



Funded by the
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CONTRIBUTION OF ODINAFRICA TO THE SEA LEVEL MONITORING IN AFRICA.

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For most region of the world, sea level is increasing at rate of a few millimetres (1~2 mm) per year. Comparison of the rate of sea level rise over the last century with the geological rate over the last two millennia (0.1 – 0.2 mm/yr) implies a comparatively recent acceleration in the rate of sea level rise. Over the last century, long term sea level change has been estimated from tide gauges in spite of their poor spatial distribution. In Africa, the sea level continuous record are very short (less than 20 years generally). The occurrence of the major tsunami in the Indian Ocean on 26 December 2004, and its aftermath demonstrated the urgent need to have an operational network of sea level. The Intergovernmental Oceanographic Commission (IOC) of UNESCO in collaboration with the Flanders Government has initiated the development of the Ocean Data and Information Network for Africa (ODINAFRICA).

ODINAFRICA is collaborating with the Global Sea Level Observing System (GLOSS), the Indian Ocean Tsunami Early Warning and Mitigation System (IOTWS), the University of Hawaii Sea Level Centre (USA), and the Proudman Oceanography Laboratory (Liverpool, UK) to develop a pan African Network of sea level stations, consisting of tide gauges spaced along the Africa coast, providing data near real time, and addressing the key oceanographic phenomena. Additional oceanographic sensors would be installed at selected locations. Training on installation and maintenance of equipment, as well as analysis and interpretation of data would be provided to technicians and scientists.

EXISTING TIDE GAUGES DATA SETS AND DATA ARCHAEOLOGY

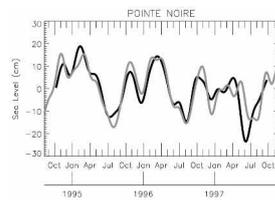
A questionnaire has been developed and sent to all African national contacts involved in the ODINAFRICA programme. The preliminary investigation based on the questionnaire reveals the following:



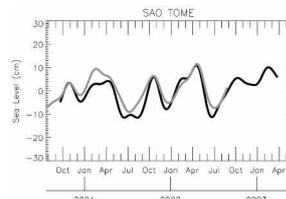
Location of existing tide stations on African coastline

- Not all existing gauges in Africa region are operational, especially along the gulf of Guinea.
- Most of the stations are not associated with the meteorological basic parameters.
- Maintenance capacity for tide stations is low in Africa.
- There are differing types of gauges in the region.
- Not all gauge stations are GLOSS stations.
- African stations capable of delivering data in fast mode via telephone or satellite or other fast means to GLOSS are located in South Africa, Sao Tome, Mozambique and Kenya.
- Poor or non-existence of communications facilities for data transmission and exchange.

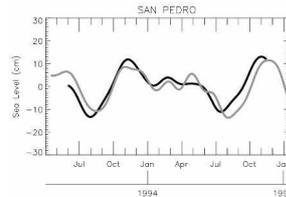
- There is a considerable amount of tide gauge data in hard copy and non-computer form.



Sea Level Anomaly at Pointe Noire from T/P (grey) and from tide gauge (black)



Sea Level Anomaly at Sao Tome from T/P (grey) and from tide gauge (black)



Sea Level Anomaly at San Pedro from T/P (grey) and from tide gauge (black)

Figures 2, 3 and 4 show that the sea level derived from tide gauges could constitute a valuable complement to Jason validation.

STATIONS PLANNED FOR INSTALLATION

- **West Africa gauges:** Nouakchott, Dakar, Limbe, Takoradi and Pointe Noire
- **East Africa gauges:** Nosy Be, Fort Dauphin, Moroni and Djibouti
- **North Africa gauges:** Alexandria, Cap Bon and Agadir.



Tide gauge housing at Takoradi, Ghana.



Old tide gauge housing at Pointe Noire, Congo



Proposed new location for ODINAFRICA tide gauge at Pointe Noire, Congo.

LIST OF THE STATIONS IDENTIFIED FOR INSTALLATION/UPGRADE BY OTHER PARTNERS

IOTWS/GLOSS: Mombassa, Lamu (Kenya)
BCLME: Lamberts Bay (South Africa), Luderitz and Walis Bay (Namibia), Namibe and Luanda (Angola)
SHOM (France): point des Galets-La Reunion, Dzaoudzi – Mayotte (France), Tamatave (Madagascar)

ODINAFRICA will install OTT Kalesto radar gauges. The choice of location for the tide gauges will be based on several considerations such as: sites security (in terms of vandalism and position of the gauge relative to activities at the site), platform stability, time series continuity at the sites, and availability of local technicians. The countries receiving the equipment will provide: (i) tide gauge housing, (ii) electricity and telephone at site, (iii) free and unrestricted access to the data collected by the equipment, and (iv) assistance to help in facilitating the installation.



OTT Kalesto radar tide gauge installed in Pemba Harbour, Mozambique (similar gauges will be installed by ODINAFRICA)



ODINAFRICA