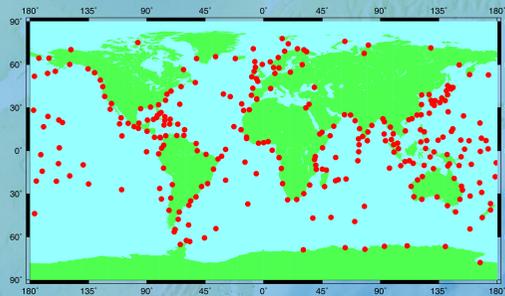


What is GLOSS?

The Global Sea Level Observing System (GLOSS) is a programme coordinated by the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) of the Intergovernmental Oceanographic Commission (IOC) and World Meteorological Organisation (WMO).

GLOSS has the aim of establishing global and regional networks of sea level stations, for the purposes of providing information essential to international oceanographic research programmes, including those dedicated to the study of aspects of climate change. GLOSS is a major contributor to JCOMM's Global Ocean Observing System (GOOS).



The main component of GLOSS is the GLOSS Core Network (GCN) which comprises approximately 300 stations worldwide of which most are now operational.

GLOSS data

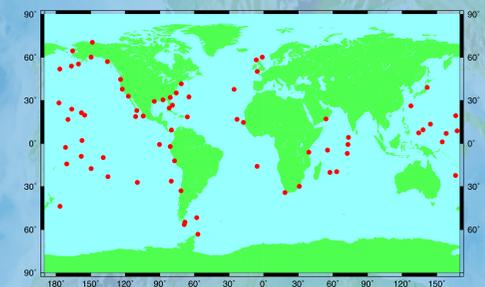
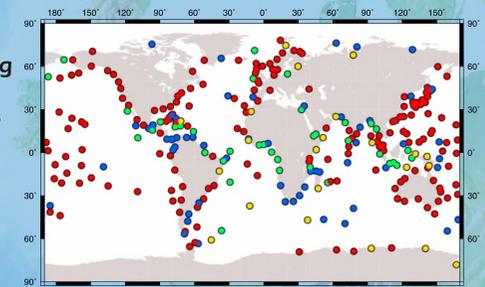
GLOSS data in Delayed Mode can be obtained via the GLOSS home web page <http://ioc.unesco.org/goos/gloss/>

Mean Sea Level data from GLOSS sites are also included in the data base of the Permanent Service for Mean Sea Level (PSMSL) <http://www.pol.ac.uk/psmsl/>

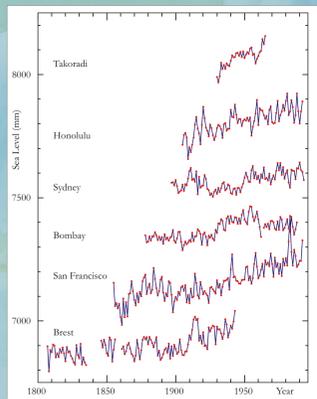
The status of stations in the Global Sea Level Observing System Core Network as defined by the latest data available at the Permanent Service for Mean Sea Level.

- Category 1: Latest data 2001 or later, 174 stations
- Category 2: 1991 to 2000, 57 stations
- Category 3: Before 1991, 37 stations
- Category 4: No data, 22 stations.

Increasingly GLOSS data are required in Fast Mode (real-time or near) for assimilation into, and validation of, ocean models in programmes such as MERCATOR and GODAE. Tide gauge and altimeter sea level data are complementary: tide gauges provide essential information through straits and at high latitudes and tide gauge data are used to calibrate altimeter time series. The GLOSS Fast Centre is at the University of Hawaii Sea Level Center <http://www.soest.hawaii.edu/UHSLC/>



Real time GLOSS data availability.



Long term sea level records from each continent (data from PSMSL).

International Activities Supported by GLOSS include:

- Intergovernmental Panel on Climate Change (IPCC)
- Global Ocean Observing System (GOOS) regional, coastal and climate programmes
- Global Climate Observing System (GCOS)
- Climate Variability and Predictability Programme (CLIVAR)

Sea Level Products include:

- Time series of sea level change for climate studies
- Anomalies of sea level for ocean circulation studies (estimates of ocean transports, heat content and ocean volume)
- Information for many coastal applications (e.g. flood warning, coastal engineering)

Regional Networks

GLOSS has stimulated the development of several regional networks of gauges with greater spatial density than that provided by the Core Network, to serve the particular oceanographic interests of those regions. Examples include networks in the Caribbean, Mediterranean and Black Seas. Special regional studies are also in progress for the Tropical Pacific, the Indian and the Southern Oceans.

National Agencies

GLOSS aims to contribute to the activities of national agencies by improving the standards for sea level recording around the world. At the local level, charting and navigation in harbours requires immediate information on sea level, whereas coastal management and coastal engineering schemes, such as those to protect against flooding, requires statistics of sea level variations measured over several years. Datum definitions for both hydrographic charts and land surveys are based on analysis of long periods of sea level information.

Workshops and Training Courses

GLOSS has organised a number of workshops and training courses on the techniques of tide gauge operations, including those in polar areas. Over twenty courses have been held in recent years in different countries and different languages. Workshops have also been held on the use of advanced geodetic techniques, and especially the Global Positioning System (GPS), for the monitoring of the rates of vertical land movement at gauge sites.

Recent courses have been held at:

- Kuala Lumpur, Malaysia 2004
- Tokyo, Japan 2006
- Further courses will be held in Ostend, Belgium and São Paulo, Brazil during 2006/2007

Recent Developments

GLOSS alone

- Completion of gauge installations at Pemba and Imhambane (Mozambique) – collaboration partners are INAHINA and Proudman Oceanographic Laboratory (POL)/Permanent Service for Mean Sea Level (PSMSL).
- Installation of one real time gauge at Karachi (Pakistan) – collaboration partners are Pakistan Hydrographic Office and POL/PSMSL.
- Upgrade of existing GLOSS Core Network stations in South Africa for real time data transmission to GTS – collaboration partners are South African Hydrographic Service and the POL/PSMSL.
- Sea level observation and analysis training course at the Japan Meteorological Agency (Tokyo, 15-26 May 2006). Ten participants from China, Indonesia, Malaysia, Myanmar, New Zealand, Philippines, Sri Lanka and Tanzania.
- Update and publication of IOC Manual on Sea Level Measurement and Interpretation developed by the GLOSS Technical Subcommittee (2nd quarter of 2006).

OdinAfrica in collaboration with GLOSS

- Work Package 2 under the OdinAfrica III project focus on developing coastal observing network and in particular a pan African sea level network. Some 10-12 stations are targeted for installations under this work package. Preparations for gauge installations at Nouakchott (Mauritania), Dakar (Senegal), Takoradi (Ghana), Port Sonora/Limbe (Cameroon) and Pointe Noire (Congo). Collaboration partners are the respective harbor masters and port agencies/hydrographic agencies, POL/PSMSL, and the French Hydrographic Agency (SHOM).
- Planning is under way for technical visits to other proposed OdinAfrica station sites. Focus is on Moroni (Comoros), Nosy Be and Fort Dauphin (Madagascar) and Djibouti to explore the possibility of gauge installations there.
- A sea level observation and analysis course is planned for OdinAfrica participants is planned for November 2006 in Ostend. Another course is in the planning for May 2007.

Indian Ocean Tsunami Warning System and GLOSS

- Some 17 (mostly existing) gauges are being upgraded for high frequency data transmission (15 minute transmission frequency) under a contract with the University of Hawaii Sea Level Center. A second phase of this project will focus on upgrading some 6-8 stations near tsunamigenic regions near Indonesia and Pakistan to 1-5 minute data transmission.
- As part of the Norwegian Funds in Trust contribution to an Indian Ocean Tsunami Warning System the European Sea-Level Service (ESEAS) will in collaboration with GLOSS offer some 10-15 "POGO" type fellowship visits at selected sea level institutions in the ESEAS network. The fellowships would offer qualified candidates to work at a sea level institution in the ESEAS network for a short period (up to 3 months) for further training on sea level observations, sea level data management, quality control and analysis, interpretation, coastal modeling/storm surge modeling, product developments, operation of national sea level networks or similar. These fellowships are intended for persons with some graduate training who presently work with sea level observation/research.

Further Information on GLOSS

Most countries have scientists or technologists who are members of the GLOSS Group of Experts. The web page http://www.pol.ac.uk/psmsl/sea_level_contacts.html contains a list of many of the National Contacts. More information on GLOSS may be obtained from the following people:

Dr Thorkild Aarup
GLOSS Technical Secretary
Intergovernmental Oceanographic Commission
1 Rue Miollis
Paris 75732 Cedex 15
France
Email t.aarup@unesco.org

Dr Mark Merrifield
University of Hawaii Sea Level Center
Department of Oceanography
University of Hawaii
Honolulu
Hawaii 96822
USA
Email markm@soest.hawaii.edu

Dr Philip Woodworth
Permanent Service for Mean Sea Level
Joseph Proudman Building
6 Brownlow Street
Liverpool L3 5DA
UK
Email psmsl@pol.ac.uk