

UK Tide Gauge Status Report – National contribution to GLOSS

The UK National Tidal & Sea Level facility (NTSLF) comprises the UK National Tide Gauge Network, geodetic networks for monitoring vertical land movements, and gauges in the British Dependent Territories of the South Atlantic and Gibraltar. It is operated by the Proudman Oceanographic Laboratory (POL) and the British Oceanographic Data Centre (BODC), with funding from the Environment Agency (EA) and the Natural Environment Research Council (NERC).

UK

The UK National Tide Gauge Network records tidal elevations at 44 locations around the UK coast. The majority of these gauges are bubbler pressure gauges. Data from these gauges are made freely available to registered users from the NTSLF website (www.pol.ac.uk/ntslf), both in real time and as delayed mode quality controlled data. The real time data is incorporated into models run at the UK Met Office Storm Tide Forecasting Service (STFS) then used to issue flood warnings to the EA.

Three of the 44 sites are committed to GLOSS. At Lerwick (GLOSS No. 236), there are two full tide and a half tide bubbler gauge installed. The main gauge at Newlyn (GLOSS No. 241) is a full tide bubbler gauge, but there is also a half tide bubbler gauge (for datum checks) and a potentiometer attached to a Munro float gauge. Charts are collected every three months and archived at BODC. At Stornoway (GLOSS No. 238) there are two full tide bubbler gauges. General maintenance has been carried out on these gauges in 2005 and 2006. These three sites are equipped with CGPS and absolute gravity measurements are made every year at Lerwick and Newlyn. As part of UK (Environment Agency), EU (TRANSFER) and IOC (Mediterranean and NE Atlantic) tsunami warning systems, a test site at Holyhead was set up with a pressure gauge producing 10Hz data averaged into 1s packets sent via GPRS. After an evaluation period of three months there was little corrosion on the submerged sensors so a permanent housing was built. Surveys are going ahead at Cromer and also the GLOSS sites Lerwick and Newlyn to install the same equipment.

For the GLOSS sites, real time data has been available since 2004 on the NTSLF website and is sent to the University of Hawai'i Sea Level Center (UHSLC) every 15 minutes. Fast delivery data are sent every week to the GLOSS fast centre at UHSLC. UHSLC are currently testing facilities for making real time plots available and these include data from Newlyn and Stornoway. Data from the UK network are also made available to the European Sea Level Service (ESEAS), the North West Shelf Operational Oceanographic System (NOOS) and Sea Levels along the European Atlantic Coastline (SLEAC). The UK is also participating in the EU SEPRISE project, developing real time data exchange in Europe.

As well as the gauges around the UK coast, the NTSLF maintains a network of gauges in the South Atlantic, Antarctica and Gibraltar. Even though most of these

gauges are committed to GLOSS, the funding comes directly from the POL science budget and has to be competed for every few years.

Gibraltar

The new radar gauge at Gibraltar (GLOSS No. 248) was installed in 2004. A visit was made in September 2005 to maintain the tide gauge and repeat the levelling performed in 2004. A pressure sensor will be installed in 2007 and the data retrieval system may be changed from a dial-up modem to a broadband connection. Real time data has been available since 2004 on the NTLF website, is available on the MedGLOSS website and is sent every hour to UHSLC where it is plotted on their real time website that is currently undergoing testing. UHSLC also has fast data available.

South Atlantic

The ACCLAIM (Antarctic Circumpolar Current Levels by Altimetry and Island Measurements) programme in the South Atlantic and Southern Oceans consists of measurements from coastal tide gauges and bottom pressure stations, together with an ongoing research programme in satellite altimetry. Data collected and information on the sites can be found at the ACCLAIM website: www.pol.ac.uk/psmslh

Port Stanley (GLOSS No.305)

The original gauge at Port Stanley is a 'B gauge' and has been in operation since 1992. In November 2005 a new "all-in-one" gauge and a radar gauge with Orbcomm were installed. The Orbcomm sends back four 15 minute averages every hour and the Southern Ocean Tide Gauge (SOTG) logger was upgraded to send back one minute averages via dial-up every hour. The original pressure gauge and Tidata logger were both refurbished during the visit and data downloaded. Port Stanley also received a second visit in December 2005. This was to upgrade the modem firmware to provide authentication after the ISP changed the protocol for sending emails via dial-up.

The Tidata card failed on 29th June 2006. The all-in-one gauge has 1 minute data values to cover that period.

Real time data are available from the NTLF website and sent every hour to UHSLC, where they are plotted on their real time site. UHSLC also has fast data.

St. Helena (GLOSS No.264)

The 'B gauge' installed at St. Helena has been in operation since 1993. There is a Tidata logger and a SOTG (dial-up access) logger. The email system has ceased to work as a result of server changes by Cable and Wireless. The back-up logger is working fine though.

Not visited in 2005. There is no real time data available at the present, though this will be fixed at some point.

South Georgia (GLOSS No.187)

Negotiations taking place for a new gauge at King Edward point. This should be installed in the 2007/2008 season.

Signy (GLOSS No.306)

The sub-surface pressure gauge at Signy has been in operation since 1988. The base is only maintained in the summer by the British Antarctic Survey (BAS) and it is difficult to keep gauge running in the winter. However, the gauge survived the winter in 2005/2006 and we have data from March 2006 to November 2006.

Tristan da Cunha (GLOSS No.266)

There is a long record (1984-1998) of sub-surface pressure measurements from Tristan da Cunha. A new gauge is planned for Tristan da Cunha which should be installed during 2007/2008.

Ascension (GLOSS No.264)

At Ascension, there is an all-in-one gauge and a radar gauge.

In September 2005 the old 'B gauge' steelwork was removed and replaced with the new all-in-one gauge. The SOTG logger was upgraded to provide 1 minute average data every hour via the dial-up connection to the local ISP. Emails are sent every hour. There is also a background Tidata logger, which was refurbished and data downloaded from both loggers. A radar gauge was also installed which returns 1 minute data via Orbcomm.

Ascension was visited again a few weeks later in November 2005, when an additional solar panel was fitted. All power needs are now met by three solar panels operating in parallel. During the same visit, a fault which had developed with the Orbcomm antenna was able to be fixed.

Real time data are available on the NTSLF website and plotted on the UHSLC development real time site. Fast data is sent to UHSLC every hour.

Vernadsky (GLOSS No.188)

The float gauge at Vernadsky has been in operation since 1958 and is the longest record in Antarctica. Charts continue to be sent regularly to POL. A pressure gauge was installed by POL in 1997 and an OTT gauge was left for installation in 2005.

The site was visited in December 2005 and data was downloaded from the pressure gauge and a new memory card installed. The new OTT gauge and DCP was also left with the Ukrainians for them to install for us. Data will be sent back via GOES.

The full tide sensor of the pressure gauge appears to have failed since 2000 as the frequency range is much reduced though the mean level is the same. Speculation that sensor is blocked. Barometric record is fine though. A new sensor could be sent out but installation may be difficult without divers. This won't be necessary if the OTT system works.

We have a Tidata logger on the pressure gauge which is downloaded whenever we visit. There is also an OTT logger with a DCP which is yet to be installed. For the OTT logger we need to find out how to get our data off the GTS.

Rothera

The 'B gauge' at Rothera has been operational since 1998. Data was downloaded from the logger in December 2005 and again in December 2006 to provide data from July 2005 to October 2006. The Gumstix telemetry system was tested from the new ethernet connection in the boatshed. In the future this should enable us to email the tide gauge data back to POL.

Africa

Under the Coastal Ocean Observing System workpackage of the Ocean Data and Information Network for Africa (ODINAFRICA) initiative of the Government of Flanders and IOC, POL took the lead in the technical specification of new gauges to be installed in Africa and the north western Indian Ocean. New gauges have been provided through POL for installation in Mozambique, Pakistan, Mauritania, Ghana, Cameroon, Congo, Djibouti and Yemen with up to 6 others planned in 2007-8. Below is a brief summary of work carried out that POL has been involved with. For full details, see the report on Africa to GE10 by Woodworth, Aman and Aarup.

Pemba

In August 2005 a radar gauge and backup pressure sensors were installed. The radar gauge is still operational but both pressure sensors have failed. Real time data used to be sent back via Orbcomm, and since April 2007, are sent every hour via DCP. The data are available from the NTSLF website, the OdinAfrica testing website hosted by VLIZ and the UHSLC real time site.

Inhambane

In June 2005 a radar gauge and backup pressure gauge were installed. The radar gauge used to report back via Orbcomm but there has been no data since June 2006, due to problems with the antennae. Since May 2007 the radar gauge has been sending data back every hour via DCP. Real time data are available from the VLIZ website.

S. Africa

We sent out 3 sets of software to upgrade the DCPs. Simon's Town is now sending back real time data (VLIZ). Port Elizabeth and Durban will be upgraded in summer 2007.

Nouakchott

Gauge is installed. Pressure sensors are problematic, though the radar is fine. Real time data are available from VLIZ.

Takoradi

There is a radar gauge and backup pressure sensors. Data are fine but the half-tide sensor needs to be re-sited. Real time data are available from UHSLC and VLIZ.

Karachi

Both radar and pressure sensors are now fully operational. Real time data are available from UHSLC and VLIZ.

Djibouti

Radar gauge has been installed. Real time data are available from UHSLC and VLIZ.

Others

The gauge for Aden has been shipped out. Pointe Noire and Port Simara have been put on hold for now. New gauges are being considered for Morocco and Alexandria.

UK territories gauges

South Caicos – A NOS acoustic gauge was in operation from 1991 to 1992, maintained by Florida Institute of Technology, but no information has been available since 1992.

Diego Garcia – Operated by UHSLC, real time and fast data available from UHSLC.

Bermuda – The US National Ocean Service (NOS) have been operating an acoustic gauge since 1992. Real time data are available from NOS and UHSLC and fast data are available from UHSLC.

Training

In November 2006 POL organised a training course for tide gauge specialists from African countries, held in Oostende, Belgium. It was the first sea level training course given as part of developing the ODINAFRICA project. Philip Woodworth organised the course and Peter Foden and Jeff Pugh played a major role providing advice and training on tide gauge installation.

There will be a short course in May 2007 for people from Iran, Yemen, Egypt and Morocco.

Also in 2006, Volume IV of the IOC Manual on Sea Level Measurement and Interpretation was published and made available via the PSMSL training pages.

Summary

GLOSS No.	Station name	Types of Gauge(s)	Delayed mode data available	Real time data available
187	South Georgia	Pressure sensor (to be installed 2007)	N	N
188	Vernadsky	Float gauge	Y	N
		Pressure gauge	Y	N
		OTT gauge	Y	N
236	Lerwick	2 full tide and a half tide bubbler gauge	Y	Y
238	Stornoway	2 full tide bubbler gauges	Y	Y
241	Newlyn	Full tide and a half tide bubbler gauge	Y	Y
		Potentiometer attached to a Munro float gauge	Y	Y
248	Gibraltar	Radar gauge	Y	Y
		Pressure sensor (to be installed 2007)	N	N
263	Ascension	All-in-one pressure gauge	Y	Y
		Radar gauge	Y	Y
264	St. Helena	'B gauge'	Y	N
266	Tristan da Cunha	Sub-surface pressure sensor	Y	N
305	Stanley, Falkland Is.	'B gauge'	Y	N
		All-in-one pressure gauge	Y	Y
		Radar gauge	Y	Y
306	Signy, South Orkney IIs.	Sub-surface pressure sensor	Y	N