National Report of France to the XVIIth GLOSS Group of Experts 07 to 10 Nov. 2022

Coordinated in ***November 2022*** *by*

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1 French context and overview of its contribution to GLOSS

In 2022, **19 tide gauges on French territories** are contributing to the GLOSS core network (Table 1). The spatial coverage of this contribution is shown in Figure 1.

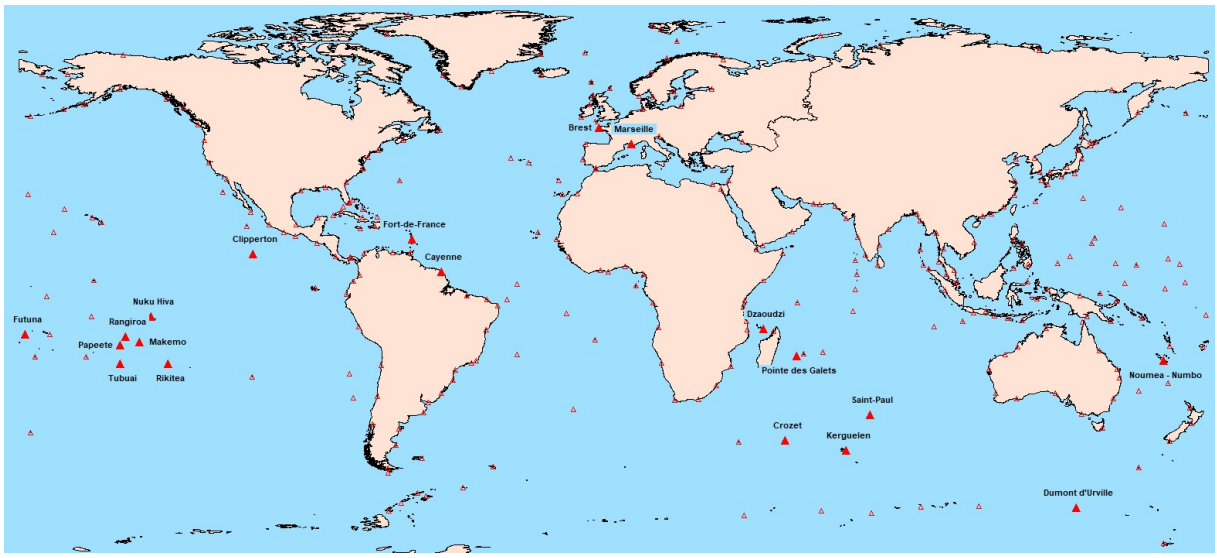


Figure 1: Geographical distribution of the French stations committed to GLOSS (empty triangle represents the other GLOSS stations of the core network)

Shom has been designed in 2010 by the French government as coordinator of the national in situ sea level observation. This led to the creation of REFMAR (http://refmar.shom.fr/en) whose main mission is to:

- Collect sea level observations made by French public establishments and services;
- Manage and archive the observations collected as delayed mode data;
- Define the networks and minimum specifications for sea level observations;
- Define and promote appropriate means of operational transmission;
- Coordinate the real-time and delayed mode distribution;
- Control the quality of the observations received;
- Contribute to the definition of national and international standards;

In the past years, REFMAR has been contacting French sea level data producers to draw an inventory of all the French sea level stations operated by Port Authorities, Research institutes, universities, flood warning systems, local authorities, and so on. REFMAR pays particular attention to general data access and data policy conditions. Through REFMAR website and meetings, Shom also aims to provide guidance and recommendations to producers and to promote state-of-the-art measurement practices. REFMAR has created a set of teaching technical sheets to describe how to install a tide staff, what a sea level observatory is, etc. These sheets are available in French at:
http://refmar.shom.fr/documentation/recommandations/fiches-techniques

In October 2022, REFMAR distributed the data of 141 permanent tide gauges, including the 50 stations of the Shom tide gauge network RONIM.

SONEL originally stands (in French) for Système d'Observation du Niveau des Eaux Littorales. That is, a research observation infrastructure whose basic activities are assembling, quality-controlling, and disseminating (www.sonel.org) high-quality continuous measurements of sea and land levels at the coast from French tide gauges and from a global (international) network of space geodetic stations (mainly composed of GNSS stations) at or near tide gauges.
SONEL also acts as the data assembly center for GLOSS regarding observations from GNSS stations co-located with tide gauges. The GNSS at Tide Gauge Activities is described in a dedicated report to this GLOSS Group of Experts.

GLOSS Id.	Station Name	Operator	Network
017	Pointe des Galets (Réunion Is.)	Shom	RONIM
021	Crozet	LEGOS/INSU	ROSAME (disabled)
023	Kerguelen	LEGOS/INSU	ROSAME
024	Amsterdam St Paul	LEGOS/INSU	ROSAME
096	Dzaoudzi	Shom	RONIM
123	Nouméa	Shom	RONIM
131	Dumont d'Urville	LEGOS/INSU	ROSAME
138	Rikitea	UHSLC	
140	Papeete Fare Ute (Tahiti)	UHSLC	
142	Nuku Hiva (Marquesas Is.)	UHSLC	
165	Clipperton	Shom	Non-permanent
202	Ile Royale (Fr. Guyana)	Shom	RONIM
204	Fort-de-France	Shom	RONIM
205	Marseille	Shom	RONIM
242	Brest	Shom	RONIM
260	Sao Tomé	LEGOS / IRD	Decommissioned
353	Futuna	Shom/DPAM	
354	Makemo	Shom/DPAM	
355	Rangiroa	Shom/DPAM	Temporarily dismantled
356	Tubuai	Shom/DPAM	

Table 1: GLOSS stations on French territories

2 Status of French sea level stations committed to GLOSS

In 2021 and 2022, the RONIM network has undergone a major modernization: replacement of the data logger, installation of complete weather sensor (temperature, pressure, humidity), installation of GPRS transmission system.

2.1 Atlantic Ocean & Mediterranean Sea

GLOSS 205: MARSEILLE

- Operated by: **IGN and Shom (RONIM TG Network).**
- First observation: **1849**
- Last observation: **Ongoing**
- Contributing to **IOC- ICG/NEAMTWS, GLOSS**


- **Sensor**: Krohne Optiflex radar sensor. Legacy floating gauge is still operating.
- **Data transmission**: 1s to NEAMTWS + 1 min. real-time internet.
- **GNSS**: One GNSS station operational since July 1998.
- **Comment**: Manual controls several times a year by IGN. Modernization in February 2022.
- **Contact**: ronim@shom.fr
- **Other:** Creation in January 2021 of the association "les amis du marégraphe de Marseille" (the friends of the Marseille tide gauge) to promote the history and scientific interest of the observatory (https://amis-maregraphe-marseille.fr/).

GLOSS 242: BREST

- **Operated by:** **Shom (RONIM TG Network)**
- **First observation:** **1846**
- **Last observation:** **Ongoing**
- **Contributing to** **IOC – ICG/NEAMTWS, GLOSS**

- **Sensor**: Krohne Optiflex 1300C radar sensor
- **Data transmission**: 1s to NEAMTWS + 1 min. real-time internet.
- **GNSS**: One GNSS station operating continuously since 1998. The distance between the GNSS and the tide gauge is about 350 meters.
- **Comment:** Manual controls several times a year. Last maintenance in 2018. Modernization in October 2020 (test site).
- **Contact:** ronim@shom.fr

GLOSS 204: FORT-DE-FRANCE, MARTINIQUE

- **Operated by:** **Shom (RONIM TG Network)**
- **First observation:** **1912 (continuous since 2005)**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/CARIBE-EWS, GLOSS**

- **Sensor**: Krohne Optiwave radar since 2011
- **Data transmission**: 1 min. real-time GTS + internet.
- **GNSS**: One permanent GNSS station since 2011
- **Comment:** Routine maintenance by local partners. Complete control operations in 2015. Will be modernized in November 2022.
- **Contact:** ronim@shom.fr

GLOSS 202: CAYENNE-ILE ROYALE-ILES DU SALUT, (French Guyana)

- **Operated by:** **Shom (RONIM TG Network)**
- **First observation:** **1896 (continuous since 2006)**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/CARIBE-EWS, GLOSS**
- **Sensor**: Krohne Optiwave radar sensor
- **Data transmission**: 1 min. real-time GTS + internet.
- **GNSS**: Permanent GNSS station since 2012
- **Comment:** Routine maintenance by local partners. Complete control operations in 2018. Modernization in May 2022.
- **Contact:** ronim@shom.fr

GLOSS 260: SAO TOME

- **Operated by:** **LEGOS (France)**
- **First observation:** **2004**
- **Last observation:** **2010**
- **Contributing to:** **-**
- **Sensor**: None
- **Data transmission**: None
- **GNSS**: Episodic GNSS campaigns
- **Link to GNSS data:** -
- **Comment:** This station was maintained with help from France but is now decommissioned

2.2 Indian Ocean & Antarctica

GLOSS 017: POINTE DES GALETS, LA REUNION

- **Operated by:** **Shom (RONIM TG Network)**
- **First observation:** **1900 (continuous since 2007)**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/IOTWS, GLOSS**

- **Sensor**: Krohne Optiflex radar sensor
- **Data transmission**: 1 min. real-time GTS + internet.
- **GNSS**: No permanent GNSS station (due to the masking of the sky visibility). GNSS measurements performed during leveling operations

- **Comment:** Routine maintenance by local partners. Complete control operation in 2017. Modernization in March 2022.
- **Contact:** ronim@shom.fr

GLOSS 096: DZAOUDZI, MAYOTTE

- **Operated by:** **Shom (RONIM TG Network)**
- **First observation:** **1962**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/IOTWS, GLOSS**
- **Sensor**: Krohne Optiflex radar sensor (since 2008)
- **Data transmission**: 1 min. real-time GTS + internet.
- **GNSS**: Permanent GNSS station since 2013
- **Comment:** Routine maintenance by local partners. Complete control operation in 2017. Modernization in November 2021.
- **Contact:** ronim@shom.fr

South Indian Ocean

GLOSS-023: KERGUELEN

- Operated by : LEGOS (ROSAME TG Network)
- First observation : First observation in 1959 continuous since 1993
- Last observation : Ongoing
- Contributing to : IOC – ICG/IOTWS, GLOSS
- Sensor : KER3 (radar Krohne Optiwave) + KER2 (pressure + Krohne Optiflex)
- Data transmission : 1 min. real time GTS and internet + 1h ARGOS for KER2
- GNSS : 1 co-located GNSS + 2 nearby GNSS + a DORIS station
- Comment : Tide pole readings and GNSS buoy sessions are made several times a year. KER2 optiflex sensor is not working properly. A mission is scheduled in March 2023 to try to fix the problem.
- Contact : philippe.techine@legos.obs-mip.fr

GLOSS-021: CROZET

- **Operated by:** **LEGOS (ROSAME TG Network)**
- **First observation:** **1995**
- **Last observation:** **2013**
- **Contributing to:** **GLOSS**
- **Sensor**: Disabled (previously pressure gauge)
- **Data transmission**: ARGOS
- **GNSS**: -1 GNSS nearby
- **Comment:** Station was lost to a storm in 2015. This site is particularly difficult to maintain and a relocation of the station is under study. A pure GNSS-IR solution is envisaged and some tests are schedule during the Mars-April 2023 field campaign.
- **Contact:** philippe.techine@legos.obs-mip.fr

GLOSS-024: SAINT-PAUL

- **Operated by:** **LEGOS (ROSAME TG Network)**
- **First observation:** **1994**
- **Last observation:** **ongoing**

- **Contributing to:** **GLOSS**
- **Sensor**: Krohne radar sensor + bottom pressure
- **Data transmission**: ARGOS
- **GNSS**: Permanent GNSS station since 2011
- **Comment:** Bottom pressure gauge is out of order. A mission is scheduled in March 2023 to remove the bottom pressure gauge to fix it and reinstall in 2024.
- **Contact:** philippe.techine@legos.obs-mip.fr

GLOSS-131: DUMONT D'URVILLE

- **Operated by:** **LEGOS (ROSAME TG Network)**
- **First observation:** **1997**
- **Last observation:** **Ongoing**
- **Contributing to:** **GLOSS**
- **Sensor**: Bottom pressure gauge
- **Data transmission**: ARGOS and Ethernet
- **GNSS**: 2 nearby GNSS stations
- **Comment:** Bottom pressure gauge was reinstalled in January 2022
- **Contact:** philippe.techine@legos.obs-mip.fr

2.3 Pacific Ocean

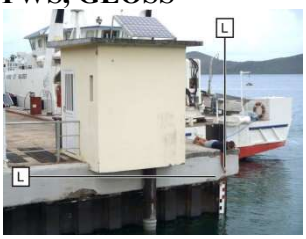
GLOSS 165: CLIPPERTON (non-permanent)

- **First observation:** **2007**
- **Last observation:** **2012**
- **Contributing to:** **GLOSS**
- **Sensor**: None
- **Data transmission**: None
- **GNSS**: Episodic campaigns (2007, 2012 and 2015)
- **Comment:** Non-permanent station. Observation campaigns were carried out between 2007 and 2015.
- **Contact:** ronim@shom.fr

2.4 New Caledonia and Wallis-et- Futuna Islands

GLOSS 123: NOUMEA-NUMBO

- **Operated by:** **Shom (RONIM TG Network)**
- **First observation:** **1967**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**



- **Sensor**: Vega Vegapuls C22 (since 2022)
- **Data transmission**: 1 min. real-time internet + GTS (since October 2022)
- **GNSS**: Permanent GNSS station since 2015
- **Comment:** Routine maintenance by Shom. Complete control operation in 2019. Modernization in April 2022.
- **Contact:** ronim@shom.fr

GLOSS 353: LEAVA, FUTUNA ISLAND

- **Operated by:** **Shom**
- **First observation:** **1986**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**
- **Sensor**: Vega Vegapuls C22 (since July 2022) radar sensor and Druck pressure sensor
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: Permanent GNSS station
- **Comment:** Station regularly visited by Shom technicians. Complete control operation in 2019.
- **Contact:** ronim@shom.fr

2.5 French Polynesia

The University of Hawaii maintains three stations in Rikitea, Papeete and Nuku Hiva.

GLOSS 138: RIKITEA

- **Operated by:** **Shom and DPAM**
- **First observation:** **1965**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**
- **Sensor**: Vaisala QHR-104 radar sensor and Druck pressure sensor
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: Permanent GNSS station since 2011
- **Comment:** A UHSLC tide gauge is installed nearby. Shom and DPAM station is regularly visited by Shom technicians and was controlled in 2019.
- **Contact:** ronim@shom.fr

GLOSS 140: PAPEETE FARE UTE

- **Operated by:** **UHSLC**
- **First observation:** **1975**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**
- **Sensor**: Several sensors, including a Vegapuls 62 radar
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: A CNES permanent GNSS station co-located since 2003
- **Comment:** Last known control in 2016

GLOSS 142: NUKU HIVA

- **Operated by:** **UHSLC**
- **First observation:** **1982**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**
- **Sensor**: Bubbler sensor, Vegapuls 62 radar and a Sutron RLR radar
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: Permanent GNSS station since 2011 (installed by Shom and UPF)
- **Comment:** Last known control in 2016

GLOSS 354: MAKEMO

- **Operated by:** **Shom and DPAM**
- **First observation:** **1990 (permanent since 2013)**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**
- **Sensor**: Druck pressure sensor and vegapuls 62 radar sensor
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: Permanent GNSS station co-located
- **Comment:** Regularly visited by Shom technicians. Last complete control operation in 2020.
- **Contact:** ronim@shom.fr.

GLOSS 355: RANGIROA

- **Operated by:** **Shom and DPAM**
- **First observation:** **1966 (permanent since 2009)**
- **Last observation:** **Temporarily dismantled**
- **Contributing to:** **IOC – ICG/PTWS, GLOSS**
- **Sensor**: Druck pressure sensor and a vegapuls 62 radar sensor
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: Permanent GNSS station co-located
- **Comment:** Regularly visited by Shom technicians. Last complete control operation in 2018. Station temporarily dismantled since February 2021 for port works. Will be reinstalled in 2023.
- **Contact:** ronim@shom.fr

GLOSS 356: TUBUAI

- **Operated by:** **Shom and DPAM**
- **First observation:** **2009**
- **Last observation:** **Ongoing**
- **Contributing to:** **IOC – ICG/PTWS**
- **Sensor**: Druck pressure sensor and a Vaisala QHR104 radar sensor
- **Data transmission**: 1 min. real-time GTS.
- **GNSS**: Permanent GNSS station co-located
- **Comment:** Regularly visited by Shom technicians. Last complete control operation in 2019.
- **Contact:** ronim@shom.fr

3 GLOSS requirements & the French stations

The table below provides a synthetic overview of the station status regarding the GLOSS requirements for core stations (IOC 2012).

Station	Type	Digital	Precision	Control	Meteo	Last Levelling	GNSS	Real-time
La Réunion	Radar	Yes	1cm	Semestrial	Pressure, temperature, humidity	2017	No	GPRS + GTS
Crozet	Pressure	Yes	1cm	<Annual	Pressure	2022	Yes	ARGOS (**disabled)**
Kerguelen	Pressure Radar	Yes	<1cm	Monthly	Pressure	2022	Yes	ARGOS ADSL GTS
Amsterdam St Paul	Pressure Radar	Yes	<1cm	Annual	Pressure	2019	Yes	ARGOS
Dzaoudzi	Radar	Yes	1cm	Semestrial	Pressure, temperature, humidity	2017	Yes	GPRS + GTS
Nouméa - Numbo	Radar	Yes	1cm	Semestrial	Pressure	2019	Yes	GPRS + GTS
Dumont D'Urville	Pressure	Yes	1cm	Annual	Pressure	2019	Yes	ARGOS ADSL
Rikitea	Radar Pressure	Yes	1cm	SHOM/ UHSLC		2019	Yes	GTS
Papeete	Radar Pressure	Yes	1cm	UHSLC		2016	Yes	GTS
Nuku Hiva	Radar	Yes	1cm	UHSLC		2016	Yes	GTS
Clipperton	Pressure 2005, 2006-2008, 2011-2012	Yes	5cm	Annual	model	2015	No	No
Ile Royale	Radar	Yes	1cm	Semestrial	Pressure, temperature, humidity	2018	Yes	GPRS + GTS
Fort-de-France	Radar	Yes	1cm	Semestrial	Pressure	2015	Yes	ADSL + GTS
Marseille	Radar Float	Yes	1cm	Semestrial	Pressure, temperature, humidity	2015	Yes	GPRS
Brest	Radar	Yes	1cm	Semestrial	Pressure, temperature, humidity	2018	Yes	GPRS
Sao Tomé	Pressure	Yes	1cm	<Annual	Pressure	2010	No	ARGOS **(decommissioned)**
Leava, Futuna Island	Radar Pressure	Yes	1cm	Annual	Pressure	2019	Yes	GTS
Makemo	Radar Pressure	Yes	1cm	Annual	Pressure	2020	Yes	GTS
Rangiroa	Radar Pressure	Yes	1cm	Annual	Pressure	2018	Yes	GTS **(temporarily dismantled)**
Tubuai	Radar Pressure	Yes	1cm	Annual	Pressure	2019	Yes	GTS

4 Access to tide-gauge and GNSS data

The website (data.shom.fr) provides a data portal that collects and distributes high frequency tide gauge data from all the different French sea level producers. Different levels of data (raw, real time, validated, etc.) are available on the portal. For GLOSS applications, hourly sea level data from the French stations committed to GLOSS are provided directly to the University of Hawaii Sea Level Centre (UHSLC). Mean sea levels and GNSS data at the tide gauges are available at SONEL (www.sonel.org) which also acts as IGS/TIGA data center and as GLOSS data assembly center for GNSS at tide gauges. Through SONELwebportal, mean sea levels are also provided to the PSMSL (http://www.psmsl.org)

The table below provides links to main data sources of French GLOSS stations.

GLOSS ID	Station	Status (October 2022)	Shom Real-time + Research Quality	IOC	SONEL	GNSS data
17	La Réunion	OK	http://data.shom.fr/donnees/refmar/110	http://www.ioc-sealevelmonitoring.org/station.php?code=reun	https://www.sonel.org/?page=maregraphe&idStation=1827	-
21	Crozet	Disabled	https://data.shom.fr/donnees/refmar/173	-	https://www.sonel.org/?page=maregraphe&idStation=1752	https://www.sonel.org/?page=gps&idStation=3452
23	Kerguelen	OK	https://data.shom.fr/donnees/refmar/23	http://www.ioc-sealevelmonitoring.org/station.php?code=kerg	https://www.sonel.org/?page=maregraphe&idStation=1780	https://www.sonel.org/spip.php?page=gps&idStation=710
24	Amsterdam St Paul	KO	https://data.shom.fr/donnees/refmar/194	http://www.ioc-sealevelmonitoring.org/station.php?code=stpa	https://www.sonel.org/?page=maregraphe&idStation=1837	https://www.sonel.org/?page=gps&idStation=3093
96	Dzaoudzi	OK	https://data.shom.fr/donnees/refmar/30	http://www.ioc-sealevelmonitoring.org/station.php?code=dzao	https://www.sonel.org/?page=maregraphe&idStation=1903	https://www.sonel.org/?page=gps&idStation=3428
123	Nouméa - Numbo	OK	https://data.shom.fr/donnees/refmar/659	http://www.ioc-sealevelmonitoring.org/station.php?code=numb2	https://www.sonel.org/?page=maregraphe&idStation=1863	https://www.sonel.org/?page=gps&idStation=3551
131	Dumont d'Urville	KO	https://data.shom.fr/donnees/refmar/108	http://www.ioc-sealevelmonitoring.org/station.php?code=dumo	https://www.sonel.org/?page=maregraphe&idStation=1756	https://www.sonel.org/?page=gps&idStation=4169
138	Rikitea	OK	https://data.shom.fr/donnees/refmar/43	http://www.ioc-sealevelmonitoring.org/station.php?code=gamb	https://www.sonel.org/?page=maregraphe&idStation=3410	https://www.sonel.org/?page=gps&idStation=3418
140	Papeete	OK	https://data.shom.fr/donnees/refmar/383	http://www.ioc-sealevelmonitoring.org/station.php?code=pape	https://www.sonel.org/?page=maregraphe&idStation=1820	https://www.sonel.org/?page=gps&idStation=809
142	Nuku Hiva	OK	https://data.shom.fr/donnees/refmar/795	http://www.ioc-sealevelmonitoring.org/station.php?code=nuku	https://www.sonel.org/?page=maregraphe&idStation=2257	https://www.sonel.org/?page=gps&idStation=2267
165	Clipperton	No permanent TG	https://data.shom.fr/donnees/refmar/797	-	https://www.sonel.org/?page=maregraphe&idStation=2853	-
202	Ile Royale	OK	https://data.shom.fr/donnees/refmar/749	http://www.ioc-sealevelmonitoring.org/station.php?code=iler	https://www.sonel.org/?page=maregraphe&idStation=1867	https://www.sonel.org/?page=gps&idStation=3414
204	Fort-de-France	OK	https://data.shom.fr/donnees/refmar/126	http://www.ioc-sealevelmonitoring.org/station.php?code=ftfr	https://www.sonel.org/?page=maregraphe&idStation=1764	https://www.sonel.org/?page=gps&idStation=3220
205	Marseille	OK	https://data.shom.fr/donnees/refmar/524	http://www.ioc-sealevelmonitoring.org/station.php?code=mars	https://www.sonel.org/?page=maregraphe&idStation=1802	https://www.sonel.org/?page=gps&idStation=735
242	Brest	OK	https://data.shom.fr/donnees/refmar/3	http://www.ioc-sealevelmonitoring.org/station.php?code=bres	https://www.sonel.org/?page=maregraphe&idStation=1736	https://www.sonel.org/?page=gps&idStation=642
260	Sao Tomé	Decommis--sioned	-	http://www.ioc-sealevelmonitoring.org/station.php?code=saot	https://www.sonel.org/?page=maregraphe&idStation=1864	https://www.sonel.org/spip.php?page=gps&idStation=1932
353	Leava, Futuna Island	OK	https://data.shom.fr/donnees/refmar/501	http://www.ioc-sealevelmonitoring.org/station.php?code=futu	https://www.sonel.org/?page=maregraphe&idStation=3112	https://www.sonel.org/?page=gps&idStation=3385
354	Makemo	OK	https://data.shom.fr/donnees/refmar/586	http://www.ioc-sealevelmonitoring.org/station.php?code=make	https://www.sonel.org/?page=maregraphe&idStation=3416	https://www.sonel.org/?page=gps&idStation=3417
355	Rangiroa	KO	https://data.shom.fr/donnees/refmar/78	http://www.ioc-sealevelmonitoring.org/station.php?code=rangi	https://www.sonel.org/?page=maregraphe&idStation=2259	https://www.sonel.org/?page=gps&idStation=2269

356	Tubuai	OK	https://data.shom.fr/donnees/refmar/113	http://www.ioc-sealevelmonitoring.org/station.php?code=tubua	https://www.sonel.org/?page=maregraphe&idStation=2258	https://www.sonel.org/?page=gps&idStation=2268

5 Data rescue activities

In France, systematic sea level observations by mechanical tide gauge started in the mid-1800s. Within SONEL framework, an extensive work is undertaken at Shom, aiming at recovering the French scientific and cultural heritage on sea level observations. This initiative fulfills the recommendations of GLOSS on the recovery of forgotten sea level measurements.

Data rescue performed at Shom firstly implies to inventory documents related to water level measurement (marigrams, ledgers): more than **60.000 documents** have been identified and inventoried, and about 50% have already been scanned, but thousands of documents still remain to inventory and scan. These old tide gauge measurements are mainly related to French ports (about 300 sites with a total of about 1,000 years of cumulated sea level measurements) but also to locations around the world (about 240 sites with a total of about 470 years of cumulated sea level measurements). Time-series duration may vary from days/weeks/months (observations for hydrographic purpose) to several decades. Longest time series can be used to assess long term sea level evolution and shorter datasets could be used to quantify historical storm surges if occurred during measurements, allowing the improvement of estimation and prediction of extreme coastal water levels.
The Shom updates the results of the inventories on the following link:
http://refmar.shom.fr/dataRescue/index_en.html.