

REPORT ON AUSTRALIAN ACTIVITIES TO THE CEOS WGCV#16

This report on recent and planned Australian Cal/Val programs will give up-dated details of our efforts in the validation of sea surface height products from satellite-borne altimeters. It also includes plans for the validation of data from the soon-to-be-launched satellite JASON. This information has been supplied by Neil White (neil.white@marine.csiro.au) at CSIRO Marine Research.

An extract from the NOAA AVHRR calibration page maintained by CSIRO is also attached (See item III below and the extract at the end of the report).

On-going activities identified in past reports to WGCV12/13/14/15 are listed below. Past reports are available at the [CEOS WGCV WWW](#) site. Note that details of all cal/val sites can be obtained from the CEOS Cal/val site dossier on the WWW - <http://sps0.gsfc.nasa.gov/calval/>

1. Continued operation of the CSIRO CIGSN Land Calibration Sites at Hay (Uardry), Alice Springs (Amburla), and Broome (Thangoo) (see report to WGCV-12).
2. Continuing radar altimeter product validation (see special report below) including plans for JASON.
3. AVHRR solar reflectance channels - Calibration info. now on the WWW at <http://www.dar.csiro.au/rs/CalWatch/default.htm> Calibration site at Tinga Tingana.
4. Antarctic activities (see special report to WGCV12).
5. Ocean colour cal/val (see reports to WGCV-12 & -14)
6. POLDER validation campaign (see report to WGCV12).
7. Validation of sea surface temperatures. The ongoing collection of data at the Townsville and Perth sites. Comparisons with AVHRR and ATSR-2 SST values continues. (WGCV-11 & -12)
8. Use of the moon for GMS calibration (see report to WGCV-14).
9. A special report on activities in Western Australia was presented in the report to WGCV-15. These include -
 - a. Validation of satellite-derived oceanographic parameters
 - b. SST Algorithm Development and Validation
 - c. SeaWiFS and Ocean Colour Sensing

- d. Solar Photometry Field Site on Rottnest Island for Validation of Maritime Aerosol Optical Thickness
- e. Solar Photometry Field Site on Rottnest Island for Validation of Oceanic Atmospheric Correction to Satellite Data
- f. Satellite Validation Field Site at Broome, Western Australia (Thangoo)
- g. Cloud Height Product Validation

NOTE:

CSIRO continues to develop its validation plan for its NASA EOS activity through an Interdisciplinary Investigation entitled "The Relationship between Climate, Ocean Circulation, Biological Processes, and Renewable Marine Resources". Planning also continues for the validation and calibration of data from instruments on ENVISAT and ADEOS-II.

VALIDATION OF SATELLITE ALTIMETER PRODUCTS IN AUSTRALIA

Calibration plan for Bass Strait and other sites in the Australian region

Dr Neil White (CSIRO Marine Research), Dr Richard Coleman (University of Tasmania), Dr John Church (CSIRO Marine Research), Mr Greg Musiela (National Tidal Facility).

1. OBJECTIVES

To estimate the magnitude of the JASON-1 altimeter bias (and the relative bias to TOPEX/Poseidon) and to monitor any long-term drift in the bias (of JASON-1 and T/P) by maintaining long-term Southern Hemisphere altimeter calibration sites.

2. RESEARCH PLAN AND METHODOLOGY

The existing site at Burnie, on the north coast of Tasmania, will be maintained through the life of the Jason-1 mission. The instrumentation at Burnie consists of a Sutron Aquatrak tide gauge with associated sensors (atmospheric pressure, temperature and wind speed) and a permanent GPS receiver.

The data from the tide gauge instruments are available in near-real-time and are maintained, calibrated and reduced by the National Tidal Facility.

A permanent GPS receiver was installed in June 1999 at the Burnie tide gauge site and this data is downloaded daily to the national geodetic agency, AUSLIG, in Canberra. There have been three repeat GPS surveys at the Burnie site since 1992 allowing estimates of vertical motion rates. In addition, we will produce improved estimates of the absolute bias at Burnie, largely through having available a better geoid model than we did in 1994.

We will use and extend the techniques that we used for the initial calibration at Burnie (White et al., 1994) and for the follow-up calibration work (presented at the T/P SWT in Southampton, 1996).

The GDR products, from both the TOPEX/Poseidon and Jason-1 satellites, will be used for our analyses.

We will share data and techniques with other similar calibration sites, such as Harvest and the new CNES site at Corsica.

We have been examining other potential sites for the determination of absolute bias and bias drift. At a number of these selected calibration sites, tide gauge records commenced after the start of the TOPEX/Poseidon mission, and hence were not used for the T/P calibration work. However, some of these sites should be useable for calibration work for the later part of the TOPEX/Poseidon mission, in addition to the complete Jason-1 mission. At the moment we are considering 12 sites, including one (Manus Island, north of Papua New Guinea) where there is a crossover very close to the gauge.

All of the selected sites will give information about bias drift. Those sites with a permanent GPS receiver or repeated GPS surveys (Burnie, Lorne, Cocos Is) will give the most reliable information about the bias drift but will also provide opportunities for absolute calibration.

In addition, we are examining a number of options for the use of GPS buoys, either in conjunction with the existing instrumentation or at other sites to produce more and/or better estimates of the absolute bias of the

altimeters.

3. EXPECTED OUTPUTS

3.1 Jason-1 calibration phase

During the "formation-flying" period, we plan to produce an intercalibration between the T/P and Jason-1 altimeters to 1-2 cm.

3.2 Jason-1 mission

Once a reasonable time series of data are available (> 1 year), we plan to:

- produce an absolute bias estimate for Jason-1 of +/- 3-4 cm,
- produce bias drift estimates good to a few mm/year for the first year,
- and estimates at higher precision as the mission progresses.

4. REFERENCES

White, N.J., R. Coleman, J.A. Church, P.J. Morgan and S.J. Walker. 1994. A Southern Hemisphere Verification for the Topex/Poseidon Satellite Altimeter Mission. *J. Geophys. Res.*, 99, 24505-24516.

Other agencies contributing to this work will include: National Tidal Facility, Australian Land and Information Group (AUSLIG), University of Canberra, CSIRO Earth Observation Centre.

NOAA AVHRR CALIBRATION IN AUSTRALIA

An extract from <http://www.dar.csiro.au/rs/CalWatch/default.htm>

Abstract:

The solar reflectance channels on the NOAA AVHRR instrument have no on-board calibration source and are known to drift in sensitivity following launch. Various methods have been developed for the post-launch calibration of these channels. This document brings together the results of this work in a form suited to the operational calibration of AVHRR data sets from both historical and currently operational sensors. The CalWatch project aims to provide users of the AVHRR solar reflectance channels with a set of calibration coefficients maintained centrally, enabling uniform generation of higher level products across the user community. Accordingly, direct electronic access is provided to the data tables appearing in this document so that processing software can be furnished with current calibration coefficients.

Introduction

Conversion from digital counts to radiance and reflectance

Definitions

AVHRR/2 (up to and including NOAA 14)

Calibration coefficients for AVHRR/3

Filter characteristics

Method used to derive space count

Format and use of calibration data tables

Calibration coefficients for past sensors

NOAA 7

NOAA 9

NOAA 11

Calibration coefficients for currently operational sensors

NOAA 12

NOAA 14

NOAA 15

Worked example

Links to NOAA NESDIS calibration pages

References

About this document ...

<http://www.wgcvceos.org>

