availability for expansion and accommodation of more and improved observations of the upper atmosphere. Such an initiative also helps build capacity in SIDS by freeing up human resources to focus more on the growing demands of national, regional and international obligations which are now tangled with the accelerating threats to weather as we know it by Climate Change.

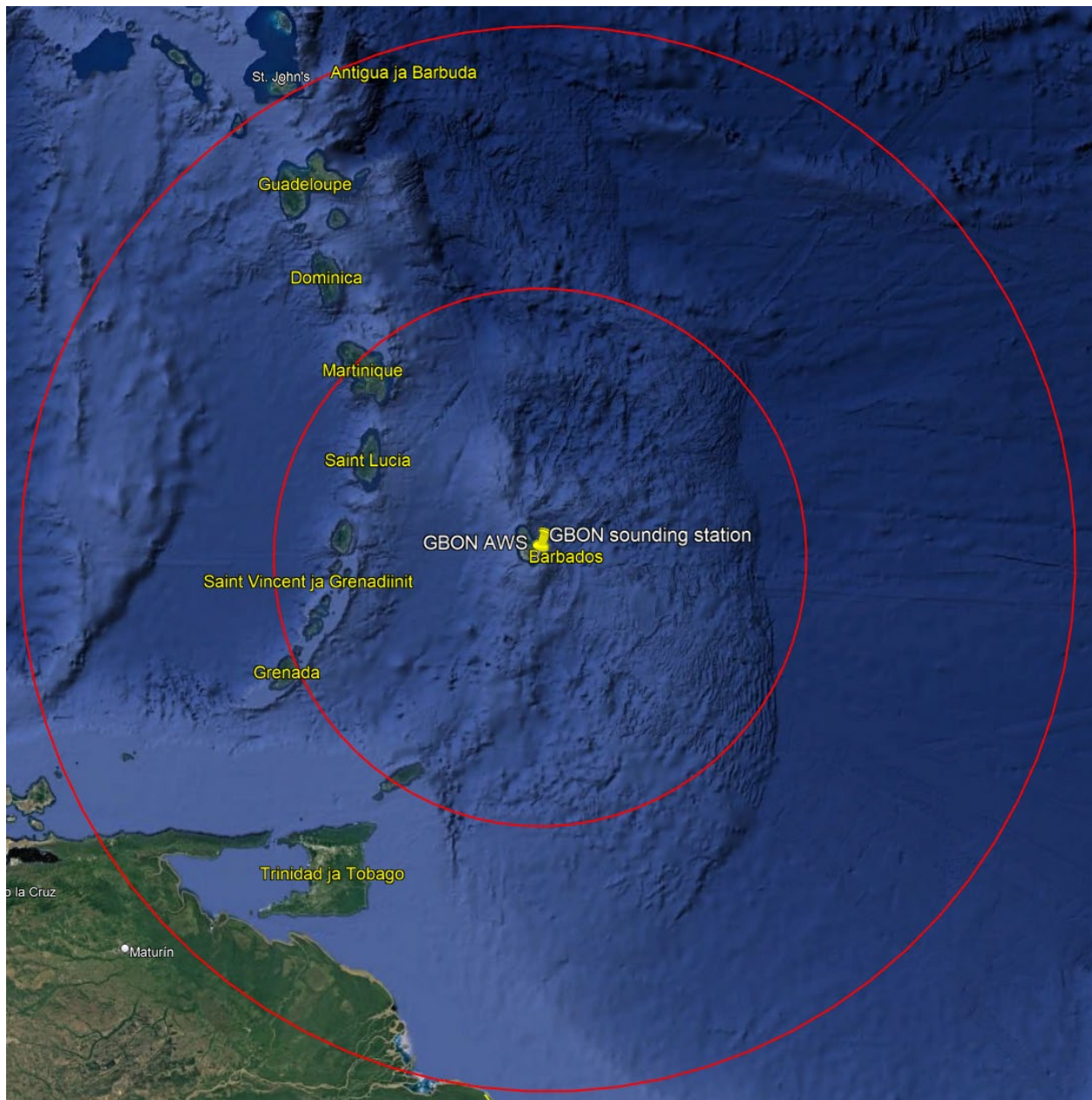
**Table 4. Results of the GBON national gap analysis.**

GBON requirements	Target (# of stations)	GBON Compliant stations (#)	Stations gap	
			New	Improved
<b>Surface stations</b> <ul style="list-style-type: none"> <li>• <b>Horizontal resolution:</b> 200km</li> <li>• <b>Variables:</b> SLP, T, H, W, SD</li> <li>• <b>Observation cycle:</b> 1h</li> </ul>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Upper-air stations</b> <ul style="list-style-type: none"> <li>• <b>Horizontal resolution:</b> 500km</li> <li>• <b>Vertical resolution:</b> 100m, up to 30 hpa</li> <li>• <b>Variables:</b> T, H, W</li> <li>• <b>Reporting cycle:</b> twice a day</li> </ul>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

### **3.1 Recommended existing surface and upper-air stations to be designated to GBON**



Station name	Station type (S/UA)
Grantley Adams	S
Grantley Adams	UA



**Figure 1. GBON surface weather station and sounding station. Inner circle with 250 km radius indicating required GBON horizontal resolution for surface weather station network for SIDS, outer circle with 500 km radius indicating required GBON horizontal resolution for upper air soundings for SIDS.**



Figure 2. GBON surface weather station and sounding station.

#### 4. Report completion signatures

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**Peer Advisor signature**



**WMO Technical Authority screening remarks and signature**



**Beneficiary Country signature**

Sabu LC Best



## **Annex 1.**

In addition to reviewing the number of GBON compliant observation stations an integral part of the sustainability of the solution is having adequate sensor calibration practices in place.

The regional calibration centre CIMH (Caribbean Institute of Meteorology and Hydrology) is located in Barbados and has previously been offering calibration services to the entire region including BMS. As for now the provided calibration services are inadequate as CIMH only calibrates pressure sensors due to lacks in their calibration chambers.

In order to meet the required level of data quality it is highly recommended to strengthen the regional calibration services and capabilities to cover the required GBON parameters and to be able to facilitate the annual calibration needs of the services. The regional approach is a very cost-effective solution as the individual services do not need calibration units or staff dedicated for this.