

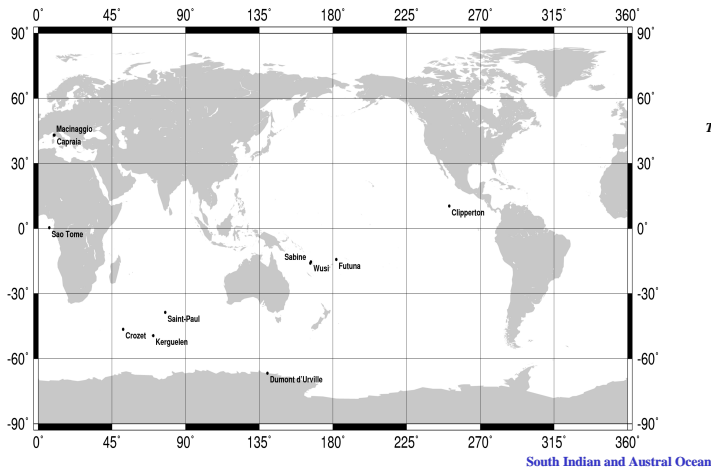
HIGH STANDARD TIDE GAUGE NETWORK FOR SCIENTIFIC STUDIES

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The comparison between sea level derived from satellite altimetry and sea level derived from tide gauges has proved to be of major technical and scientific interest. Tide gauges have been used to estimate the reliability, accuracy and stability of satellite altimeters (Mitchum, 1998). On the other hand the accuracy of the T/P and Jason mission is now able to identify some of the particular bias of the tide gauges such as sensor drift or appreciable land movement. The comparison of both instruments was also very fruitful for sea level rise studies. The principal inconvenient of establishing dedicated absolute calibration site is the heaviness of structure to be deployed and the cost it leads. This can be done only on few particular site easy to access and maintained on short time scale. On the contrary the global approach does not allow to look individual or regional relation between coastal and open ocean sea level variability or to make regional experiments. Our approach is then to use already existent sites relatively well distributed around the world ocean. We will then have a relatively representative situation and propose to maintained or update these sites on a long term base in order to make a network of highly controlled sea level gauges able to be useful for altimeter calibration and for scientific applications. Indeed a great care will be taken to the monitoring of the sensor drift, of the vertical motion and on the representativeness of each site in term of sea level variability. One of the scientific objective of this network is to better understand the link between the open ocean sea level variability measured by satellite altimeter and the coastal sea level variability measured by sea level gauges. **This poster presents the state of all potential sites and send the reader back to relate poster in this meeting.**



Technical objectives

Technical requirements for each site:

- ✓ High quality gauge sensor (+ temperature and conductivity)
- ✓ Installed auto-calibration system on each site in order to follow the sensor drifts
- ✓ Reliable atmospheric pressure data
- ✓ Real time access to data (via satellite or modem transmission)
- ✓ Permanent GPS or frequent GPS campaign in the vicinity of the gauge
- ✓ Yearly maintenance of site in particular with levelling.
- ✓ GPS buoy levelling between the TG and the satellite track

Kerguelen Island is equipped with a real time station since 1993. It has a permanent GPS and a DORIS beacon. A radar tide gauge station is scheduled for march 2006.

Saint-Paul Island is equipped with a real time station since 1994.

Crozet Island is equipped with a real time pressure gauge station since 1995. This island has been equipped with a DORIS beacon in November 2003. A GPS station is scheduled at Crozet.

Dumont d'Urville is equipped with a real time pressure gauge station since 1997. This site is equipped with DORIS and permanent GPS.

See the "Validation of T/P data in the South Indian Ocean" poster by C. Maraldi.

Atlantic ocean

Sao Tomé Island is equipped with a real time station since 1999. A levelling program was done in February 2004.

Pointe Noire in Congo will probably be reinstalled under the GLOSS program in the next few years.

Pacific Ocean

Futuna an autonomous tide gauge station and a GPS are scheduled in may 2006.

Clipperton has been included in the GLOSS installation plan for many years, but due to strong logistic difficulties haven't been installed yet. A first experience has been done between January 2004 and March 2005 with a couple of pressure gauge and GPS. See "CLIPPERTON campaign on altimetry side: Ocean observation site exploration" by G. Jan.

Sabine and Wusi pairs of bottom pressure gauges are on both rims of the New Hebrides subduction zone. See "Comparison between sea height GPS measurements and satellite altimetry data in the New Hebrides Subduction Zone" by M.N. Bouin

A tide gauge in **Marquesas Island** have been installed by the Tsunami Warning System. An agreement is foreseen with this organization for collecting these data.

Mediterranean Sea

Macinaggio Pressure gauge is installed and maintained by LEGOS since June 2003. This site was levelled and a GPS buoy levelling between Capraia and Macinaggio has been done in Septembre 2004.

Capraia Pressure gauge is already installed by ENEA (Italy) and University of Bologna and Pise.

Ibiza Pressure gauge maintained by Spain. See the "Altimeter Calibration Campaigns at Ibiza Island and Cape of Begur (Spain)" poster by JJ Martinez-Benjamin.

Senetosa 4 Pressure gauges maintained by CNES-CERGA-NOVELTIS since 1998 for absolute calibration purposes. See "Corsica: an experiment for long-term altimeter calibration and sea level monitoring" poster by P. Bonnefond.

N°	Station Name	Operational	Real Time	Meteorological Station	Permanent GPS	DORIS	Mooring	Levelled	Gps Buoy Levelling	Local Assistance	Sensor Calibration	Update site	Meteorological Station	GPS buoy Levelling	Install GPS	Real-Time
1	Kerguelen	Y	Y	Y	Y	Y	Y	Y	-	Y	●			●		
2	Saint-Paul	Y	Y	-	-	-	Y	-	-	-	●	●	●			
3	Crozet	Y	Y	Y	Y	Y	Y	S	-	Y	●					
4	D. d'Urville	Y	Y	Y	Y	Y	-	-	-	Y	●					
5	Sao Tome	Y	Y	Y	-	-	-	Y	S	Y	●				●	
6	Sabine bank	Y	-	-	-	-	-	-	Y	-	●					
7	Wusi bank	Y	-	Y	Y	?	-	Y	Y	-	●					
8	Futuna	S	-	S	S	-	-	Y	-	Y	●					●
9	Macinaggio	Y	-	S	-	-	-	Y	Y	Y	●				●	●
10	Capraia	Y	-	-	-	-	-	Y	Y	Y	●					
11	Clipperton	-	-	-	-	-	-	-	-	-	●	●	●	●	●	●
12	Sète	-	-	-	-	-	-	-	-	Y	-					
13	Banyuls	-	-	-	-	-	-	-	-	Y	-					
14	Nouméa	Y	Y	Y	-	Y	-	Y	-	Y						
15	Marquises	Y	Y	Y	-	-	-	?	-	Y						
16	Ibiza	?	?	?	?	-	-	?	?	?						
17	Senetosa	Y	-	Y	Y	-	-	Y	Y	Y						
18	Abidjan	?	?	-	-	-	-	S	-	Y			●			
19	Pointe Noire	S	S	-	-	-	-	S	-	Y			●			

This table lists the tide gauges (n°14→20 is where LEGOS is involved). It summarizes some of the present characteristics of the network and points out the future needs (black dots ●) [S=Scheduled, Y=Yes]. The **Sensor Calibration** item corresponds to the need of a reliable on site calibration method (mainly to control offsets and drifts in the data). When a black dot appears in the **Update site** item, that is to say the station is old and need to be updated or replaced by a new one. **Meteorological Station** points out the need of reliable atmospheric pressure data near the tide gauge, it is often the case when no airport or METEO Stations are in the vicinity of the tide gauge. **Install GPS** points out the need to install a permanent GPS station and **GPS buoy levelling** the needs to related the sea surface height at the tide gauge to the sea surface height under the satellite track. **Real Time** point out the need of satellite transmission of the data in near real time. Some of the site nearly fulfil the technical requirements cited above (ex: Kerguelen, Noumea, Futuna). *Italic sites are scheduled sites.*