

# Field-based Validation of the Digital Earth Australia Sentinel-2 Surface Reflectance Product

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## Abstract

The effective utilisation and uptake of long-term records of environmental Earth observations, by both government and private sectors, requires Analysis Ready Data (ARD), processed to a minimum set of requirements and organised into a form that allows immediate analysis with a minimum of additional user effort and interoperability both through time and with other datasets. Geoscience Australia's Digital Earth Australia (DEA) initiative, funded by the Australian Government, is a unique digital infrastructure and analysis platform that supports the effective utilisation of a range of Earth observation (EO) data collections that span multiple decades.

The DEA Sentinel-2 Surface Reflectance (SR) dataset is a foundational ARD product that enables dense time-series analyses and rapid generation of other downstream information products. Validation of the satellite derived surface reflectance by conventional ground-based observations is critical to characterise uncertainties that determine its fitness for purpose and also important for downstream product development. During 2018, a continental scale validation of the DEA Sentinel-2 SR product was undertaken by coordinated field teams from multiple organisations across Australia. Around 40 Sentinel-2 overpasses were validated using near synchronous field-based measurements at multiple field sites across Australia. The validation exercise applied best practice field measurement protocols, including field instrument calibration, sampling strategy and approach for post-collection processing and management of field spectral data. This paper reports on the methodology and results of field validation of the DEA surface reflectance product from Sentinel-2 acquisitions over Australia during 2018-19. The collaborative national field data collection campaign in Australia including the identification of permanent field sites, to support the validation effort within the international EO community is expected to serve as a model for coordinated ongoing validation of SR derived from a range of EO platforms at continental to global scales.

**Keywords** - Product Validation