

6. Data Exchange Procedures

6.1 Background

The previous chapters of this manual, together with Volumes 1 and 2, have given advice on purchase and operation of tide gauges and on data processing software. By this stage you should, therefore, have some sea level data sets from your station. This section describes what you should do with them.

For many years, all tide gauge authorities (whether involved in GLOSS or not) have contributed monthly and annual means of sea level to the Permanent Service for Mean Sea Level (PSMSL). The PSMSL was established in 1933 as an international data centre for mean sea level. Its responsibilities include collection, publication and distribution of data and the analysis and interpretation of these data. Advice on practical aspects of sea level measurement and data reduction is also given. An example of the way in which PSMSL encourages uniform standards and procedures is the preparation of this manual, which is itself based on courses given at the Proudman Oceanographic Laboratory, Bidston Observatory, United Kingdom, where the PSMSL is housed. For more information on the PSMSL and GLOSS, see

<http://www.pol.ac.uk/psmsl/psmsl.info.html> and
<http://www.pol.ac.uk/psmsl/gloss.info.html>

When the GLOSS programme was first proposed in the mid-1980's, and in the first GLOSS Implementation Plan (IOC, 1990), the main purpose of the programme was stated to be the improvement in the quality and quantity of MSL information delivered to the PSMSL. The success of GLOSS in this regard can be seen from the annual reports of the PSMSL on GLOSS status (see web pages above).

With the advent of the World Ocean Circulation Experiment (WOCE) in the late-1980's, the sea level community recognised the need for a worldwide effort for the collection of 'higher frequency' (i.e. typically hourly) sea level data. Such collections had already been made on a regional basis (e.g. MEDALPEX, TOGA) but this was the first time that collections were attempted from a global network. This resulted in the establishment of two WOCE Sea Level Centres: a 'fast' centre based at the University of Hawaii, and a 'delayed mode' centre at the British Oceanographic Data Centre (BODC) at Bidston Observatory alongside the PSMSL. These Centres are still active as of 2000 and their international activities have been joined by a Southern Ocean Sea Level Centre (SOSLC) at the Australian National Tidal Facility.

These experiences with WOCE during the 1990's convinced GLOSS that it was quite feasible to propose the collaborative collection of higher frequency data from all GLOSS sites. This collection would not only allow access by analysts to the higher frequency part of the sea level variability spectrum, but would provide an essential archive of the original sea level data. Consequently, when the GLOSS Implementation Plan was rewritten in 1997, it was decided to make it an essential requirement of participation in GLOSS for an agency to make their higher frequency data available to the international community in some way. For more details of these recommendations, see Chapter 7 of the Implementation Plan 1997 on the web at:

<http://www.pol.ac.uk/psmsl/gip97/> (and read the README file)

or as a paper report from the GOOS Project Office at IOC. These recommendations were subsequently endorsed by the full IOC Assembly in 1997.

6.2 Consequent Data Exchange Actions

An agency willing to make sea level data available to the international community must, therefore, take some actions consistent with the decisions described in the previous section. For agencies with stations which are **not** part of the GLOSS programme, we strongly recommend that they should:

- Take steps to preserve the original higher frequency data safely in a national archive, together with all ancillary data (e.g. meteorological data) and metadata.
- If the national archive, or its catalogue of holdings, has a web interface, then the web address should be made known to the PSMSL so that it can be included in a list of national web addresses (see http://www.pol.ac.uk/psmsl/sea_level.html). Any user can then at least see what higher frequency data are available from the agency and can contact the agency directly to obtain them (depending on that agency's data policy including charging policy).
- Monthly means of sea level should be sent to the PSMSL, as they have been for many years, together with associated information. For advice on sending data to the PSMSL see <http://www.pol.ac.uk/psmsl/psmsl.info.html>

For agencies with stations which **are** part of the GLOSS programme, they should implement the requirements of Chapter 7 of the Implementation Plan, which comprise:

- Take the three actions described above, and
- Send copies of their original higher frequency data to an International Archiving Centre for safe-keeping and for distribution to the international community, **or** make their original data available on their own web servers which are made known to GLOSS (in which case one of the IAC's will take copies of the data).

At the present time the recognised GLOSS International Archiving Centres are:

- The PSMSL and BODC at Bidston Observatory
- The University of Hawaii Sea Level Center
- The Australian National Tidal Facility

and each agency participating in GLOSS should send its data to whichever of the three IAC's is most convenient.

For more information on GLOSS and on the various international, regional and national sea level data centres, see:

http://www.pol.ac.uk/psmsl/sea_level.html

6.3 Fast Delivery Data

Since the WOCE programme, and the development of satellite radar altimetry into a reliable and accurate technique for quasi-global sea level monitoring, the community

has begun to require access to near real-time, or 'fast delivery', tide gauge data. The first main driver for this need is that altimetric data sets can now be provided very fast by data centres (in virtually real time for some preliminary products and in a week or so for the best scientific products). Consequently, analysts who require tide gauge data for comparison to altimetry need the gauge information in a similar timescale. The second main driver comes from the numerical ocean modelling community which is involved in altimeter and tide gauge data assimilation into ocean models and which provides various types of ocean forecasting (e.g. of El Niño development). To be useful to the modellers, the information has to be available much more rapidly than hitherto, even if the data have not been subjected to the final control expected of most GLOSS sea level data sets. (The situation is analogous to weather forecasting which requires timely wind and air pressure data.)

At the GLOSS Group of Experts meeting in 1999 the decision was made to ask the University of Hawaii Sea Level Center to function in the future as the 'GLOSS Fast Centre', as an extension of its role as the WOCE Fast Centre. The UHSLC will be contacting tide gauge operators which it hopes will be able to supply quasi-real time data to the GLOSS Fast Centre.

6.4 Regional Programmes

The GLOSS Implementation Plan 1997 recognised that regional activities have been some of the most successful of the GLOSS programme, and provided a summary of regional activities known at the time. Since 1997, there have been initiatives started in Europe, the Caribbean, West Pacific, Africa etc. which it is to be hoped will result in their own data centres and products of various kinds in future. Connections to these many activities will be attempted through web links such as:

http://www.pol.ac.uk/psmsl/sea_level.html

7. Training Materials, Training Courses and More Information

7.1 Training Materials

The PSMSL maintains a web page which attempts to provide a range of sea level and GLOSS information and training materials in electronic form. The page is:

<http://www.pol.ac.uk/psmsl/training/training.html>

The page contains copies of a number of the documents mentioned in this volume (mostly in Acrobat Reader PDF format or in Word format). It provides links to available software packages and to general information on sea levels and tides such as publications, glossary, acronyms etc. It is our intention that this page will be expanded as much as possible in future. Suggestions for additions are welcome, and contributions in languages other than English are especially welcome.