Introduction

The Burnie calibration site is located in northern Tasmania, Australia (41° 03' S, 145° 55' E) under Topex/Poseidon / Jason-1 descending pass 088. The focus of the calibration activities is the regular deployment of two GPS buoys at our chosen comparison point, approximately 40km from Burnie.

Data from the episodic GPS buoy deployments, combined with the Burnie tide gauge and colocated GPS time series and supplementary oceanographic instrumentation allows the estimation of both the Topex Poseidon and Jason-1 absolute bias. The project also aims to monitor any long-term drift in the bias of both altimeters.

GPS Processing Methodology

The static sites in the analysis are processed using the GAMIT/GLOBK suite in a regional network solution together with other sites contributing to the Australian Regional GPS Network (ARGN). Global IGS solutions are used in the final GLOBK to enable the estimation of site coordinates in ITRF2000.

The BUR1, TBCP and RKCP sites are then used as fixed reference sites in the kinematic processing of the the two GPS buoys using TRACK software developed at MIT. The emphasis in kinematic processing development remains the successful determination of the differential tropospheric delay parameter on a moving platform.

The development of improved kinematic processing strategies for the GPS buoys form a major component of the research undertaken by the group.

Deployments Completed

A total of seven (7) deployments have been completed to date.

- Deployment 1: 21/09/2001, T/P cycle 332
- Deployment 2: 17/02/2002, T/P cycle 347, Jason-1 cycle 4
- Deployment 3: 09/03/2002, T/P cycle 349, Jason-1 cycle 5
- Deployment 4: 07/04/2002, T/P cycle 352, Jason-1 cycle 9
- Deployment 5: 27/04/2002, T/P cycle 354, Jason-1 cycle 11
- Deployment 6: 07/05/2002, T/P cycle 355, Jason-1 cycle 12
- Deployment 7: 27/05/2002, T/P cycle 357, Jason-1 cycle 14

Example GPS Buoy Results

An example of the GPS buoy time series from the first deployment shows the 1Hz time height series for the 4 hour deployment. The red line shows the low pass filtered signal, highlighting the tidal displacement over the duration of the deployment. The vertical bar indicates the time of overflight. SWH for this deployment was 0.8m.

The power spectrum of the 1 Hz GPS Buoy data indicates a dominant frequency corresponding to the swell, with a period of approximately 14 seconds.

Issues to be Addressed

- Further development of integrated multi reference, multi rover solutions
- Verification of reference frame selection
- Improved resolution of tropospheric delay parameters
- Improved signal weighting algorithms
- Repeated calibration of height of buoy antenna above mean water level
- Further investigation of optimum filtering of the 1 Hz buoy data

Atimeter Data

- There is some anomalous Jason-1 radiometer data near shore - a brightness temperature interpolation flag (bt_inter_flag, bit 1) is set some distance (>60km) offshore. At this point the wet troposphere correction goes into a "flat spot" and then seems to recover closer in to shore. We also see a consistent ~1 cm offset between the TOPEX/Poseidon and Jason-1 radiometer corrections.

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