



30 May 2024

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# GBON National Gap Analysis

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Systematic Observations  
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## Screening of the National Gap Analysis (NGA) of Seychelles

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 peer advisor and beneficiary country, WMO Technical Authority confirms that the National Gap Analysis is consistent with GBON regulations. While the WMO GBON Global Gap Analysis identified the need for 6 surface stations and 2 upper air station over land to meet the GBON horizontal requirement, the **WMO Technical Authority confirms the NGA results which indicate the need for 7 surface land stations and 2 upper station based on specific national circumstances.**

Date: 18 November 2024

Signature:

Albert Fischer

Director, WIGOS Branch, Infrastructure Department, WMO

# GBON National Gap Analysis Report

## Seychelles

<b>Beneficiary Country Focal Point and Institute</b>	Mr Vincent Amelie, Seychelles Meteorological Authority (SMA)
<b>Peer Advisor Focal Point and Institute</b>	Mr Ishaam Abader, South African Weather Service (SAWS)

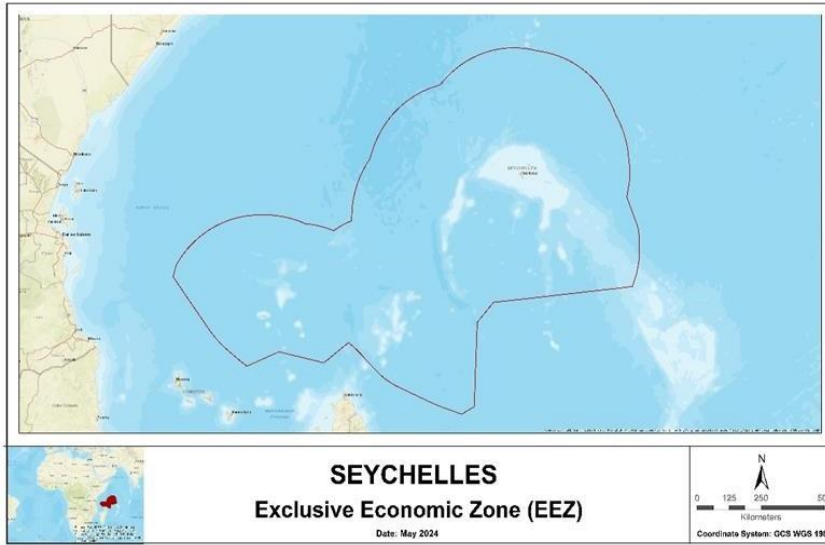
### 1. Country information from the GBON Global Gap Analysis

Seychelles, officially known as the Republic of Seychelles (French: République des Seychelles; Seychellois Creole: Repiblik Sesel), is an island country and archipelagic state situated in the Indian Ocean. It consists of 115 islands (as per the Constitution) and is located approximately 1,500 kilometers east of mainland Africa. It is also the smallest country in Africa and the least populated sovereign African country with an estimated population of 108,097 as of March 22, 2024. This relatively small population resides mainly on three islands: Mahé, Praslin, and La Digue. Seychelles boasts a vast and diverse Exclusive Economic Zone (EEZ) spanning approximately 1.37 million square kilometers. The EEZ extends 200 nautical miles from the baselines of the Seychelles islands and is characterized by a combination of shallow continental shelves, deep oceanic basins, and diverse marine habitats. The unique geography of the EEZ includes coral reefs, seagrass beds, mangroves, and a variety of coastal and aquatic ecosystems.

Meteorological activities in the Seychelles are closely monitored and studied by the Seychelles Meteorological Authority (SMA), responsible for providing weather forecasts, issuing warnings, and conducting a range of meteorological services. Given its geographical location, the archipelago is prone to monsoons, which are characterized by strong winds and substantial rainfall. These monsoons, influenced by the Indian Ocean Dipole and the El Niño-Southern Oscillation, are vital for Seychelle's agricultural sector as they provide the necessary water supply for crops. However, excessive rainfall can lead to flooding and landslides, posing risks to inhabitants and infrastructure.

In addition to monsoons, the Seychelles also experiences tropical cyclones, which typically form during the wet monsoonal season from November to April. The occurrence of cyclones can have severe impacts on the country's economy, particularly its tourism sector. Therefore, accurate forecasting and timely warnings are essential for preparedness and minimizing potential risks associated with these extreme weather events. Furthermore, climate change poses a significant challenge for the Seychelles, as its low-lying islands are vulnerable to rising sea levels. As a response, the Seychelles government has implemented various measures to combat climate change and adapt to its effects. These include the creation of marine protected areas, promoting sustainable tourism practices, and investing in renewable energy sources. As climate change continues to pose challenges, it is essential for local authorities, scientists, and international partners to collaborate and develop sustainable

strategies to effectively mitigate and adapt to the impacts of climate change on the Seychelles.



The Global Basic Observing Network (GBON) gap analysis in the table below is based on the June 2023 baseline and assessment of the status of the observational data exchange in Seychelles measured against GBON requirements. This provides an estimate of how many surface and upper-air stations are needed to meet the GBON requirements. Target indicates the total number of stations needed. Reporting denotes how many stations are reporting. The gap is the total of how many stations need to, either be improved, or newly installed, respectively. It is therefore as a preliminary result anticipated that Seychelles install 5 new surface land stations and 1 new upper-air station.

**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) <sup>1</sup>	D. Gap to improve	E. Gap new	F. Gap total
	[# of stations]				
<b>Surface stations</b> Standard density <sup>2</sup> 200 km	6	0	1	5	6

<sup>1</sup> 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.

<sup>2</sup> 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.

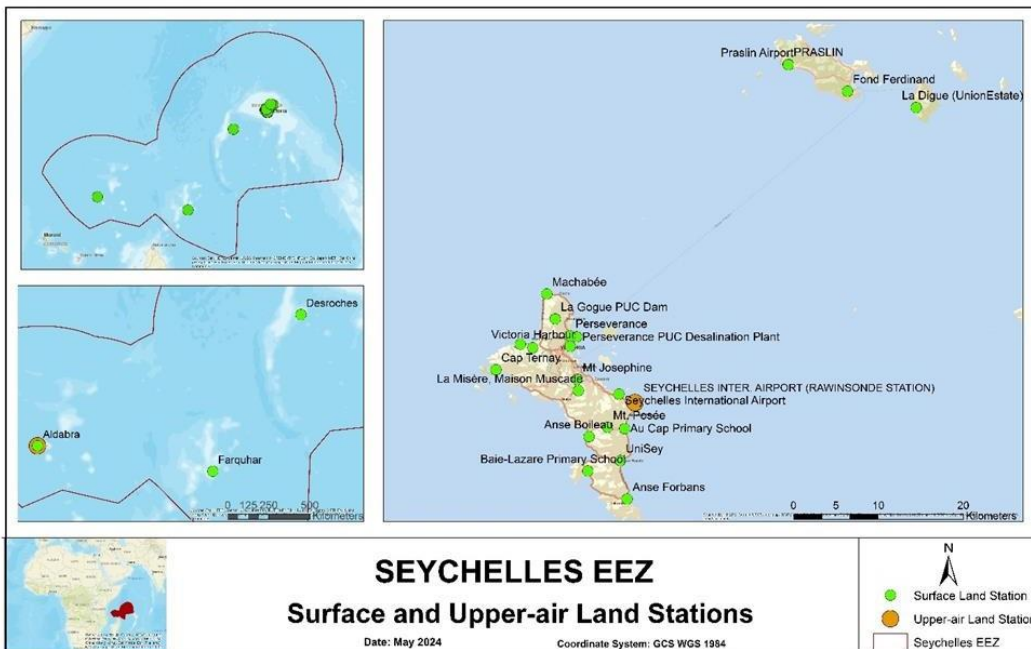
<b>Upper-air stations over land</b> Standard density <sup>2</sup> 500km	2	1	0	1	1
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## 2. Analysis of existing GBON stations and their status against GBON requirements

The Seychelles Meteorological Authority (SMA) operates and maintains a network of 24 surface land stations.

#	Station name	WIGOS-ID	Station type	Ownership	Latitude	Longitude	Deployment date	Declared reporting status
1	ALDABRA	0-20000-0-63995	S	NMHS	-9.4017	46.2061	2001-01	Operational
2	Anse Boileau	0-690-0-63001AB	S	NMHS	-4.7152	55.4821	2023-05	Operational
3	Anse Forbans	0-690-0-63008AF	S	NMHS	-4.7813	55.5225	2023-05	Operational
4	Au Cap Primary School	0-690-0-63002AC	S	NMHS	-4.7067	55.5199	2023-06	Operational
5	Baie-Lazare Primary School	0-690-0-63009BL	S	NMHS	-4.7516	55.4808	2023-05	Operational
6	Belombre PUC Desalination	0-690-0-63003BO	S	NMHS	-4.6173	55.4094	2023-05	Operational
7	Cap Ternay	0-690-0-63010CT	S	NMHS	-4.6443	55.3834	2023-05	Operational
8	DESROCHES	0-20000-0-63994	S	NMHS	-5.6951	53.6502	2001-01	Silent
9	FARQUHAR	0-20000-0-63996	S	NMHS	-10.1225	51.1611	2001-01	Silent
10	La Digue (UnionEstate)	0-690-0-UNIO	S	NMHS	-4.3663	55.8288	2021-04	Silent
11	La Gogue PUC Dam	0-690-0-63004LG	S	NMHS	-4.5905	55.4463	2023-05	Operational
12	La Misère, Maison Muscade	0-690-0-63011LM	S	NMHS	-4.6665	55.4709	2023-05	Operational
13	Le Niolle PUC Waterworks	0-690-0-63005LN	S	NMHS	-4.6209	55.4224	2023-05	Operational
14	Machabée	0-690-0-63012MA	S	NMHS	-4.564	55.4373	2023-05	Operational
15	Mt Josephine	0-690-0-63006MJ	S	NMHS	-4.6546	55.4698	2023-06	Operational
16	Mt. Posée	0-690-0-63013MP	S	NMHS	-4.7053	55.5018	2023-06	Operational
17	PRASLIN	0-20000-0-63981	S	NMHS	-4.3205	55.6931	2001-01	Silent
18	Perseverance PUC Desalination Plant	0-690-0-63015PD	S	NMHS	-4.6094	55.4691	2023-05	Operational

#	Station name	WIGOS-ID	Station type	Ownership	Latitude	Longitude	Deployment date	Declared reporting status
19	SEYCHELLES INTERNATIONAL AIRPORT	0-20000-0-63980	S	NMHS	-4.6701	55.5138	2017-12	Operational
20	UniSey	0-690-0-63007US	S	NMHS	-4.7406	55.5153	2023-05	Operational
21	Victoria Harbour	0-690-0-63014VH	S	NMHS	-4.6196	55.4621	2023-05	Operational
22	Perseverance	68982	S	NMHS	-4.6083	55.4619	2023-06	Operational
23	Fond Ferdinand	63983	S	NMHS	-4.3492	55.756	2021-04	Operational
24	Praslin Airport	160196	S	NMHS	-4.321	55.6933	2023-10	Operational
25	SEYCHELLES INTER. AIRPORT (RAWINSONDE STATION)	0-20000-0-63985	UA	NMHS	-4.6790	55.5308	1976-01-01	Operational



The table below shows the information concerning the surface land observing stations identified for GBON.

#	Station name	WIGOS-ID	Latitude	Longitude	Date Established	Program/Network affiliation
1	ALDABRA	0-20000-0-63995	-9.4017	46.2061	1968-01-01	GOS General: Non-reporting, RBCN - deprecated: Closed, RBON: Operational; GBON: Planned
2	DESROCHES	0-20000-0-63994	-5.6951	53.6502	2001-01-01	GBON: Planned; GOS General: Non-reporting
3	FARQUHAR	0-20000-0-63996	-10.1225	51.1611	2001-01-01	GOS General: Non-reporting

#	Station name	WIGOS-ID	Latitude	Longitude	Date Established	Program/Network affiliation
4	LA DIGUE	0-690-0-UNIO	-4.3663	55.8288	2021-12-01	GBON: Planned
5	PRASLIN	0-20000-0-63981	-4.3205	55.6931	2001-01-01	GBON: Planned, RBCN - deprecated: Closed, RBON: Non-reporting, RBSN(S) - deprecated: Closed
6	SEYCHELLES INTERNATIONAL AIRPORT	0-20000-0-63980	-4.6701	55.5138	1894-01-01	CLIMAT(C) - deprecated: Closed, GBON: Operational, GOS General: Operational, GSN: Operational, RBCN - deprecated: Closed, RBON: Operational, RBSN(S) - deprecated: Closed
7	COEVITY	To be registered in OSCAR/Surface	-7.1322	56.2736	n/a	GBON: Planned

Furthermore, SMA has 1 upper-air (radiosonde) land station located at the Seychelles International Airport which currently performs 1 ascent per day at 12h00 UTC. The new upper-air station will be deployed at Aldabra.

#	Station name	WIGOS-ID	Latitude	Longitude	Date Established	Program/Network affiliation
1	SEYCHELLES INTER. AIRPORT (RAWINSONDE STATION)	0-20000-0-63985	-4.6790	55.5308	1976-01-01	GBON, Global Upper Air Network (GUAN)
2	ALDABRA	0-20000-0-63995	-9.4017	46.2061	1968-01-01	GBON: Planned

**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) <sup>3</sup>	To improve	Reporting (GBON compliant) <sup>3</sup>	To improve

<sup>3</sup> 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.

<b>Surface land stations</b> Standard density <sup>4</sup> 200km Variables: SLP, T, H, W, P, SD	n/a	n/a	n/a	n/a
<b>Upper-air stations operated from land</b> Horizontal resolution <sup>4</sup> : 500km Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	n/a	n/a	n/a	n/a
<b>Surface marine stations in Exclusive Economic Zones:</b> <sup>7</sup> 500 km Variables: SLP, SST	1	1	0	0
<b>Upper-air stations operated in Exclusive Economic Zones:</b> <sup>5</sup> 1000 km Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	1	1	0	0

**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 <sup>6</sup> )	Owner (NMHS/3rd party)	Funding source	GBON variable measured							Reporting cycle (obs/day)	GBON Compliant (Y/N)
				SLP	T	H	W	P	SD	SST		
Aldabra	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Anse Boileau	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally

<sup>4</sup> 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.

<sup>5</sup> Although GBON marine stations and stations in EEZ are not part of initial SOFF scope, peer advisors are encouraged to analyze in this step when considered relevant e.g. SIDS, the status of current marine stations for future GBON marine observations investments.

<sup>6</sup> Please see guidance on marine stations in Section 2 on Scope.



Anse Forbans	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Au Cap Primary School	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Baie-Lazare Primary School	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Belombre PUC Desalination	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Cap Ternay	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Desroches	S/M	NMHS	NMHS	N	N	N	N	N	N/A	N	0	No. The station does not disseminate data internationally
Farquhar	S/M	NMHS	NMHS	N	N	N	N	N	N/A	N	0	No. The station does not disseminate data internationally
La Digue	S/M	NMHS	SADC	N	N	N	N	N	N/A	N	0	No. The station does not disseminate data internationally
La Gogue PUC Dam	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
La Misère, Maison Muscade	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Le Niole PUC Waterworks	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Machabée	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Mt Josephine	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Mt. Posée	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Praslin	S/M	NMHS	NMHS	N	N	N	N	N	N/A	N	0	No. The station does not disseminate data internationally
Perseverance PUC Desalination Plant	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Seychelles International Airport	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N/A	8	No. Station to be rehabilitated to meet GBON requirements
UniSey	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Victoria Harbour	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally

Perseverance	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Fond Ferdinand	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Praslin Airport	S/M	NMHS	NMHS	Y	Y	Y	Y	Y	N/A	N	0	No. The station does not disseminate data internationally
Seychelles Inter. Airport (Rawinsonde Station)	UA	NMHS	NMHS		Y	Y	Y	Y			1	No. Station to be rehabilitated to meet GBON requirements.
Aldabra	UA	NMHS										New station to be established and installed
Coetivy	S/M	NMHS										New station to be established and installed

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

The technical and local assessment of the GBON stations indicated that there is a need to rehabilitate the surface land station located at the Seychelles International Airport. The 5 remaining stations will be re-opened and replaced with new Automatic Weather Stations that meet the GBON technical requirements.

The additional station, Coetivy, will be installed to cover the southern part of the Seychelles EEZ located approximately 290km from the south of Mahe. The inclusion of Coetivy will not pose any challenge particularly to the maintenance and sustainability of the station as SMA has a good partnership with institutions on the island.

The reasons for the rehabilitation and installation of new AWS are depicted in the table below:

#	Station name	Status	Data transfer protocol (MQTT/SMTP)	Station type
1	Aldabra	Operational	Uses FTP technology instead of MQTT/SMTP	All-in-one
2	Desroches	Silent/no station	n/a	n/a
3	Farquhar	Silent/no station	n/a	n/a
4	La Digue	Silent	Uses FTP technology instead of MQTT/SMTP	All-in-one
5	Praslin	Silent/no station	n/a	n/a
6	Seychelles International Airport	Operational	Uses FTP technology instead of MQTT/SMTP	n/a
7	Coetivy	Planned	n/a	n/a

**Distance Table in Kilometers (km)**

Station name	Aldabra	Desroches	Farquhar	La Digue	Praslin	Seychelles International Airport	Coetivy
Aldabra	925	563	820	16	43	Seychelles International Airport	Coetivy
Desroches							
Farquhar	555	563	820	16	43	Seychelles International Airport	Coetivy
La Digue	1208	283	820	16	43	Seychelles International Airport	Coetivy
Praslin	1197	273	815	16	43	Seychelles International Airport	Coetivy
Seychelles International Airport	1161	236	772	48	43	Seychelles International Airport	Coetivy
Coetivy	1144	331	654	310	317	285	Coetivy

**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	6	7	1	1	6
Upper-air stations operated from land	2	2	1	1	1
Surface marine stations in Exclusive Economic Zones: <sup>7</sup> Density 500 km Variables: SLP, SST Observing cycle: 1h					
Upper-air stations operated in Exclusive Economic Zones: <sup>8</sup> Density 1000 km Vertical resolution: 100 m, up to 30 hPa Variables: T, H, W					

<sup>7</sup> 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.

<sup>8</sup> 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.

Observing cycle: twice a day					
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### 3.1 Recommended existing surface, upper-air and marine<sup>10</sup> stations to be designated to GBON

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

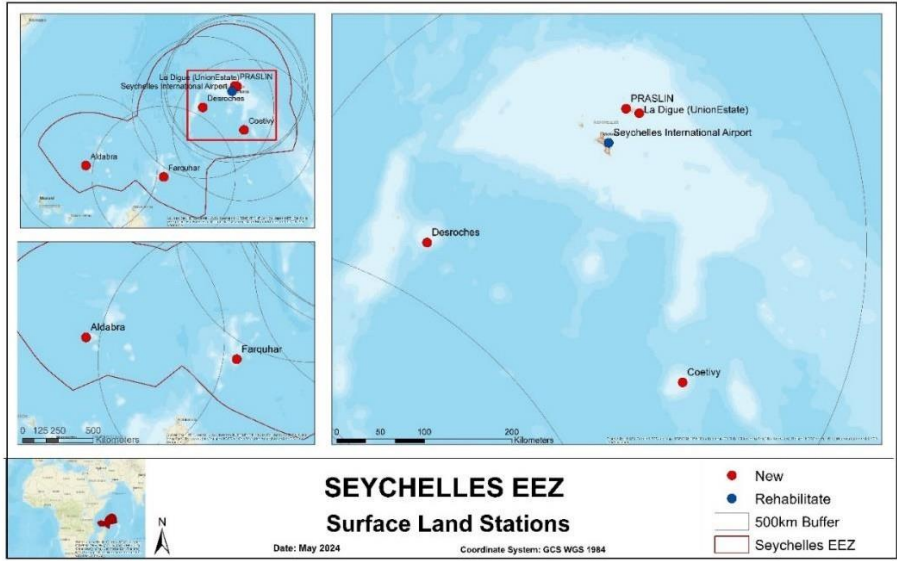
Station name	Station type (S/UA/M <sup>11</sup> )
Aldabra	S/M
Desroches	S/M
Farquhar	S/M
La Digue	S/M
Praslin	S/M
Seychelles International Airport	S
Coevity	S/M
Seychelles Inter. Airport (Rawinsonde Station)	UA
Aldabra	UA

### Map of existing and newly proposed surface land stations with 500km (diameter) circles – SIDS

<sup>9</sup> 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.

<sup>10</sup> 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.

<sup>11</sup> Please see guidance on marine stations in Section 2 on Scope.



#### 4. Report completion signatures

##### Peer Advisor signature

Ishaam Abader

DocuSigned by:  
*Ishaam Abader*

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15/11/2024 | 10:59 AM SAST

##### Beneficiary Country signature

Mr. Vincent Amelie

15/11/2024 15:15 UTC

##### WMO Technical Authority screening signature