A community approach to the standardised validation of surface reflectance data

Cindy Ong[1], Tim Malthus, Ian Lau and Peter Fearns

1) cindy.ong@csiro.au, CSIRO

Abstract

Earth Observation (EO) satellite data are the single most important and richest source of environmental information for Australia. Data from operational missions, such as the USA Landsat and the EU Copernicus missions, are important data sources underpinning a range of operational uses.

An initiative which aims to capture the potential of the rich archive of EO data in Australia is Digital Earth Australia (DEA) [1]. "DEA is a series of data structures and tools which organise and enable the analysis of large EO satellite data collections" [1] and builds on the success of the Australian Geoscience Data Cube (AGDC) [2]. It aims to provide open access to an analysis platform containing long-term and consistently processed satellite EO datasets for the Australian continent for users across the sectors of business, research and government.

"The surface reflectance (SR) product is seen as the fundamental starting point for many analyses and provides the underlying data for all other DEA products at this time" [1]. To provide confidence in the data from these DEA SR products, research and development was undertaken in Australia to develop a national framework for the validation of these data. Specifically, these DEA SR products were comprehensively validated to provide a standardised well calibrated dataset for the Australian EO user community. This paper reports on the approach developed for the continental-scale validation of the DEA SR product using field-based measurements that were acquired near-synchronous to satellite observations over multiple sites across Australia. As part of this work we developed a set of site selection criteria and selected 16 standardise site where a total of 59 acquisitions were made. In order to achieve consistency between field operators, sites and acquisitions, we also developed a field measurement guidebook to standardise the field measurements. In parallel, we also developed a set of instrument calibration protocols and, data analysis methods and tools.

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