



## Tidal observation reference networks (REFMAR)

### In brief..

SHOM is the national reference for the “sea level” in all zones under French jurisdiction<sup>1</sup>. As such, it fulfils various coordination functions concerning the collection and issuing of public data relating to sea level observation, so as to promote their use in a wide range of applications.

#### Origins of variations in sea level

The sea level varies at different rates due to the action of a variety of phenomena, such as: the attraction of the Moon and Sun, the effects of weather, earthquakes and land movements as well as due to climate change.

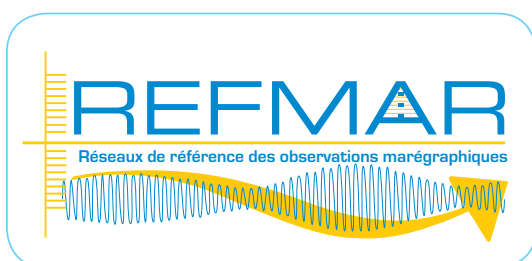
#### Sea level observation

The measurements carried out are of interest from a number of standpoints within the framework of support to public maritime and littoral policies such as:

- **anticipating and managing risks concerning the littoral:** estimation of the global change in sea level and the effects of climate change; evaluation of random events and the associated vulnerability of territories; establishment of real-time multi-risk warning and alert networks (tsunamis, storm waves, coastal waves, marine submergence etc.);
- **navigational safety:** tidal predictions; correction of bathymetric soundings etc.;
- **port safety:** real-time tidal height information at entrance to ports;
- **research into and development of meteorology-oceanography and climatology:** validation of products of operational oceanography; calibration of altimeters on board satellites; changes to mean sea level; probabilistic calculation of extreme levels; evaluation of the vagaries of tsunamis etc.



SHOM observatory in Les Sables-d'Olonne (digital coastal tide gauge and tide staff)



#### The birth of REFMAR

In view of the multiple benefits to be derived from these measurements, on 20 April 2010, as authorized by the Prime Minister, SGMer approved the instruction “relating to the observation of the sea level and the management and issue of the resulting data”, which formally assigns SHOM the role of national coordinator and reference authority in the field. Since that time, these missions are carried out under the name of REFMAR (Réseaux de référence des observations marégraphiques - *Tidal observations reference networks*).

#### Data access

The data can be displayed, accessed and made available free of charge in real and deferred time on the internet site operated by SHOM at <http://refmar.shom.fr>

<sup>1</sup>Prime Minister's Instruction relating to the observation of the sea level and the management and issue of the resulting data (N°863/SGMER dated 20 April 2010). [http://www.circulaires.gouv.fr/pdf/2010/06/cir\\_31210.pdf](http://www.circulaires.gouv.fr/pdf/2010/06/cir_31210.pdf)

## Background

### 1679

First systematic sea level observations by Picard and de La Hire in Brest.

### 1844

Installation of the first tide gauge in France (Toulon) by the hydrographic engineer Chazallon, initiating the first French mainland tide gauge network (7 tide gauges in 1860).

### 1992

Launch of the RONIM (currently 38 tide gauges).

### 1993

Installation of the first ROSAME tide gauge (currently 4).

### Depuis 2009

SHOM's new tidal database.

### 2010

Signature of the Prime Minister's Instruction relating to the observation of the sea level and the management and issue of the resulting data.

## Glossary

### CEA

Atomic energy commission

### CRATANEM

Regional tsunami alert centre for the North-East Atlantic and Western Mediterranean

### DGPR

General directorate for risk prevention

### DSC

Civil safety directorate

### GLOSS

Global sea level observation system, UNESCO international programme

### IPGP

Paris institute for global physics

### LEGOS

Space geophysics and oceanography study laboratory

### RONIM

Sea level observation network (SHOM)

### ROSAME

Sub-Antarctic and Antarctic sea level observation network (LEGOS)

### SGMer

General Secretariat for the sea

### SONEL

Littoral sea level observation system (future sea level long-term change observation system)

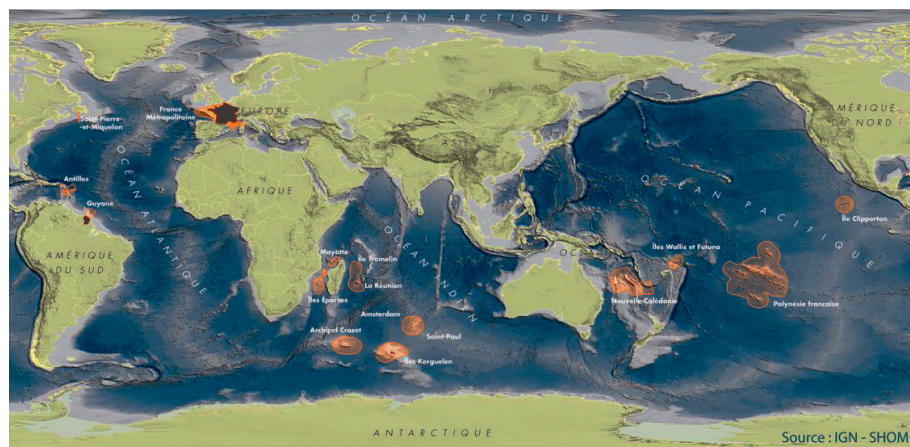
### TIDE GAUGE

Sea level measuring and recording instrument



## The missions of the REFMAR

- coordinate the collection of sea level observations conducted by all bodies, establishments and public services belonging to public authorities;
- manage and archive the various observations collected in real-time;
- define the networks and minimum specifications for observing the sea level;
- define and promote appropriate means of operational transmission;
- coordinate the real and deferred time distribution of the observations;
- check the conformity of the observations received;
- define, distribute, promote and monitor national and international standards (GLOSS);
- contribute to representing France in the international and European observation organizations.



Competent authority for REFMAR in all areas under national jurisdiction



## REFMAR partners and contributors

### Projects and partners:

- SGMer
- CRATANEM (MEEDDM/DGPR, MIOMCT/DSC, CEA, CNRS)
- Previmer (Ifremer, Météo-France)
- SONEL (LEGOS, Université de La Rochelle)

### Contributors (tide gauge data):

- SHOM
- LEGOS
- IPGP
- CEA
- Université de Polynésie française
- Université de la Rochelle
- Grands ports maritimes
- Services de prévision des crues

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