



**26 May 2025**

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# **GBON National Gap Analysis**

**Tuvalu**

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**Systematic Observations  
Financing Facility**

**Weather  
and climate  
data for  
resilience**





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

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: 26 June 2025

Signature:

Albert Fischer

Director, WIGOS Branch, Infrastructure Department, WMO

# GBON National Gap Analysis Report

## Tuvalu

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

**Table 1. 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	4	0	4	0	4
<b>Upper-air stations over land</b> Standard density 2 500km	1	1	0	0	0

<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 Small Island States that have a significantly larger EEZ area than land surface area, 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 these Islands have been calculated with 500 km for surface stations and 1000 km for upper-air stations.

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

**Table 2. 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>1</sup>	To improve	Reporting (GBON compliant) <sup>2</sup>	To improve
<b>Surface land stations</b> Standard density 2 200km Variables: SLP, T, H, W, P, SD	0	4	0	0
<b>Upper-air stations operated from land</b> Horizontal resolution: 500km Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	0	1	0	0
<b>Surface marine stations in Exclusive Economic Zones:</b> <sup>3</sup> 500 km Variables: SLP, SST	0	0	0	0
<b>Upper-air stations operated in Exclusive Economic Zones:</b> <sup>3</sup> 1000 km Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	0	0	0	0

Tuvalu operates four surface land stations, one of which is affiliated to GBON in OSCAR Surface. This station at Funafuti provides eight 3-hourly manual synoptic observations and one upper air sounding per day. The three remaining land surface stations provide four manual synoptic observations per day at the main synoptic reporting times.

There are no compliant surface marine stations operating in Tuvalu.

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

<sup>3</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.

Station name	Station type (S/UA/M <sup>4</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			
Nanumea	S <sup>#</sup>	NMHS	TMS	X	X	X	X	X			4		N
Nui	S <sup>#</sup>	NMHS	TMS	X	X	X	X	X			4		N
Funafuti	S <sup>#</sup>	NMHS	TMS	X	X	X	X	X			8		N
Niulakita	S <sup>#</sup>	NMHS	TMS	X	X	X	X	X			4		N
Nanumea AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Nanumaga AWS	S	NMHS	UNDP RESPAC	X	X	X	X	X			24		N
Vaitupu AWS	S	NMHS	UNDP RESPAC	X	X	X	X	X			24		N
Vaitupu AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Funafuti	UA	NMHS	UKMO		X	X	X				1		N
Funafuti Aero AWOS	S	NMHS	DFAT (Australia)	X	X	X	X	X			24		N
Nukulaelae AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N

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).

The four manual surface reporting stations listed in Table III are staffed with Tuvalu Meteorological Service (TMS) observers undertaking manual observations, which they code into SYNOP code. These observations are transmitted to the Funafuti office by HF Radio where they are collated into message bulletins and emailed to GTS centres in New Zealand and Australia for onward distribution on the GTS/WIS.

There are currently five AWSs operating across Tuvalu. Two AWS, Nanumaga and Vaitupu, were funded by the UNDP/RESPAC project with operations funded by TMS. Another three AWS, Nanumea, Vaitupu and Nukulaelae, were recently installed and funded by UNEP CIS-Pac5 project with operational funding until 2026. All AWS report the standard meteorological parameters required of GBON land surface stations except snow depth, as snow does not occur in Tuvalu. None of the AWS stations are registered in OSCAR Surface.

An AWOS at Funafuti Airport was installed in 2024 funded by the Australian Government.

The upper-air programme at Funafuti provides one sounding per day at 00 UTC. The UKMO funds the balloons and radiosondes through the WMO Voluntary Cooperation

<sup>4</sup> Please see guidance on marine stations in Section 2 on Scope.

Programme (VCP), while technical support and annual equipment maintenance is provided by the Meteorological Service of New Zealand. The upper air data is automatically encoded in FM-35 TEMP code and the reports are emailed by the duty observer to the GTS Centre in Wellington for onward distribution. The upper air system can produce high resolution data in FM-95 BUFR code, but this is not currently configured.

A tide/sea level gauge is installed at the wharf at Funafuti and two Spoondrift Spotter wave buoys measuring wave height and sea surface temperature have been deployed offshore Funafuti and Vaitupu, in cooperation with the Tuvalu Fisheries Department. These data are not distributed on the GTS.

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

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

GBON requirements	Global GBON target	Approved national target	GGBON compliant	Gap	
				To improve	New
	[# of stations]				
Surface land stations	4	4	0	4	0
Upper-air stations operated from land	1	1	0	1	0
Surface marine stations in Exclusive Economic Zones: <sup>3</sup> Density 500 km Variables: SLP, SST Observing cycle: 1h					
Upper-air stations operated in Exclusive Economic Zones: <sup>3</sup> Density 1000 km Vertical resolution: 100 m, up to 30 hPa Variables: T, H, W Observing cycle: twice a day					

SLP: Atmospheric pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation; SD: Snow depth; SST: Sea surface temperature.

The in-country gap analysis noted that Tuvalu's reporting surface land stations and the one upper-air station do not meet GBON requirements.

### 3.1. Recommended existing surface, upper-air and marine<sup>3</sup> stations to be designated to GBON

**Table 5. Recommended existing surface, upper-air and marine stations to be designated to GBON.**

Station name	Station type (S/UA/M <sup>5</sup> )
Nanumea	S
Nui	S
Funafuti	S / UA
Niulakita	S

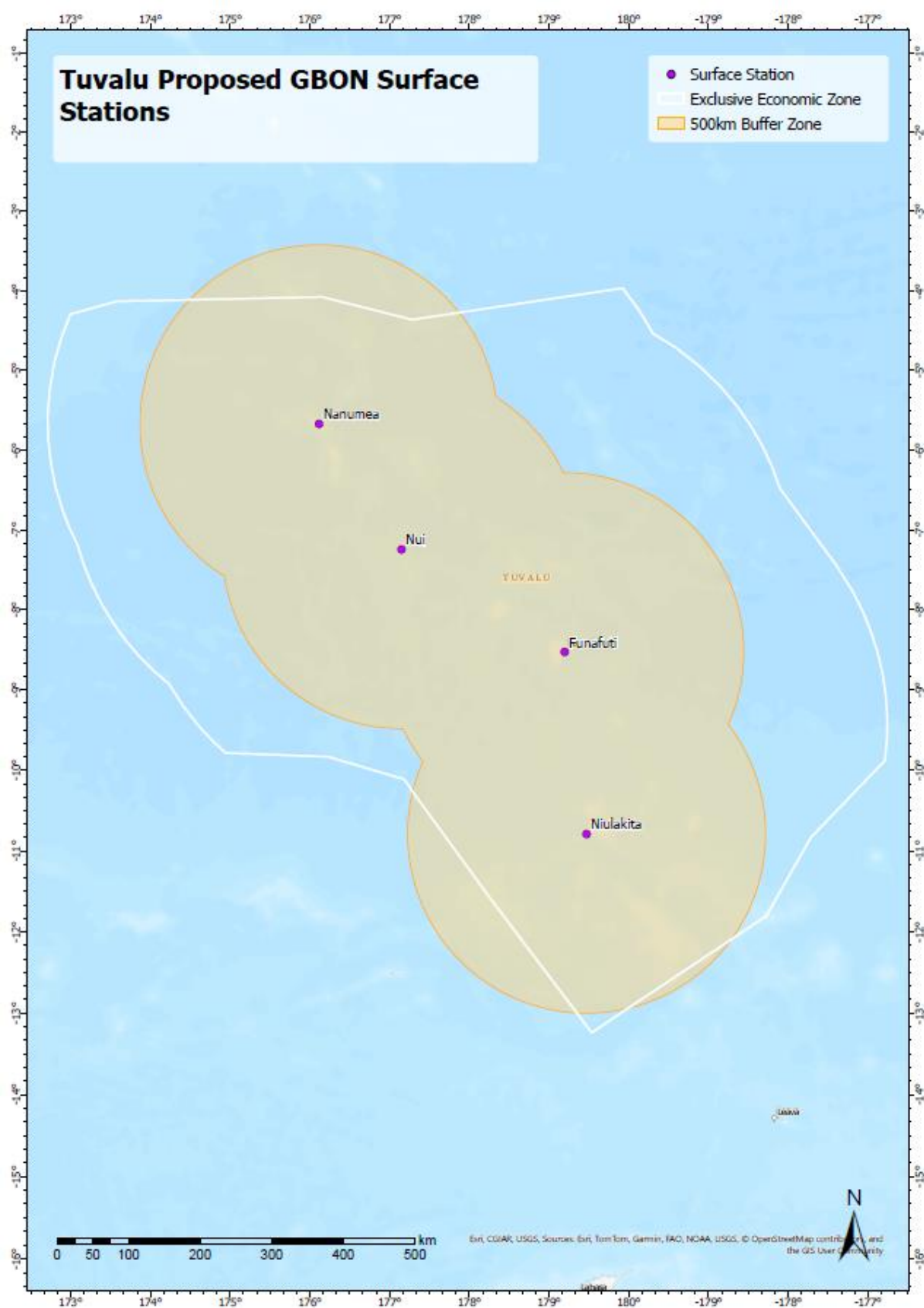
Funafuti is currently the only station designated as a GBON station for its Surface and Upper Air Programme. It is recommended that the manual surface stations at Nanumea, Nui and Niulakita are also designated as GBON stations.

While the UNEP CIS-Pac5 AWS are telemetered and upload data to the CliDE database, they do not currently distribute their observations to global NWP centres, which is a key GBON requirement. It is technically feasible to supplement the manual observing programme with observations from the AWS network to provide 24 observations a day.

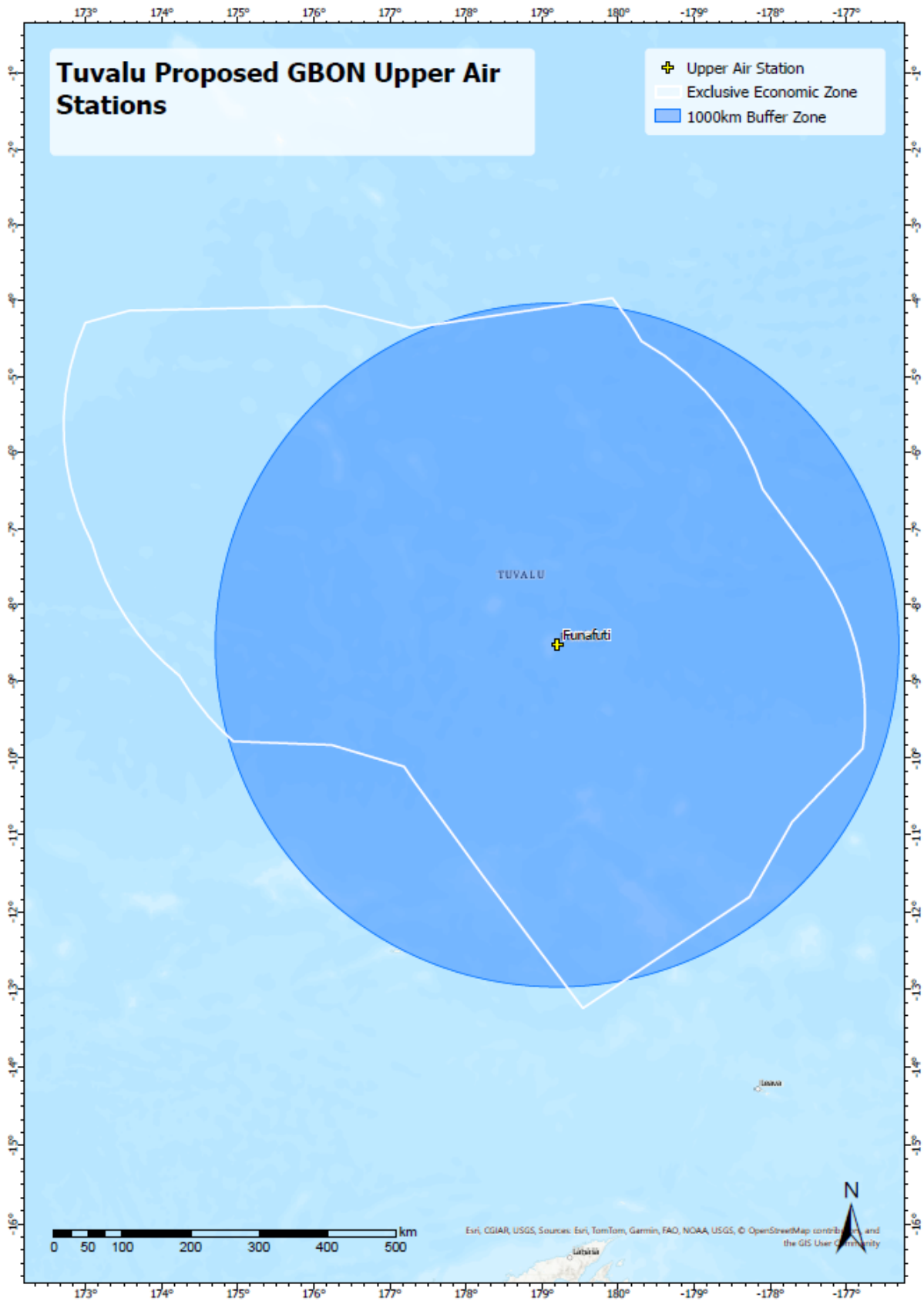
The UNEP CIS-Pac5 project provides for eight new AWS across Tuvalu: two were installed in 2023, one was installed in 2024 and five are scheduled for installation in 2025/26.

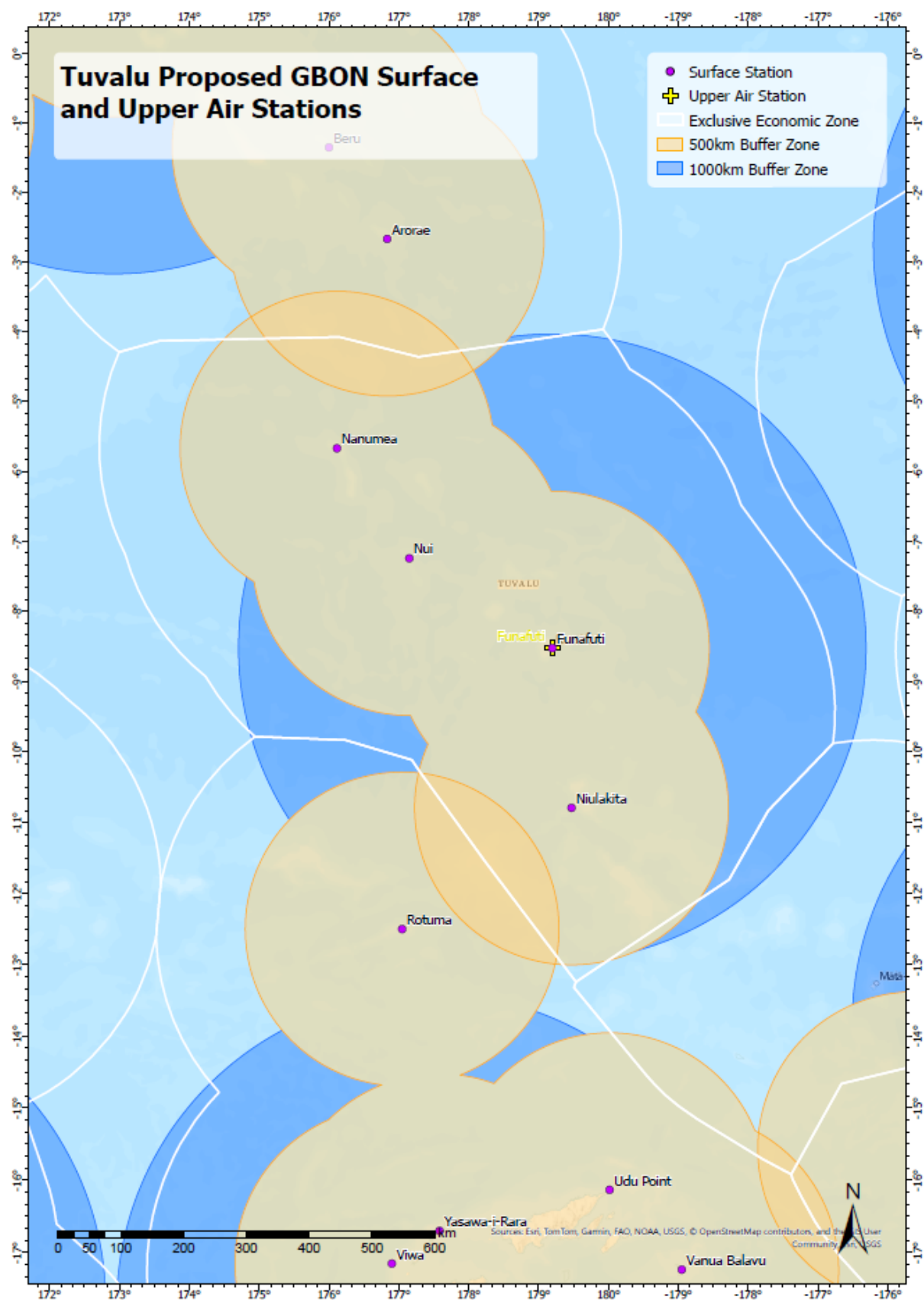
See Attachment 1 for details of the AWS network.

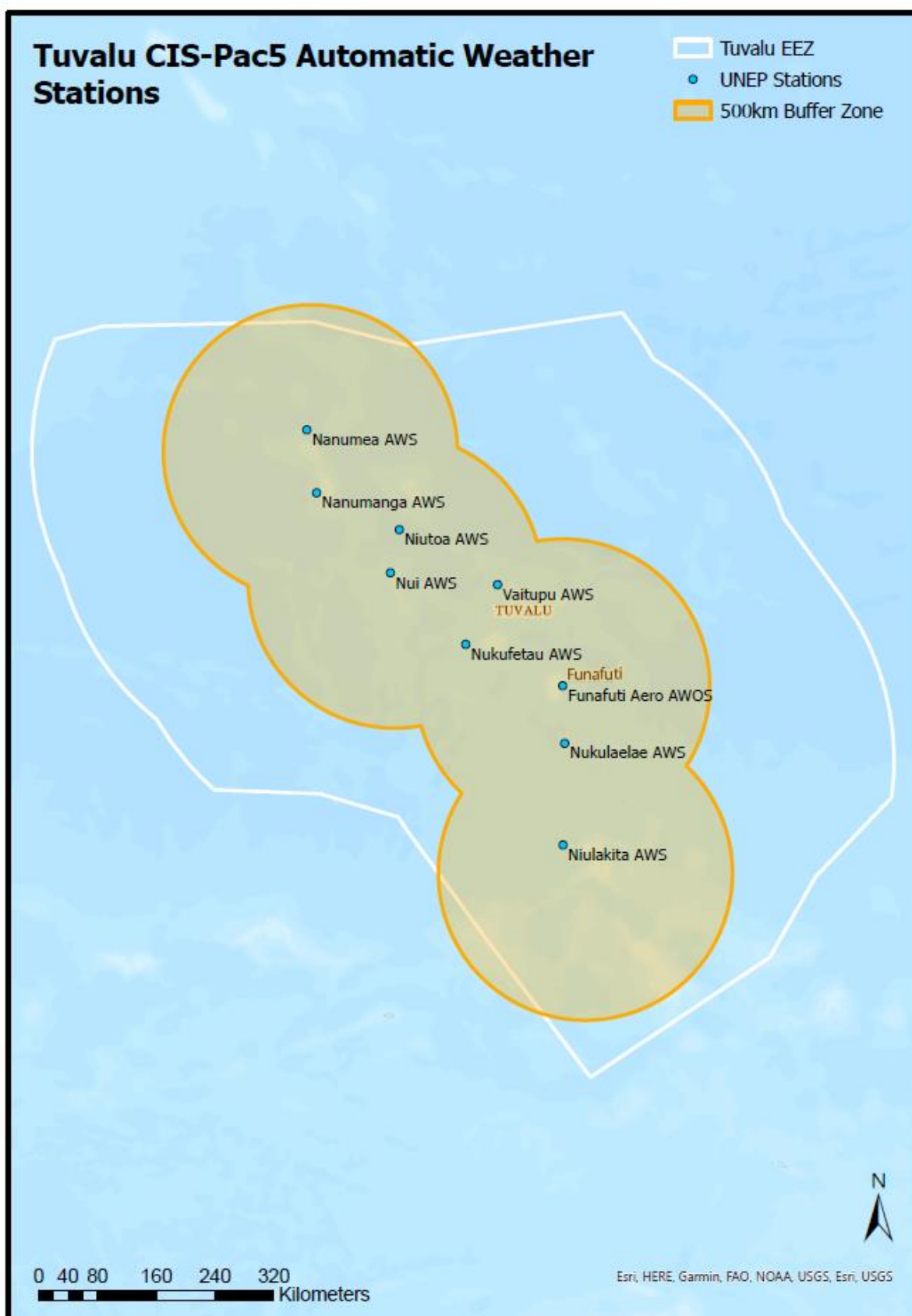
<sup>5</sup> Please see guidance on marine stations in Section 2 on Scope.












## 4. Report completion signatures

### Peer Advisor signature



Emma Coombe

### Country signature



Taula Katea

### WMO Technical Authority



## Attachment 1 – Tuvalu Meteorological Service AWS Network

### 1. Existing AWS Installations

	Station type	Owner (NMHS /3rd party)	Funding source	GBON variable measured							Reporting cycle (obs/day)		GBON Compliant (Y/N)
				SLP	T	H	W	P	S D	SST			
	(S/UA/M)												
Nanumea AWS	S	NMHS	UNDP RESPAC	X	X	X	X	X			24		N
Nanumea AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Vaitupu AWS	S	NMHS	UNDP RESPAC	X	X	X	X	X			24		N
Vaitupu AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Nukulaelae AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Funafuti Aero AWOS	S	NMHS	DFAT (Australia)	X	X	X	X	X			24		N

Stations are GBON compliant in terms of variables measured and reported, but they are not compliant in terms of international data sharing. It is expected that the CIS-Pac5 stations will all be compliant once metadata are entered into OSCAR Surface and observations are made available and published in WIS 2.0/GTS.

### 2. AWS Installations planned for 2025.

	Station type	Owner (NMHS /3rd party)	Funding source	GBON variable measured							Reporting cycle (obs/day)		GBON Compliant (Y/N)
				SLP	T	H	W*	P	SD	SST			
	(S/UA/M)												
Nanumaga AWS*	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Niutoa AWS*	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		N
Nui AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		Y*
Niulakita AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		Y*
Nukufetau AWS	S	NMHS	UNEP CIS-Pac5	X	X	X	X	X			24		Y*

\* Supplied but yet to be installed

Stations will GBON compliant in terms of variables measured and reported, but they are not compliant in terms of international data sharing. It is expected that the CIS-Pac5 stations will all be compliant once metadata are entered into OSCAR Surface and then data made available and published in WIS 2.0/GTS.