

# SEA LEVEL MONITORING IN MOROCCO

## National report for GLOSS

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Limited information was available on historical sea level measurements in Morocco but, since 2003 and due to the importance of the sea level data, Morocco has developed an extensive tide gauge network along the Atlantic and Mediterranean coast.

There are actually four different institutions in Morocco running the main tide gauge networks: Direction des Ports et du Domaine Public Maritime (DPDPM-Rabat), Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie (ANFCC-Rabat), Service Hydrographique et Océanographique de la Marine Royale (SHOMAR-Casablanca) and Direction de la Météorologie Nationale (DMN-Casablanca).

### **DIRECTION DES PORTS ET DU DOMAINE PUBLIC MARITIME (DPDPM NETWORK)**

DPDPM is a Public Department of the Ministère de l'Equipement et du Transport concerned with management of national ports, navigation, dredging with an office (service) concerned with hydrographic surveys and oceanography. DPDPM head office is based at Rabat ([www.equipementtransport.gov.ma](http://www.equipementtransport.gov.ma)).

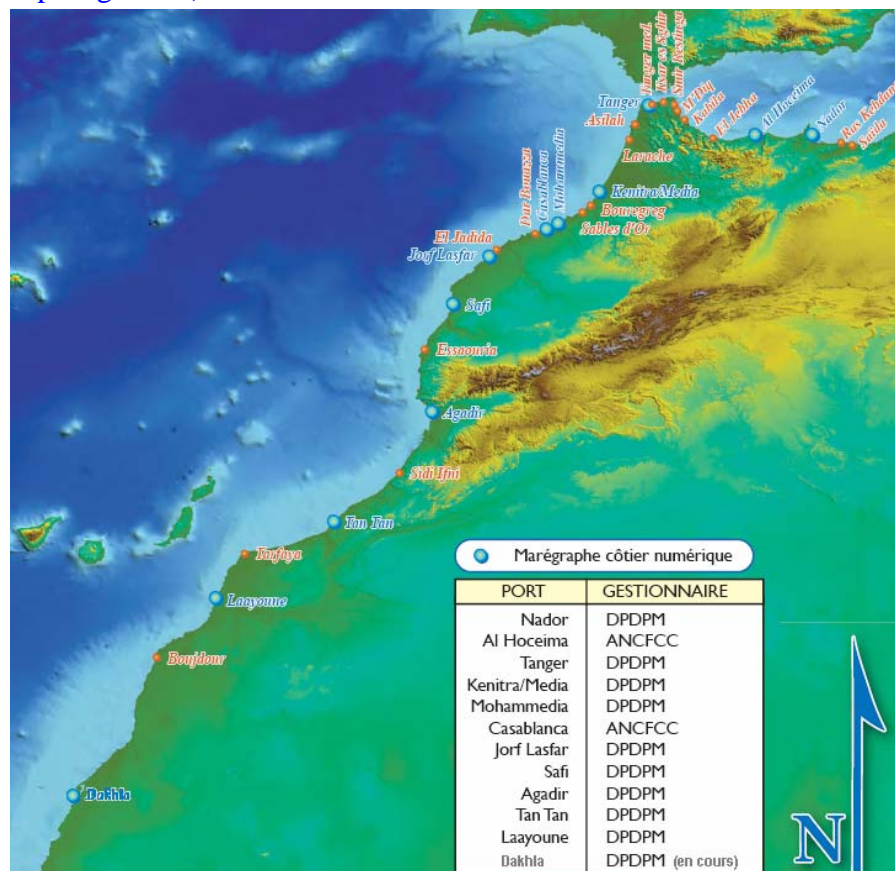


Figure 1: Moroccan tide gauge network operated since 2003 by DPDPM and ANCFCC.

DPDPM have actually 10 of these new radar TG systems at Nador (moroccan Mediterranean coast), Tanger, Kénitra, Mohammadia, Jorf Lasfar, Safi, Agadir, Tan Tan, Laayoune and Dakhla (from the north to the south of the moroccan Atlantic coast) (Figure 1 and Table 1). The above mentioned 10 tide gauges are from Warsh Electronics (Casablanca), who custom developed these systems for DPDPM, and the first gauges of this batch were installed in 2003 (Table 1). Martec/Serpe-IESM of France provided the AURORE 200 data logger. A GPS patch antenna is used for time calibrations with a Vega Radar/Microwave sensor and guided wave antenna (VegaPuls 65). Data is recorded every 10 minutes and all tide gauge data is processed in Rabat, with data sent as an attachment to an email on a monthly or 3 monthly period from all ports (Source IOC Technical Report Visit, 2007). SHOM have provided DPDPM with tidal analysis software and DPDPM produced an annual tide tables for the above ports (Table 1).

Table 1: Tide gauge operated in Morocco by DPDPM.

Location Port	Responsible Authority	System type	Sensor	Observation
Nador	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2005
Tanger	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2005
Kénitra	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2004
Mohammadia	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2006
Jorf Lasfar	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2004
Safi	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Installed since 2004 but not operational
Agadir	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2006
Tan Tan	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Operational since 2006
Layoune	DPDPM	Warsh Martech Aurore 200 logger with solar panel	VegaPuls Radar 65	Operational since 2003
Dakhla	DPDPM	Warsh Martech Aurore 200 logger	VegaPuls Radar 65	Not yet operational

## **AGENCE NATIONALE DE LA CONSERVATION FONCIERE, DU CADASTRE ET DE LA CARTOGRAPHIE (ANCFCC NETWORK)**

ANCFCC is the National Agency involved with topographical cartography, GPS and high order geodetic control surveys. ANCFCC head office is based at Rabat ([www.ancfcc.gov.ma](http://www.ancfcc.gov.ma)).

The Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie (ANCFCC) have 2 acoustic tide gauges at Casablanca and Al Hoceima. (Table 2). Equipment includes Leica GPS, Mors HT200 tide gauges production facilities (Source IOC Technical Report Visit, 2007).

Table 2: Tide gauge operated by ANCFCC.

Location Port	Responsible Authority	System type	Sensor	Observation
Casablanca	ANFCC	Mors HT 200	Acoustic	Operational since 2006
Al Hoceima	ANFCC	Mors HT 200	Acoustic	Operational since 2006

## **SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE ROYALE (SHOMAR)**

The Service Hydrographique et Océanographique de la Marine Royale (SHOMAR) is based at Casablanca and they have operated a network of tide gauges for hydrographic charting. No information was available on this network or systems used but they produced an annual tide tables for shipping for the Moroccan Atlantic and Mediterranean ports.

## **DIRECTION DE LA METEOROLOGIE NATIONALE (DMN)**

The Direction de la Météorologie Nationale (DMN) is based at Casablanca ([www.marocmeteo.gov.ma](http://www.marocmeteo.gov.ma)) and have operated in the past a tide gauge at Casablanca for their specific purposes. No information is available about these data.

## **REFERENCES**

Intergovernmental Oceanographic Commission (IOC), 2007. Global Sea Level Observing System (GLOSS)- Ocean Data and Information Network for Africa (OdiAfrica). MOROCCO Sea Level Network , Technical Visit Report, 4th - 12th February 2007, Survey/report by D.J. Dixon, 20 p.

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