

Permanent Service for Mean Sea Level (PSMSL)



Head: E. A. Bradshaw (UK)

<http://www.psmsl.org>

Development

Since 1933, the Permanent Service for Mean Sea Level (PSMSL) has been responsible for the collection, publication, analysis and interpretation of sea level data from the global network of tide gauges. It is based at the National Oceanography Centre (NOC), which on the 1st November 2019 began operating as an independent self-governing organization – a charitable company limited by guarantee. Funding is provided by the UK Natural Environment Research Council (NERC). The PSMSL continues to be one of the main data centres for both the International Association for Physical Sciences of the Oceans (IAPSO) and the IAG. The PSMSL operates under the auspices of the International Science Council (ISC) and reports formally to IAPSO's Commission on Mean Sea Level and Tides. The PSMSL is a regular member of the World Data System of ISC.

Mission/Objectives

Changing sea levels will have a major impact on human life over the next 100 years. We need mean sea level data to study climate change, the impact of human activities on densely populated areas, the economic impacts of sea level rise and to plan coastal engineering. The mission of the PSMSL is to provide the community with a full Service for the acquisition, analysis and interpretation of sea level data. Aside from its central role of operation of the global sea level data bank, the PSMSL provides advice to tide gauge operators and analysts. It occupies a central management role in the development of the Global Sea Level Observing System (GLOSS) and hosts important international study groups and meetings on relevant themes. The Sea Level Futures Conference that took place in July 2018 to mark the 85th Anniversary of the PSMSL is one such meeting.

Products

The database of the PSMSL contains over 72000 station-years of monthly and annual values of mean sea level (MSL) from over 2360 tide gauge stations around the world received from approximately 200 national authorities. On average, approximately 800 stations per year are entered into the database. This database is used extensively throughout the sciences of climate change, oceanography, geodesy and geology, and is the main source of information for international study groups such as the Intergovernmental Panel on Climate Change (IPCC).

Data for all stations are included in the PSMSL METRIC (or total) data set. The METRIC monthly and annual means for any one station-year are necessarily required to be measured to a common datum, although, at this stage, datum continuity between years is not essential. The year to-year datum checks become essential, however, if the data are subsequently to be included in the PSMSL 'Revised Local Reference (RLR)' component of the data set.

The 'Revised Local Reference (RLR)' dataset of the PSMSL contains records for which time series analysis of sea level changes can be performed. Long records from this dataset have been the basis of all analyses of secular changes in global sea level during the last century. The geographical distribution of longer RLR records contains significant geographical bias towards the northern hemisphere, a situation which is being rectified by the establishment of the GLOSS global sea level network.

The PSMSL is also responsible for the Higher Frequency Delayed Mode (HF DM) data set of sea level information from the GLOSS Core Network. This consists of the original sea level measurements from each site (typically hourly values) which provide a strategic backup to the MSL information of the main PSMSL data set.

The PSMSL received funding from the European Union Horizon 2020 EuroSea project to create an international archive to preserve and deliver Global Navigation Satellite Systems Interferometric Reflectometry (GNSS-IR) data and to integrate these data with existing sea level observing networks. GNSS-IR sensors provide an alternative method to observe sea level. As well as recording the sea level, these sensors will also provide vertical land movement information from one location.

In addition, the PSMSL provides a range of sea level products (e.g. interactive anomaly and trend maps, tables of sea level trends) for its users. These findings are input to national and international scientific study groups regularly. A range of training materials and software products are also made available via its web site which can be consulted for more information.

Structure/Governing Board Members

The PSMSL reports formally to the IAPSO Commission on Mean Sea Level and Tides (President Dr. *G.T. Mitchum*, USA). It is also served by an Advisory Group, which at present consists of Prof. *G. T. Mitchum* (University of South Florida, USA), Prof. *P. L. Woodworth*. (National Oceanography Centre, UK), Dr. *P. Knudsen* (Danish National Space Center), Dr. *R. Bingley* (Nottingham University, UK) and Dr. *G. Woppelmann* (Universite de La Rochelle, France). The Advisory Group is currently under review and membership will be updated in 2020. Suggestions for improvements

in PSMSL activities may be sent directly to the PSMSL or via the IAPSO Commission or via any member of the Advisory Group.

Points of Contact

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