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## **PCTMSL NEWS—November 2003**

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### **Australian Baseline Sea Level Monitoring Stations**

The calibration and maintenance visits to Baseline stations started on schedule during the first half of 2003 with the Spring Bay and Burnie stations being serviced in February and Portland in March.

A scheduled visit to Port Kembla, Rosslyn Bay and Cape Ferguson has been deferred on the advice that the Cape Ferguson installation, where we share the instrumentation housing with the Queensland Department of the Environment, was to be refurbished. This will require that the whole structure be decommissioned and dismantled. The site visit to the east coast stations has been deferred so that the special visit to decommission the Cape Ferguson site can take place concurrently. Refurbishment of the site will take about one month after which the station will be reinstalled and calibrated. This is planned for late September.

The only problem reported in this period was the failure of the Cape Ferguson Backup pressure sensor.

### **Survey**

During the reporting period levelling surveys of the Australian baseline Sea Level Monitoring Array have been undertaken at Darwin and Groote Eylandt. Final results will become available at:

<http://www.ga.gov.au/nmd/geodesy/abslma>

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### **South Pacific Sea Level and Climate Monitoring Project**

The year started with the requirement for a special service visit to Tonga to replace sensor cables accidentally dug up during the installation of a nearby mobile phone service tower.

The Calibration and Maintenance schedule of Phase III of this project continued on schedule with four stations being visited in this period. They were Pohnpei, Vanuatu, Nauru and Kiribati. The latter two were exchanged for a scheduled visit to Papua and New Guinea (PNG) as they both had problems that could not be rectified by the local contacts. Solomon Islands, which would have normally been visited in conjunction with Vanuatu, was deferred due to the political climate.

Site feasibility studies for the possible provision of project stations to the islands of Niue and Palau were also undertaken. Reports have been submitted to Australian Agency for International Development (AusAID) for consideration.

The phone connection to the Solomon Island station which has been disconnected since July 2001, was finally reinstated following provision of special funds from AusAID.

The noisy phone line problem in Samoa was resolved during the site visit in September.

The secondary water level sensor, a submerged pressure transducer, as previously reported continued to show drift problems at Samoa and PNG. In the case of Samoa this has been rectified during the site visit there in September.

The air temperature probe at Majuro in the Marshall Islands is recording abnormally high temperatures. The phone line there is also unserviceable due to noise.

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## Southern Ocean Sea Level Centre

The first six months of 2003 has seen new 2002 and 2003 data for Macquarie Island, Mawson, Casey and Davis sent by Australian Antarctic Division (AAD) to National Tidal Facility Australia (NTFA) for analysis.

The analyses for Macquarie Island, Mawson, Casey and Davis on the 2001 and 2002 data has been completed and will be sent to Henk Broisma, Mapping Officer, AAD for comment once the 2005 predictions have been prepared. The data to the end of 2002 has been posted and is available from the NTFA's web archive.

The Southern Ocean Sea Level Centre (SOSLC) web pages are currently being reviewed with the aim of making them more user-friendly. System development is in progress to automate the update of graphical and numerical data presented on the SOSLC web pages and web archive.

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## Association of Australian Port and Marine Authorities/National Tidal Facility Australia Tidal Contract

Further to *PCTMSL NEWS—May 2003*, NTFA has received 2002 sea level observations from the 64 operating tide gauges at the 79 ports currently covered by the contract.

All of these data sets have been checked and feedback has been supplied to the relevant Port Authorities. The 2005 tide predictions have been computed and supplied to the relevant Port Authorities.

For further details please refer to the **Tide Predictions** section of the NTFA web site <http://www.ntf.flinders.edu.au> or contact:

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## Other News from the National Tidal Facility

### Visitors

13 January 2004—26 February 2004: Professor Jon Hinwood of Monash University, Melbourne, and Director of the Australian Marine and Offshore Group.

10 February 2004: Mr Brendan Doran, Australia's Ambassador to the Federated States of Micronesia.

21 February 2004: Mr Jurek Juszczak, High Commissioner Designate to Tarawa.

### Meetings

Mr W Mitchell (Acting Director, NTFA) attended the following meetings:

SPSL&CM Technical Working Group Meeting, Canberra  
SPSL&CM Project Coordination Committee Meeting, Nadi  
National Greenhouse Science Meeting, Melbourne  
SPSL&CM Policy Workshop, Nadi  
AAPMA Hydrographic Surveyors Group Meeting, Wollongong  
PCTMSL Meeting, Sydney

### Training

NTFA facilitated the attendance of Mr A Srerurngla, a preliminary Masters student studying cyclones in the Gulf of Thailand, at the 'Stormtrak' storm surge and tidal modelling and analysis system training workshop held in Nadi, Fiji, 01–07 June 2004.

A program of Australasian Tides Workshops of the type last held in October 2002 and reported on in the *PCTMSL NEWS—May 2003* will be resumed once the NTFA's future is determined.

### Staff Movements

Mr W Mitchell is continuing as Acting Director of NTFA.

Mr Noel Sears, Instrumentation Technician, who has been with the NTFA since 1999, resigned at the end of July. He has taken a new position with Agrilink Holdings Pty Ltd.

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## Regional News

### Environmental Protection Agency and Maritime Safety Queensland

The routine of the tidal office continues—recorded water levels are gathered, predicted tides obtained from the National Tidal Facility or prepared in-house, and inquiries answered.

The Environmental Protection Agency (EPA) (EPA who operate the storm tide monitoring on behalf of the Beach Protection Authority) has completed major refurbishment of the Cooktown and Karumba stations. Both are now in service with an expected life of a further ten years.

The storm tide stations at Mooloolaba, Urangan, Shute Harbour, Mackay, South Trees Wharf Gladstone, Rosslyn Bay, Port Alma, and Burnett Heads Bundaberg have been re-instrumented with Data Taker loggers and downward looking Vega radar units. It is intended to progressively replace the aging float/shaft encoder/stilling well equipment at the remaining stations.

The tidal stations operated by Maritime Safety Queensland (MSQ) at Port Douglas and Thursday Island failed during the past year.

The Port Douglas station, which has not operated for nearly a year, has been renewed completely. The data logger was replaced on 18 June 2003 with a MACE 2001 unit taking readings from a Milltronics downward looking air acoustic sensor.

Preparation is in hand to renew the Thursday Island station. The logger will be a MACE 2001 taking readings from a downward looking Vega radar unit.

Both the EPA and MSQ anticipate much reduced costs for the maintenance of the tidal network as a result of replacing in water sensor systems with the downward looking acoustic and radar units.

All tidal recordings for the year 2002 have been forwarded to the National Tidal Facility Australia (NTFA). Quality assurance of the readings have been completed and the harmonic analyses of them are underway in preparation for deliver of the year 2005 tidal predictions by December 2003.

The NTFA provides a tidal prediction service for port operational purposes under contract to the members of the Association of Australian Port and Marine Authorities (AAPMA). As many people will know, changed circumstances at the NTFA have necessitated renegotiation of the contract. The Queensland port authorities have preparations well in hand to commence the negotiations.

For further information contact:

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### Australian Antarctic Division

The following is the status of the tide gauges at the Antarctic Stations and Macquarie Island:

**Macquarie Island.** Type of gauge: Aquatrak and Druck installed under fibreglass domes about 1 centimetre thick, with access to sea via an inclined bore hole.

Period of operation: December 1994 to present.

For many years the AAD has attempted to make an internet connection from the gauges in Garden Cove to the nearby Antarctic Division station. Due to the location of the gauges on a small isolated headland we have had to rely on batteries and solar power with the resulting problem of very low power for the running of the gauge. In winter this is exacerbated by the low sun angle.

The atmosphere at Macquarie Island is not kind to electronics especially those installations outside of station buildings. The weather is one of almost constant violent winds, drizzle, sea spray and inundation of the tide gauge site and installations with sea water.

Roger Handsworth has kept this installation operating for ten years and in March was able to install and successfully operate a radio connection to Kingston. The gauges survived a very severe storm in June which seriously damaged several sheds and carved a good metre or more of sand and rock from nearby beaches. See storm pictures at: <http://www.aad.gov.au/default.asp?casid=10481>

**Casey.** Type of gauge: Platypus pressure gauge installed in 600 kilo block of concrete in about 6 metres of water.

The first gauge at Casey was installed in 1992 but was displaced and turned on its side by a small iceberg. Both the gauge and block of concrete were found some years later.

The present gauge was installed in 1996 and was last downloaded in January 2003.

A vertical stainless steel pipe (300 mm diameter) was included in the construction of a new wharf in the summer of 2002–2003 for the installation of an Aquatrak gauge in the summer of 2004–2005. The gauge installation will require heating to prevent freezing of water in winter.

**Davis.** Type of gauge: Platypus pressure gauge.

First installed in March 1993 and data collected till 23 September 2001 after which the batteries ran out. The gauge was extracted in February 2002. A second gauge was deployed in May 2002 with the last set of data download in November 2002.

Unfortunately there was no overlap of data between the first gauge and second gauge due to access problems.

**Zhongshan.** Joint project with CHINARE. (Chinese Antarctic Research Expeditions). Type of gauge: Platypus pressure gauge.

Gauge deployed in February 2000 and last downloaded in January 2003.

**Mawson.** Type of gauge: Platypus pressure gauge.

First gauge deployed in May 1992, retrieved and redeployed on 23 March 1993, data collected till 09 September 2001 after which the batteries ran out. The gauge survived for 8.5 years on lithium batteries.

Second gauge was deployed in November 1999 and was last downloaded in January 2003.

There was an overlap of twenty two months in the data collection between the two gauges so an accurate transfer of height can be calculated.

Shore mounted Aquatrak and Druck pressure.

The installation consists of an Aquatrak and Druck pressure gauge, installed in a 70 mm inclined drill hole at the southern end of East Arm. The drill hole is lined with a stainless steel 'thermos flask' and heat trace to maintain temperature of water above freezing point in the winter. The installation has both power and communications connections so the download of data from Kingston is possible.

Water level readings to calibrate the tide gauges at Macquarie Island and Davis were observed using a 'floating' GPS unit by University of Tasmania personnel—PhD student Chris Watson and Associate Professor, Richard Coleman. The GPS observations will allow:

- a. An accurate calculation of the sea level as it relates to the onshore ARGN GPS base stations operated by Geoscience Australia/Geodesy; and
- b. A comparison of sea level as observed by the tide gauge and the GPS unit and hence a calibration of the tide gauge.

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## Australian Hydrographic Service Happenings

**Australian National Tide Tables 2004.** The compilation of the Australian National Tide Tables 2004 (ANTT), and its electronic version, Seafarer® Tides, has been completed and distribution will take place in early December. The ANTT 2004 format retains its now familiar look and contents, as does Seafarer® Tides.

**Hydrographic Service Support.** The Tidal and Geodetic section of the Office has been providing support to the Hydrographic ships during conduct of survey operations over a wide geographic variety of areas during the last six months. These include Arnhem Land in NT, Lasinie Island in Papua New Guinea, and the Hogan Group in Bass Strait. At all of these surveys new tidal data has been collected and analysed, and has been added to the Offices database.

**International Exchange of Tidal Predictions.** The Australian Hydrographic Service has recently provided Tidal Predictions to various Hydrographic Authorities in varying countries for inclusion in their Tidal Tables. These countries include the United Kingdom, the United States, Japan, and Korea. This continues a long-standing arrangement whereby every effort is made to ensure that Tide Predictions that are published in various sets of Tide Tables are consistent with those published in Australia. Several other national Hydrographic Authorities also exchange Tide tables with Australia to ensure that Tidal predictions are as easily to access as possible.

**Contact the AHO Tidal and Geodetic Section.** The Tidal and Geodetic Section has established a group email address, 'tides@defence.gov.au'. This address should be used in preference to individual staff members address's as it is anticipated that there will be several changes in the staff line up in the Section in the near future, with a pending retirement and a resignation. It also allows your enquiry to be answered quicker in case one of us is out of the office for any length of time.

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## Estimates of the Regional Distribution of Sea-level Rise over the 1950 to 2000 Period

During the July meeting of the Permanent Committee on Tides and Mean Sea Level (PCTMSL), John Church from the Antarctic Climate and Ecosystems Cooperative Research Centre and CSIRO Marine Research in Hobart presented new estimates of sea level rise over the 1950 to 2000 period.

The work was jointly done with Neil J. White (also at the Antarctic Climate and Ecosystems Cooperative Research Centre and CSIRO Marine Research) Richard Coleman (university of Tasmania), Kurt Lambeck (Australian national University) and Jerry X. Mitrovica (University of Toronto Canada). They used TOPEX/Poseidon satellite altimeter data to estimate global empirical orthogonal functions that were then combined with historical tide gauge data to estimate monthly distributions of large-scale sea-level variability and change over the period 1950 to 2000. The reconstruction of monthly sea levels was an attempt to narrow the current broad range of sea-level rise estimates reported in the Intergovernmental Panel on Climate Change Third Assessment Report, to identify any pattern of regional sea-level rise, and to determine any variation in the rate of sea-level rise over the 51 year period. The computed rate of global averaged sea-level rise from the reconstructed monthly time series was  $1.8 \pm 0.2$  mm/yr. They found decadal variability in sea level but found no significant secular increase in the rate of sea-level rise over the period 1950 to 2000. They did find a regional pattern of sea-level rise. The maximum sea-level rise was in the eastern off-equatorial Pacific and there was a minimum along the equator, in the western Pacific and in the eastern Indian Ocean along the north west coast of Australia. A greater rate of sea-level rise on the eastern north American coast compared with the United Kingdom and the Scandinavian Peninsula was also found. The major sources of uncertainty are the inadequate historical distribution of tide gauges, particularly in the southern hemisphere, inadequate information on tide gauge datum movements (vertical land motion from post glacial rebound and tectonic activity) and the short satellite altimeter record to estimate global sea-level covariance functions. The results clearly demonstrate that tide gauge records will continue to complement satellite altimeter records for observing and understanding sea-level change.

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## 'Achievements of the Permanent Committee on Tides and Mean Sea Level' Report

We are thankful to Mr John Broadbent, the longest standing member of the PCTMSL (since the early 1980s) for his considerable effort in compiling the report on 'Achievements of the PCTMSL'. The report is now on the ICSM web site. To view/access go to:

[http://www.icsm.gov.au/icsm/tides/tides\\_msl.htm](http://www.icsm.gov.au/icsm/tides/tides_msl.htm)

or

<http://www.icsm.gov.au/icsm/publications/index.html#tides>

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## Conferences and Symposia

### 2004

**26–30 January 2004.** '12th Ocean Sciences Meeting'. Portland, Oregon, USA.

Information and registration at:

<http://www.agu.org/meetings/os04/>

**03–06 February 2004.** 'Pacific 2004: International Maritime and Naval Exhibition for the Asia Pacific'. Sydney Convention and Exhibition Centre, Darling Harbour, Sydney, Australia.

Information contact at:

Email: [pacific@maritime.net.au](mailto:pacific@maritime.net.au)  
Web site: <http://www.pacific2004.com.au>

**16 March 2004.** 'WATTS 2004 : Wave and Tidal Technology Symposium (in parallel with Oceanology International 2004)'. ExCel, London, UK.

Information and registration at:

<http://www.r-p-a.org.uk/>. Click on 'WATTS 2004'

**16–19 March 2004.** 'Oceanology International 2004'. Exhibition Centre London (ExCeL), London, UK.

Information and registration at:

<http://www.oceanologyinternational.com/>

**21–22 April 2004.** 'Integrated Coastal Zone Management : Fact or Fiction?'. University of Plymouth, Plymouth, UK.

Information and registration at:

<http://www.science.plym.ac.uk/pass/>

**30 May 2004 – 04 June 2004.** 'PACON 2004 : Eleventh Pacific Congress on Marine Science and Technology (20th Anniversary)'. Waikiki Beach Marriott Resort, Honolulu, Hawaii.

Information and registration at:

<http://www.hawaii.edu/pacon/>

**13–16 October 2004.** '4th Trans Tasman Surveyors Conference'. Auckland Convention Centre, Auckland, New Zealand.

Registration of interest at:

[ttsc04@cmevents.co.nz/](mailto:ttsc04@cmevents.co.nz)

**02–04 November 2004.** 'Hydro 2004: 14th Biennial Conference of International Federation of Hydrographic Societies'. Galway Bay Hotel, Galway, Ireland.

Information at:

[Hydro4@hydrographicsociety.org](mailto:Hydro4@hydrographicsociety.org)

**09–12 December 2004.** 'Oceans 2004 and Techno Ocean'. Kobe, Japan.

For information contact:

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