AUSCOVER CALVAL: COORDINATING AUSTRALIAN ACTIVITIES IN CALIBRATION AND VALIDATION

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1. INTRODUCTION

Earth Observing missions are important to a number of Australian research and environmental programs and there is a need to ensure that data is accurately calibrated and validated (cal/val) to provide reliable information [1]. Australia has wide ranging experience in coordinating the cal/val of earth observing sensors. Whilst this previous involvement in international cal/val activities has been valuable, it is also recognized that the national coordination and funding of this activity has been both limited and ad hoc.

With the establishment of the Australian Terrestrial Environmental Research Network (TERN, $56 M, since mid 2009) and the Integrated Marine Observing System (IMOS, $56 M, since 2008) Australia will significantly develop and better coordinate its activities in cal/val in both the terrestrial and aquatic arenas. There is the opportunity to make a systematic contribution to a range of international satellite missions. Successful implementation of such activity needs careful planning of issues such as coordination of activities, the selection and establishment of networks of sites, the development and deployment of instrumentation to support measurement campaigns, and the adoption of common measurement and data distribution/availability protocols.

TERN AusCover is a new nationally consistent approach to collecting, validating and distributing time-series of remote sensing-derived terrestrial vegetation products to meet the requirements of ecosystem research and natural resource management in Australia.

Specifically, the AusCover will provide:

1. unencumbered local access to nationally consistent terrestrial land cover products, for use in ecosystem science and natural resource management, via AusCover nodes in Perth, Brisbane, Darwin, Melbourne and Canberra;

2. a consistent core set of standardised spatial biophysical data products (and associated metadata), including historical time series, validated for Australian conditions, as well as selected 'experimental' science products through each node;

3. a national standard approach to land-product validation of key biophysical variables derived from remote sensing data. Where possible this will include a system of adequately instrumented field validation sites, associated, where appropriate to other long-term ecological sites including the TERN Ozflux towers;

4. a data service operated in the form of a "distributed data archive and access capability" (DAAC) in the form of several regional data nodes, coordinated for consistency and accessibility through a 'Central Console' operating an "AusCover Portal", physically located at the CSIRO Black Mountain Laboratories in the ACT;

5. a clear communication plan for AusCover stakeholders with key science and policy-relevant messages and outcomes.

This paper will present a status report on cal/val activities in Australia as well as outlining the latest developments in the TERN AusCover calibration and validation sites set up for autonomous monitoring.

2. AUSCOVER VALIDATION ACTIVITIES

The purpose of the AusCover validation scheme is to: (1) provide an enhanced understanding of remotely sensed estimates of ecosystem composition, structure and functioning; (2) facilitate the linking of RS data across scales from point to landscape to region to continent; and, (3) to encourage standardized field measurements and protocols.

AusCover validation aims to achieve CEOS Stage 3 (CEOS WGCV) for a wide range of terrestrial land surface products. It will be sensor non-specific but will look to incorporate all major earth observing systems.

The aim of the proposed in situ observation framework is to ensure each ground site is representative of the biome, sub-region, gradient or (bioclimatic) state it seeks to characterize. Supported or newly established sites will be suitable for multi-instrument land product validation and algorithm development.

It is proposed to deploy two or three "SuperSites" during AusCover-I. These will act also as demonstrators for training and cross –calibration of methods.

Initial stratification will be based on IBRA –Australian bioregions, targeting five sub-regions, so that they meet the EOS criterion, namely:

- representative of spatially extensive and/or biogeochemically-important land covers
- relatively homogeneous (or "constantly mixed")
- large (at least 2km x 2km) preferably 5km x 5km
- Easily accessible / incorporate existing research facilities

Other AusCover activities reported on in this paper include the development of:

- an instrument facility for TERN
    - Associated Calibration facilities
    - Spectral libraries and data distribution portal
- Standards and protocols

- cal/val Education and Training

- SuperSite characterisation (using LiDAR and imaging spectroscopy)

- Wireless sensor networks for SuperSite autonomous monitoring

- a "Green book" for best practice in situ observations

REFERENCES

[1] Australian Academy of Science, Australian Academy of Technological Sciences and Engineering 2009 AN AUSTRALIAN STRATEGIC PLAN FOR EARTH OBSERVATIONS FROM SPACE. Australian Academy of Science 2009 GPO Box 783, Canberra, ACT 2601, Australia. ISBN 085847 267 8
www.science.org.au/reports/index.