



Australian Government
Geoscience Australia



Agency Report - Geoscience Australia

Adam Lewis, Medhavy Thankappan



Digital Earth Australia

Structured time-series



*A fundamental requirement is: EO data that have been 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 ...**Analysis Ready Data***

Terria-Cube Prototype

Version: 2018-05-23T18:08:21

Search for locations

Add data

DATA SETS [2] Remove All

Sentinel-2-NRT S2B-MSI ard (NBAR-T)

Zoom To Extent About This Data Split Remove

Opacity: 100 %

Left Both Right

Time:

18/04/2018, 10:00:00

Style False colour SWIR, NIR and green

Sentinel-2-NRT S2A-MSI ard (NBAR-T)

Zoom To Extent About This Data Split Remove

Opacity: 100 %

Left Both Right

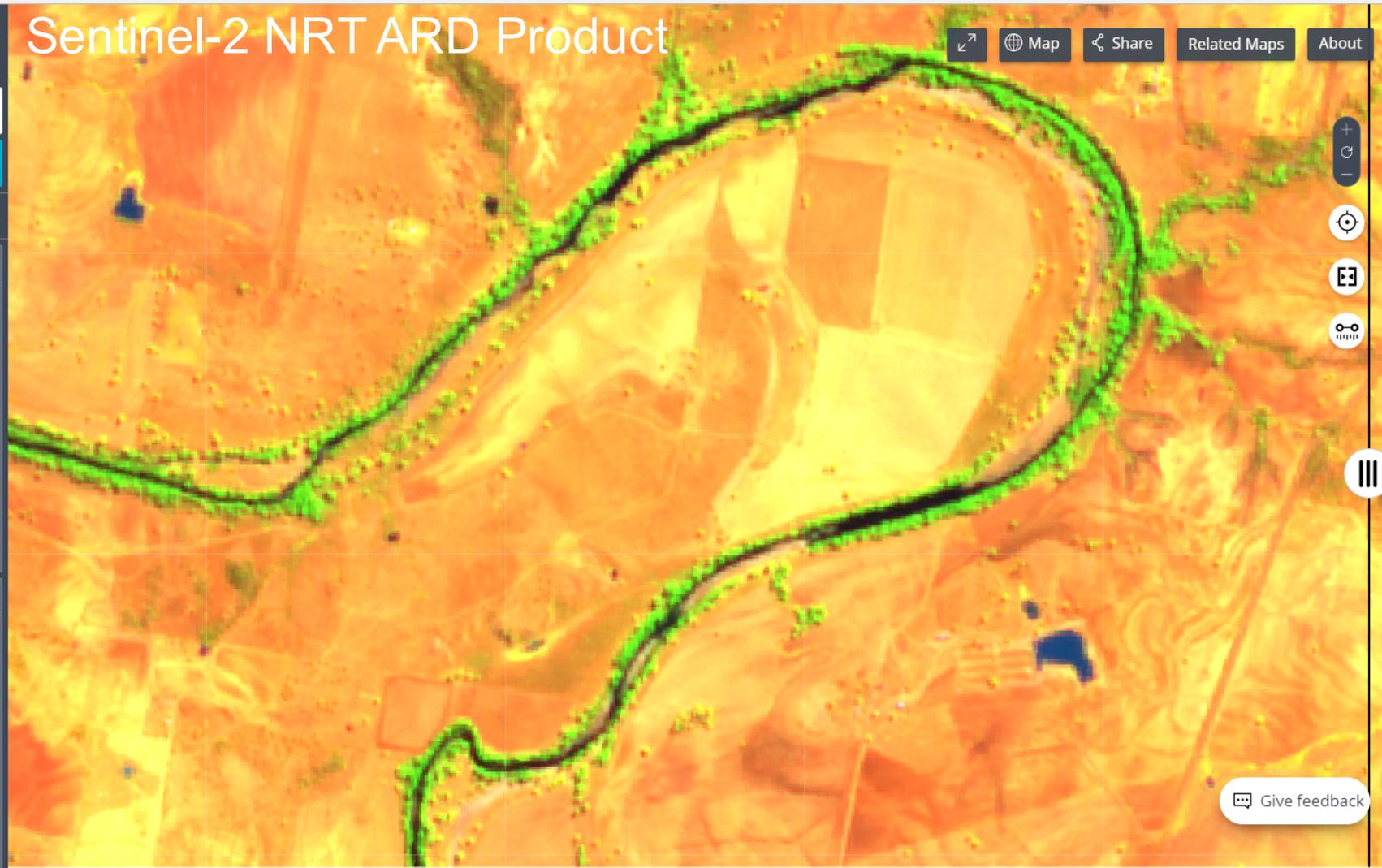
Time:

23/04/2018, 10:00:00

Style False colour SWIR, NIR and green

Sentinel-2 NRT ARD Product

Map Share Related Maps About



Map navigation controls including zoom in (+), zoom out (-), home, full screen, and a menu icon.

Give feedback

Disclaimer: This map must not be used for navigation or precise spatial analysis. Data61 | Leaflet | Geoscience Australia, AusHydro Contributors (NSW Department Land and Property Information, Queensland Department of National Resources and Mines, Victorian Department of Environment, Land, Water and Planning, South Australia Department for Environment, Water and Natural Resources, Tasmanian Department of Primary Industries, Parks, Water and Environment and Western Australian Land Information Authority (Landgate)), OpenStreetMap (© OpenStreetMap contributors), Natural Earth Data Australian Bureau of Statistics, Attorney General's Department (Territories of Australia)

Sentinel-2-NRT S2B-MSI ard (NBAR-T) 18/04/2018, 10:00:00 Lat 29.55190°S Lon 150.38597°E Elev 300 m

Timeline navigation bar with play, stop, and back/forward arrows. Dates: 16/04/2018, 23/04/2018, 30/04/2018, 07/05/2018, 14/05/2018, 21/05/2018.

Sentinel-2 NRT ARD Product

Search for locations

Add data

DATA SETS [2] Remove All

Sentinel-2-NRT S2B-MSI ard (NBAR-T)

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18/04/2018, 10:00:00

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False colour SWIR, NIR and green

Sentinel-2-NRT S2A-MSI ard (NBAR-T)

Zoom To Extent About This Data Split Remove

Opacity: 100 %

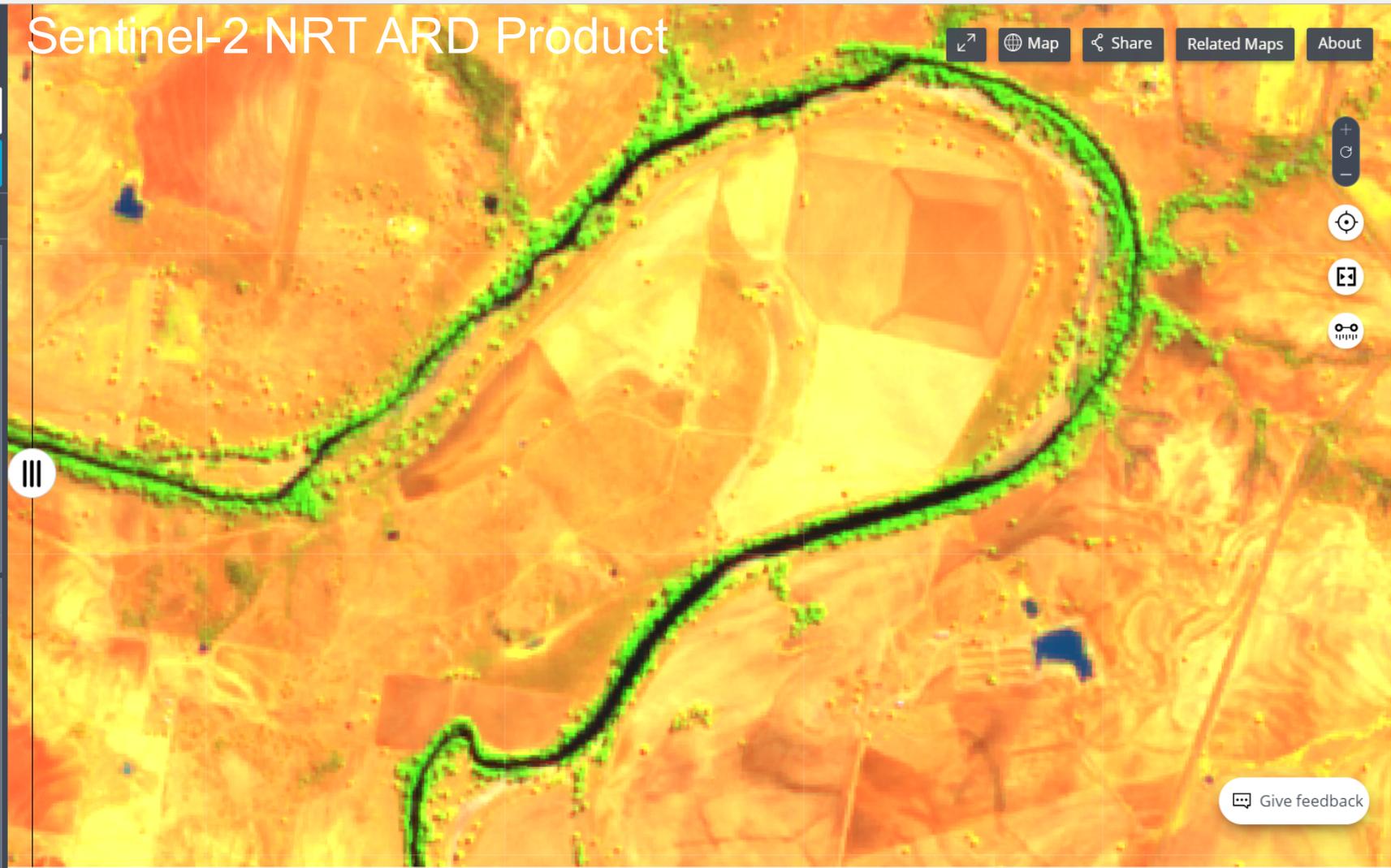
Left Both Right

Time:

23/04/2018, 10:00:00

Style

False colour SWIR, NIR and green



Disclaimer: This map must not be used for navigation or precise spatial analysis. Data61 | Leaflet | Geoscience Australia, AusHydro Contributors (NSW Department of Land and Property Information, Queensland Department of National Resources and Mines, Victorian Department of Environment, Land, Water and Planning, South Australia Department for Environment, Water and Natural Resources, Tasmanian Department of Primary Industries, Parks, Water and Environment and Western Australian Land Information Authority (Landgate)), OpenStreetMap (© OpenStreetMap contributors), Natural Earth Data Australian Bureau of Statistics, Attorney General's Department (Territories of Australia).

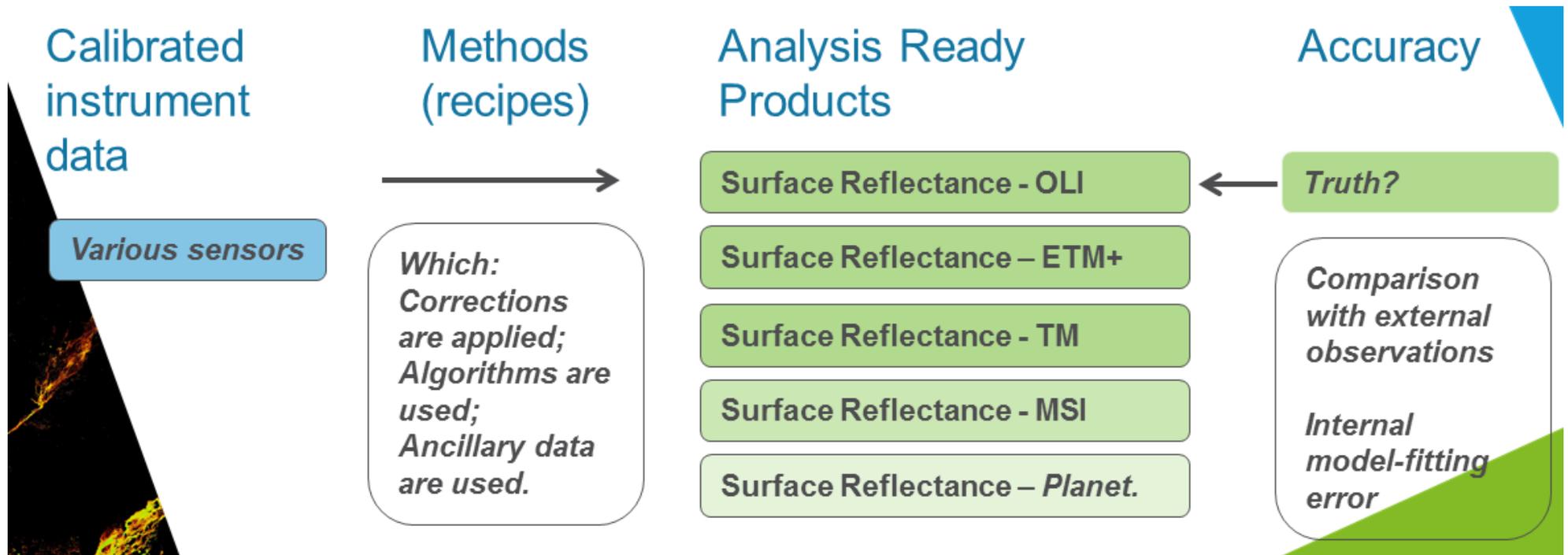
Sentinel-2-NRT S2B-MSI ard (NBAR-T) 18/04/2018, 10:00:00 Lat 29.54738°S Lon 150.36542°E Elev 300 m



ARD products need validation

- Field measurements are important for the on-going development of rigorous ARD products that are validated
- Validation is needed to:
 - Verify results and make comparisons
 - Direct effort towards key areas for improvement
 - Characterise product uncertainty
 - Model the effects on down-stream products
 - Develop better products
- The DEA program has an ARD team with calibration and validation capability, and supports participation in the ARD agenda driven by CEOS (LSI-VC, WGCV, WGISS)

Example ARD products for validation



PFS Process - CARD4L

Focus of validation is not *how* the corrections are made, but *how effective* the corrections are

Continental scale validation of surface reflectance

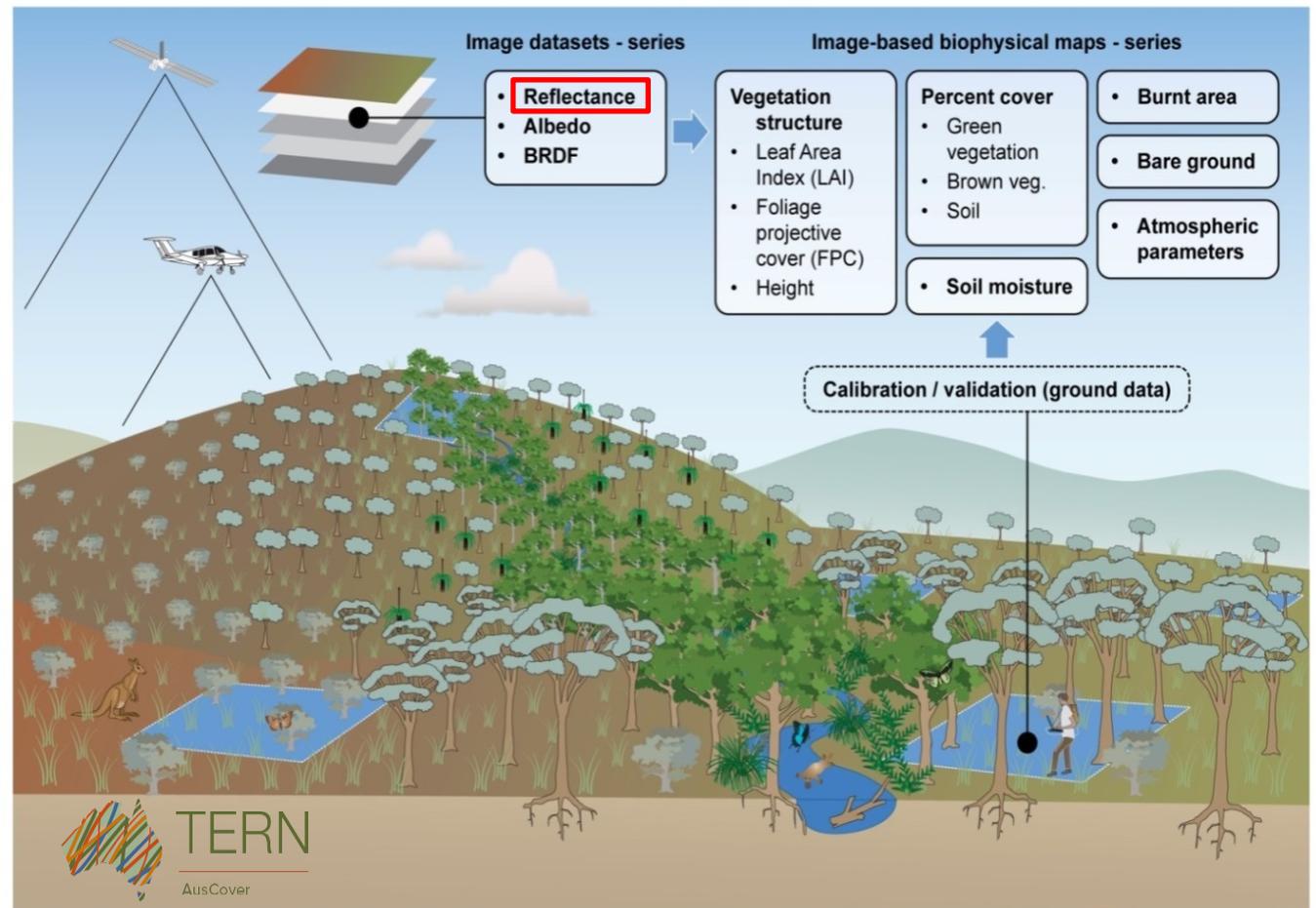
Field data collection coordinated by CSIRO under a Project Agreement, funded through Digital Earth Australia (DEA)

Two phases of field data acquisition, near-coincident with satellite overpass (L8, S2a, S2b)

Good practice protocols for coordinated multi-temporal data acquisition by multiple teams

Data collection commenced in March 2018 and continues to Dec 2018

Field data to be managed as a national collection

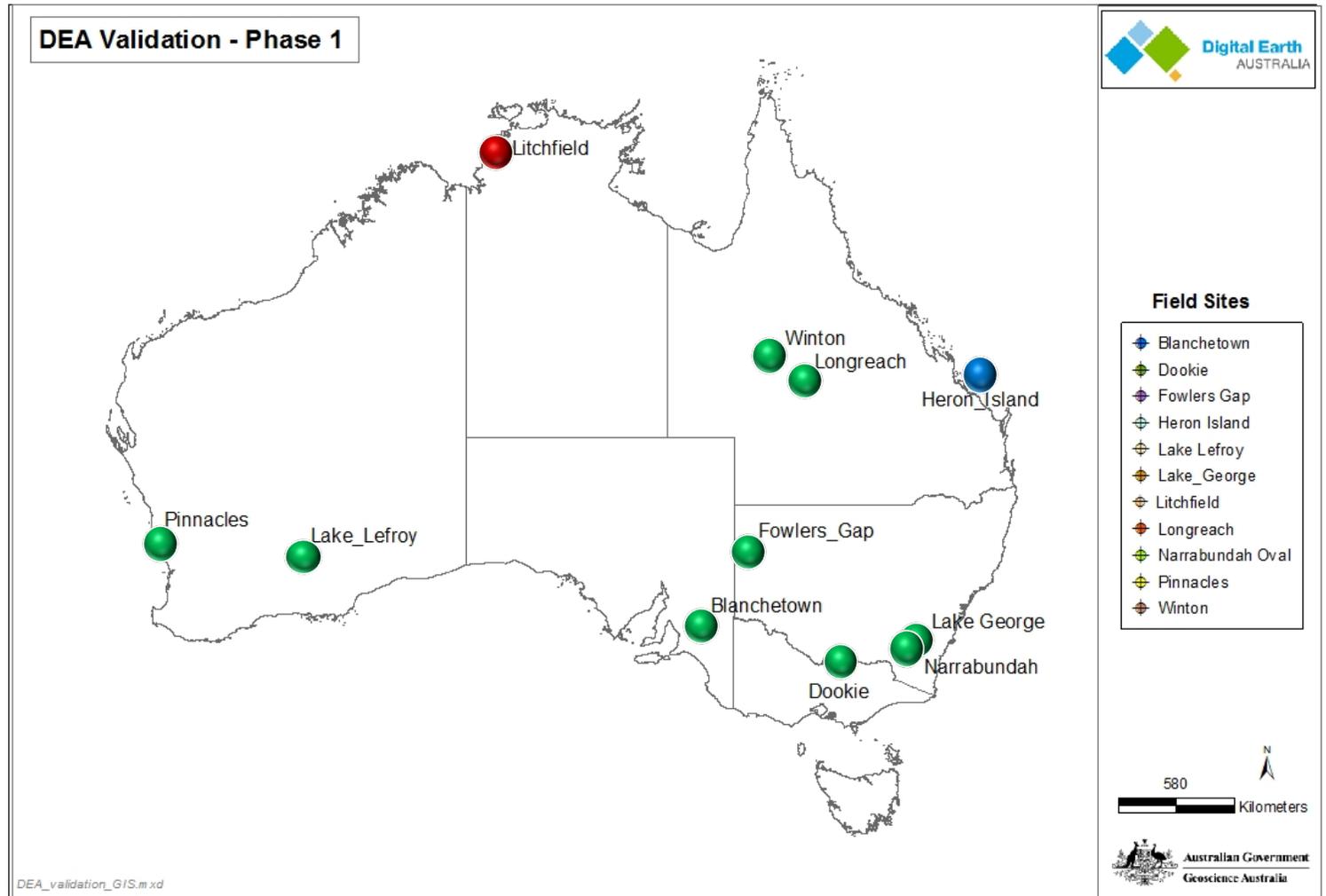


SR Validation - Collaborators

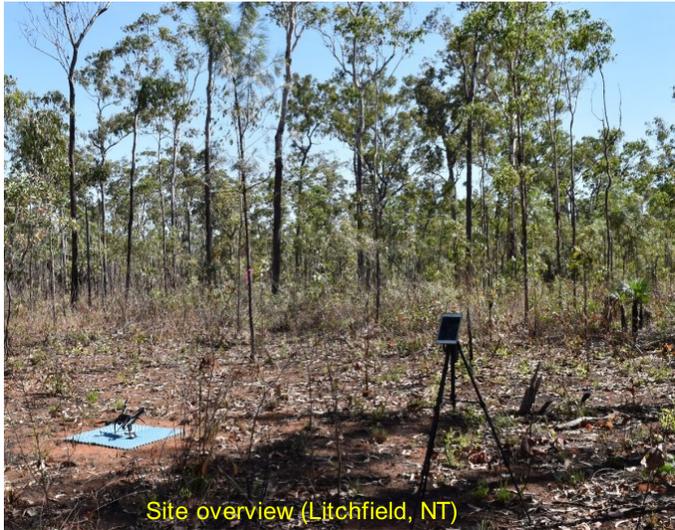


Sites

Surface type



Drone based validation (Litchfield, NT)



Miniature Spectrometer

Drone based spectral data collection trial over Litchfield site synchronous with a Sentinel-2a overpass as a preparatory exercise for Phase 2



DEA Validation Workshop Brisbane 16-17 August 2018

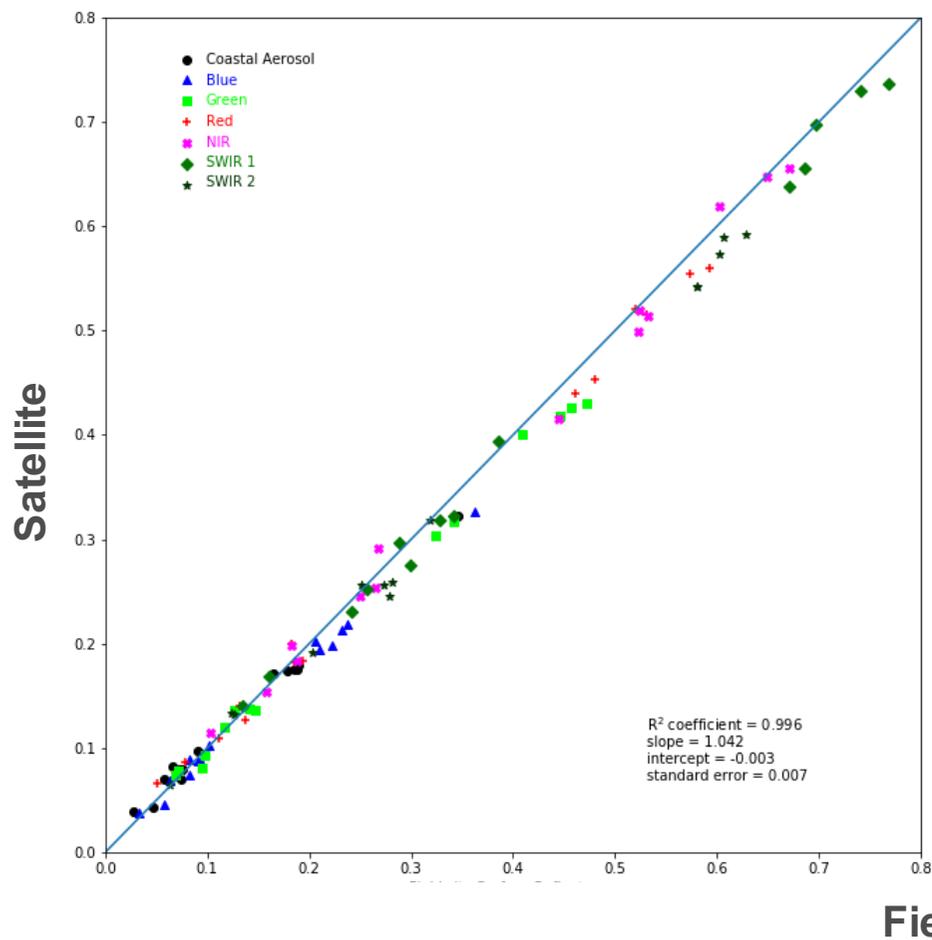


Left to right : Dale Hughes (ANU), Arko Lucieer (Uni Tas), Ian Lau (CSIRO), Lola Suarez (Uni Melb), Stuart Phinn (Uni Qld), Guy Byrne (GA), Ken Clarke (Uni Adl), Kurt Thome (NASA), Stefan Maier (Maitec), Tim Malthus (CSIRO), Andrew Walsh (GA), Cindy Ong (CSIRO), Lan-Wei Wang (GA), Fuqin Li (GA), Laurie Chisholm (Uni Wol), Peter Feams (CSIRO), and Medhavy Thankappan (GA)

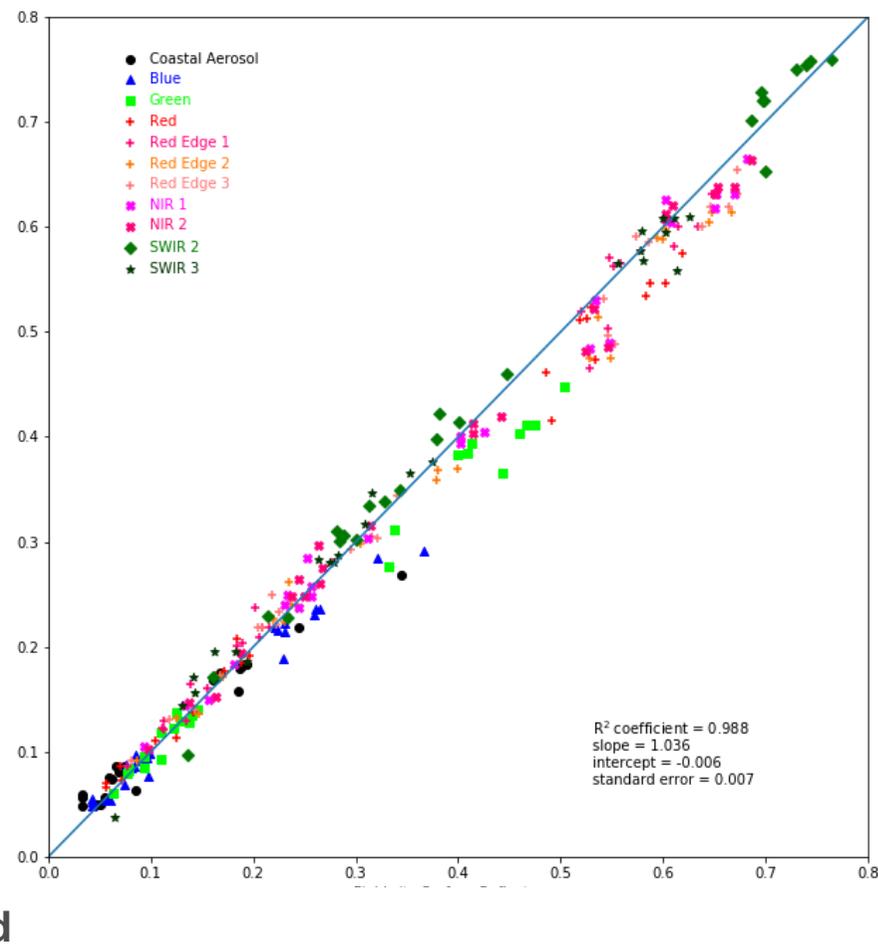


Overall comparison for all sites

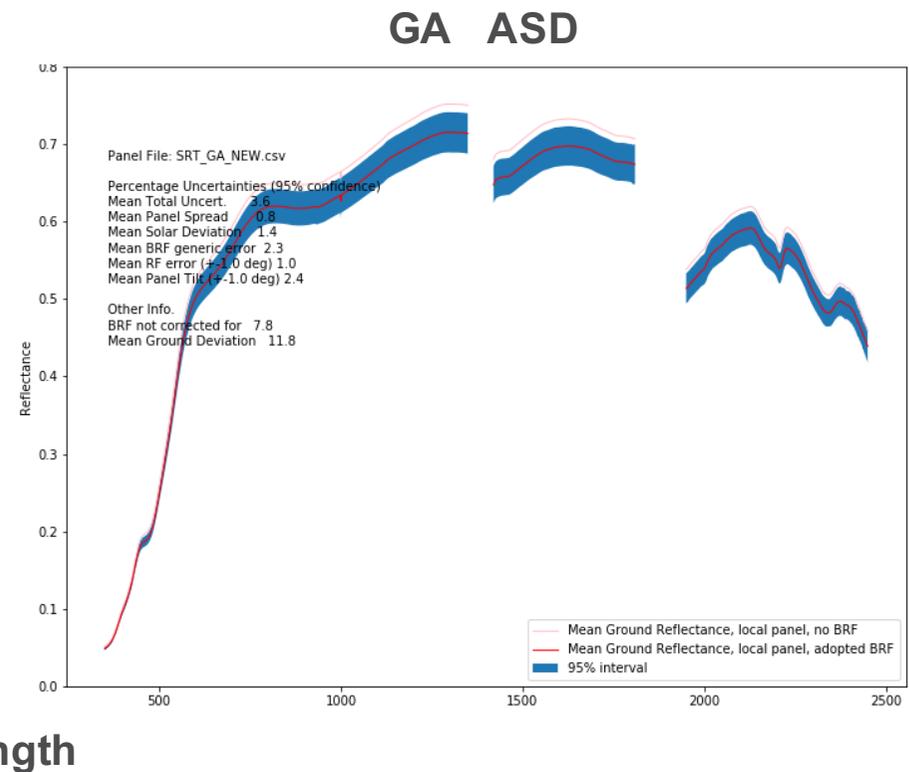
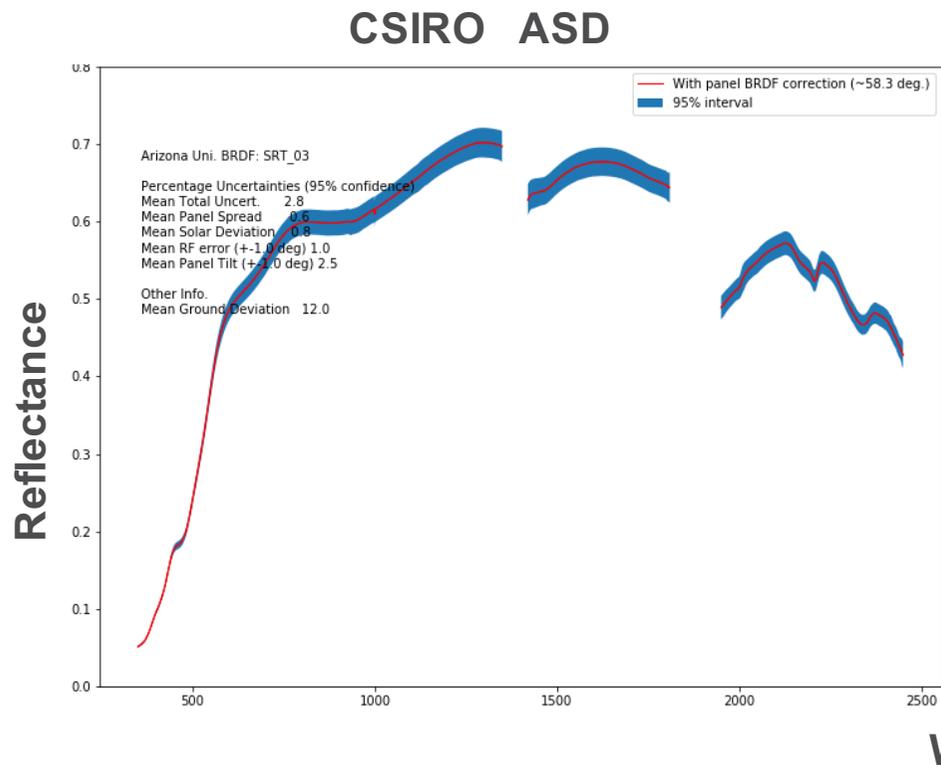
Landsat 8



Sentinel 2 A/B



Quantifying uncertainty : field measurements

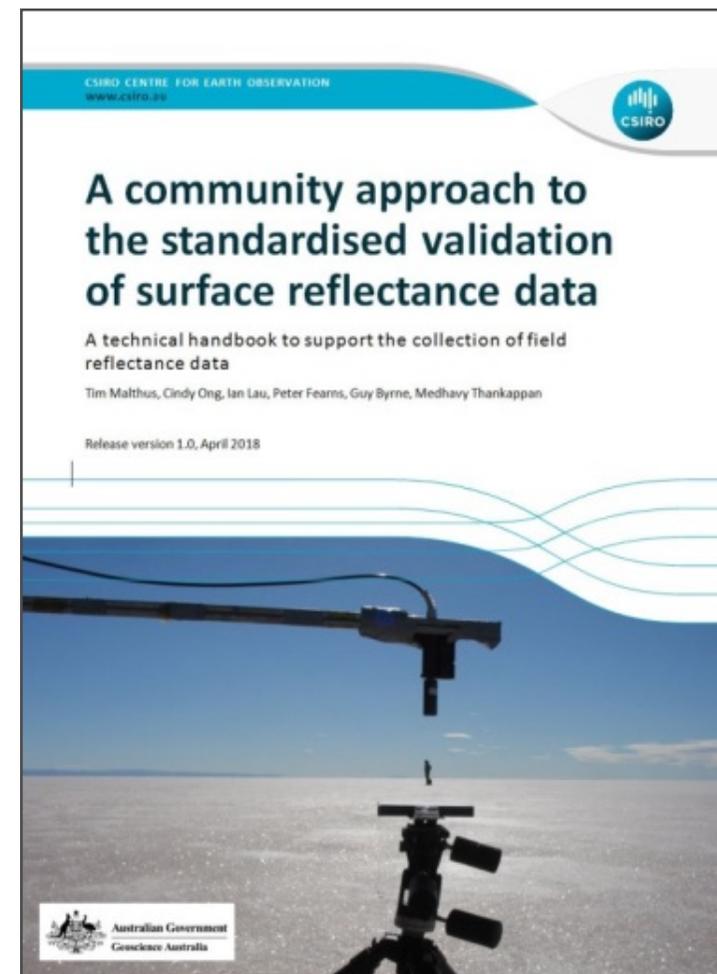


Surface reflectance validation on WGCV work plan

Importance of surface reflectance validation as precursor

Continental SR validation protocols in Australia for global adoption

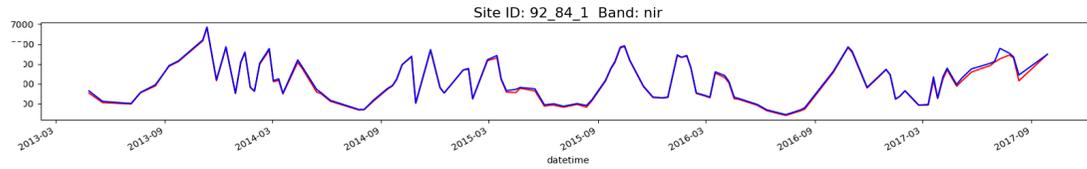
Involvement of WGCV subgroups such as LPV and IVOS



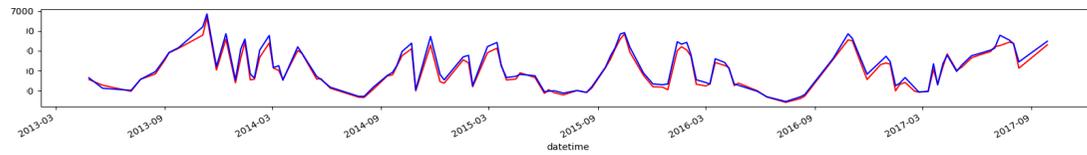
ARD intercomparison tool



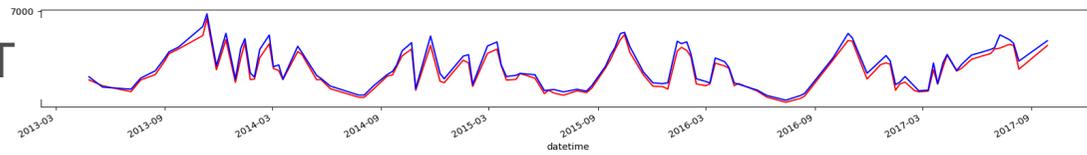
LAM



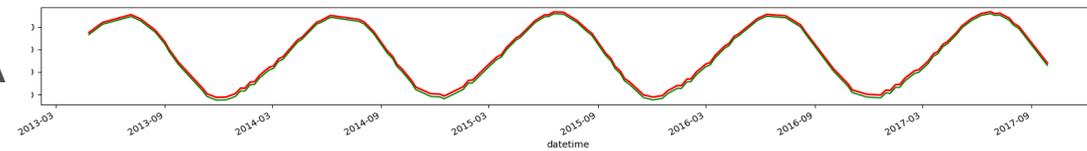
NBAR



NBART



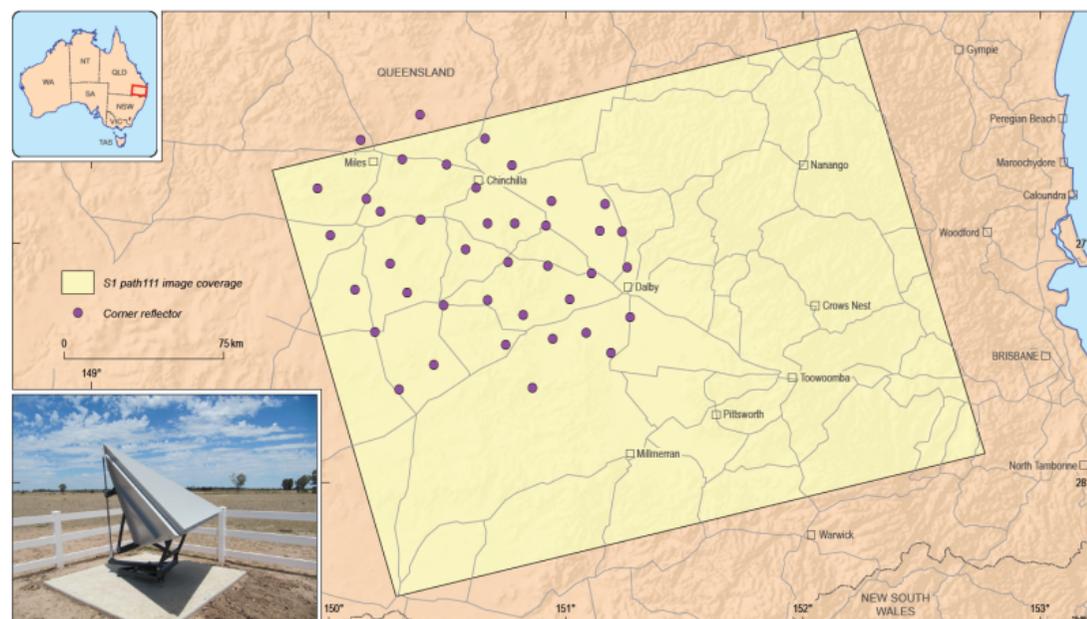
SZA



— USGS — GA

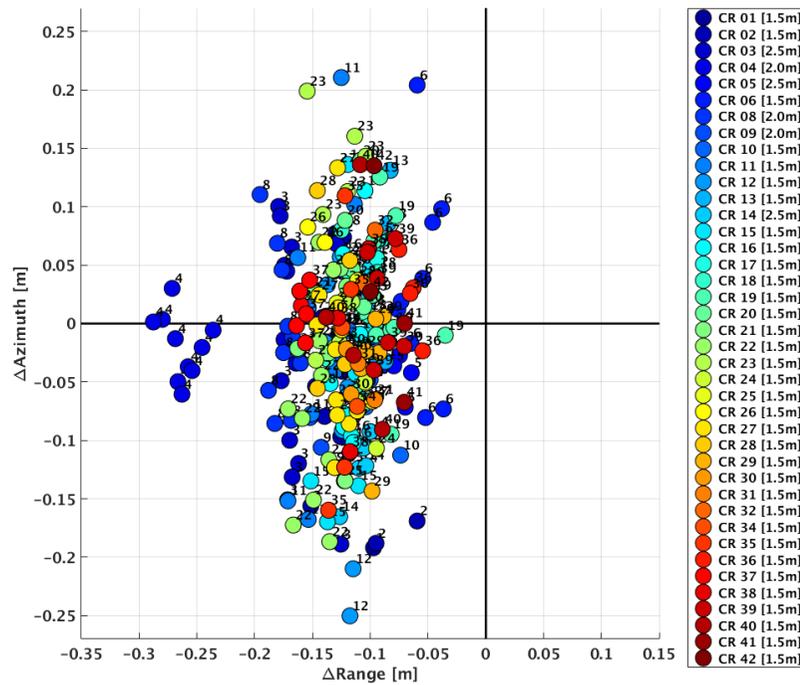
SAR calibration validation and ARD

40 permanently deployed corner reflectors in Queensland (Surat Basin) supporting routine Sentinel-1 radiometric and geometric cal / val and other SAR missions (FRM4SAR)

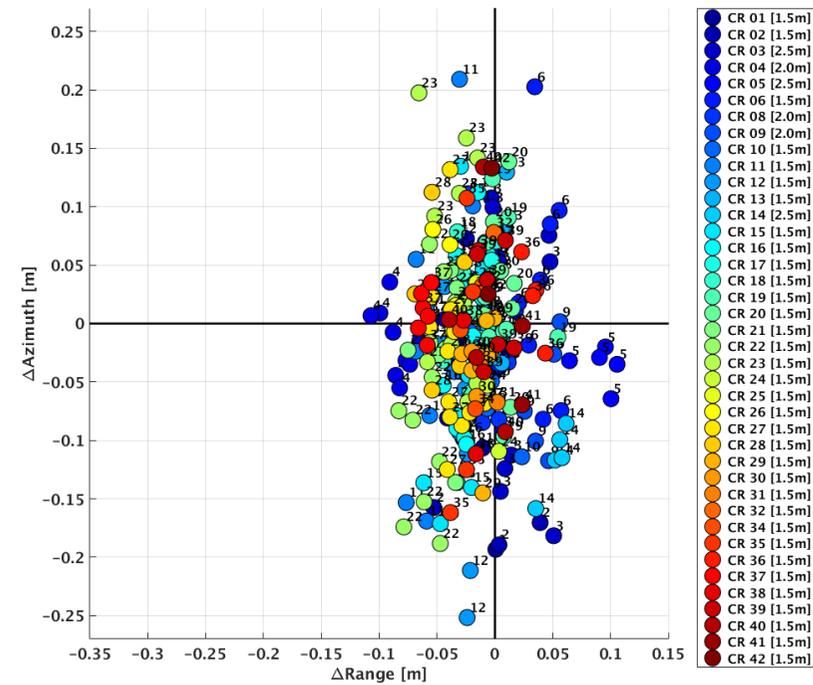


Corner Reflectors in the Surat Basin QLD

Improving absolute location error



No mount model adjustment



With mount model adjustment

TanDEM-X ScanSAR products from 2017 04 18 to 2017 09 08 - 7 passes in total

Re-survey of Queensland CR array

- Original survey measured this point
- CR apex is required for geometric cal/val
- All 40 sites re-surveyed in May/June 2018
- New CR apex positions by early 2019.
- Average range offsets:

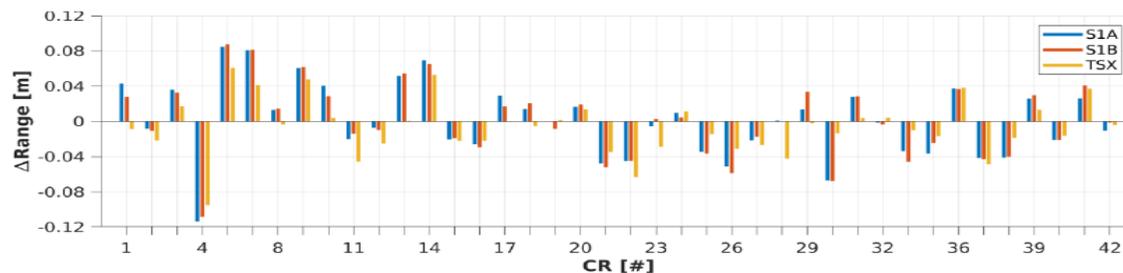
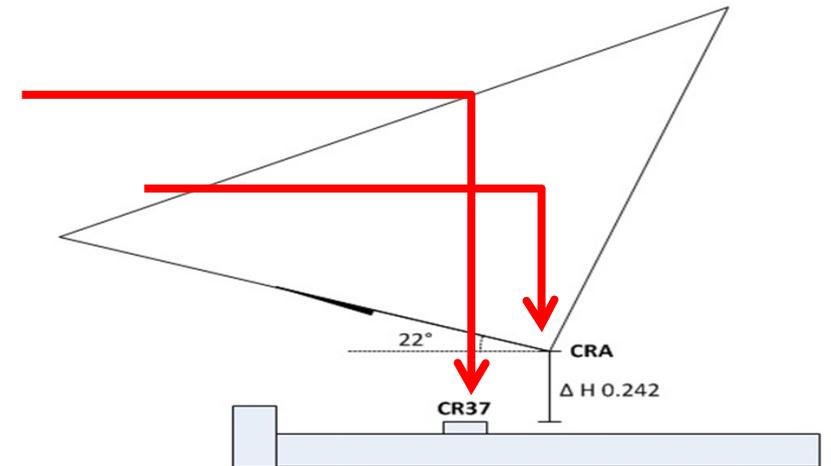


Figure 23: Average range offset for the individual CRs computed from range residuals of the experimentally calibrated Sentinel-1 IW data (see Table 8) and the TerraSAR-X ScanSar data (range results of Figure 13).

Results courtesy C. Gisinger, DLR

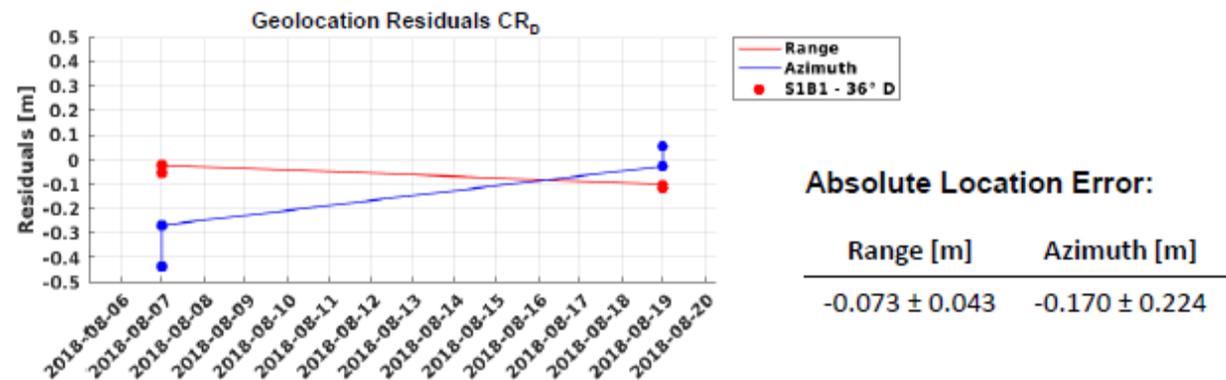


New calibration CRs at Yarragadee Geodetic observatory

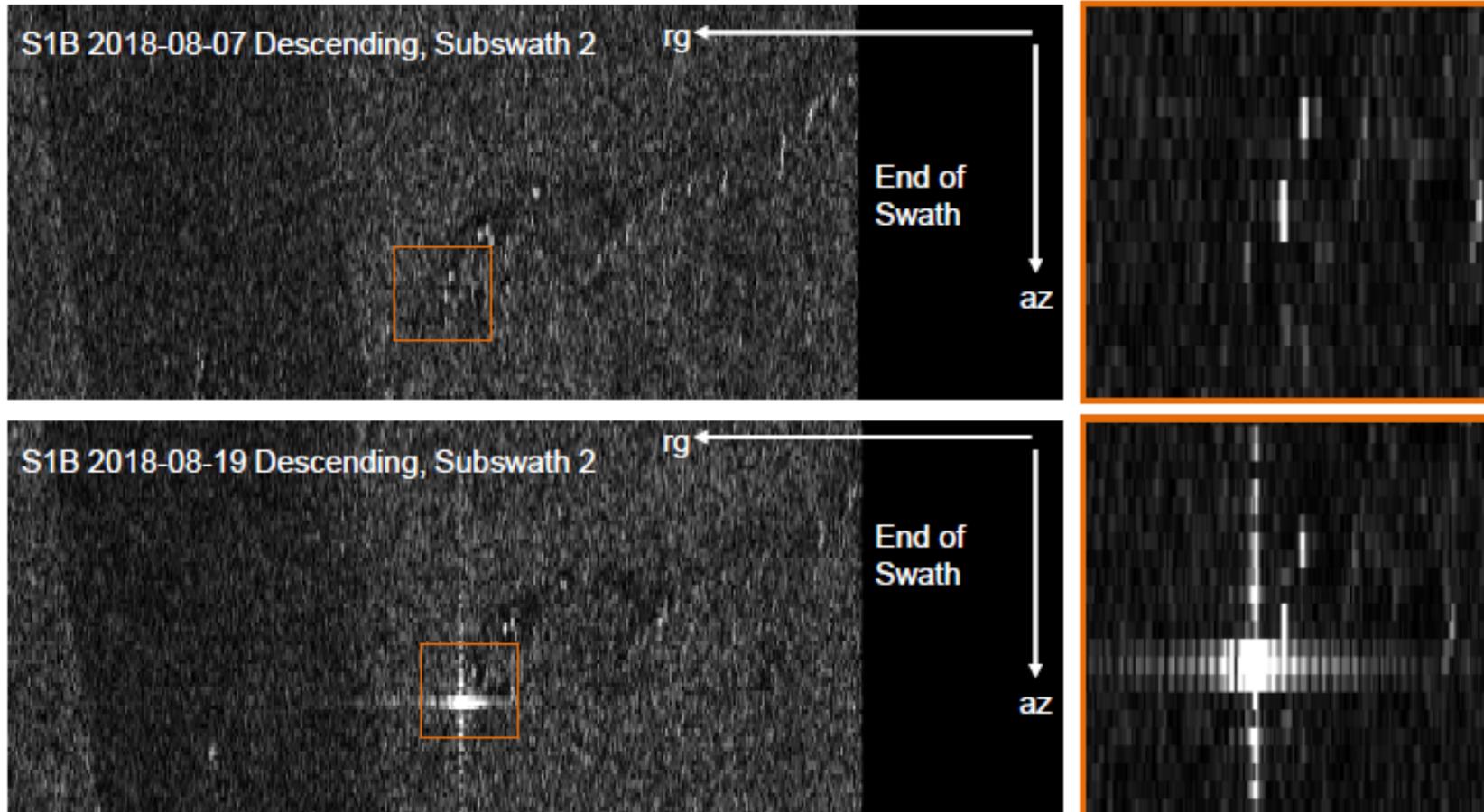
Yarragadee is one of the few fundamental geodetic stations that co-locates all four geodetic techniques (GNSS, VLBI, SLR, DORIS)

In August 2018 the station was equipped with two 1.5m trihedral CRs permanently mounted with one CR facing east and the other CR facing west to support both ascending and descending passes Successful

Sentinel-1B range and azimuth geolocation analysis using the coordinates obtained with TerraSAR-X



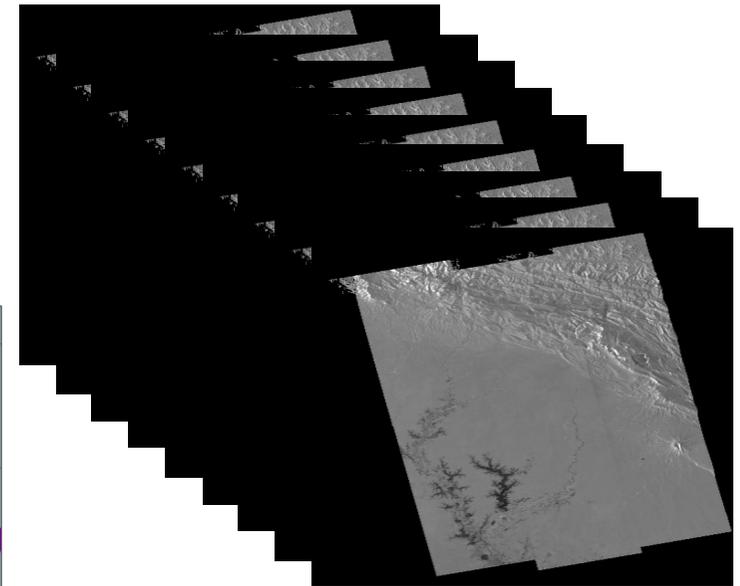
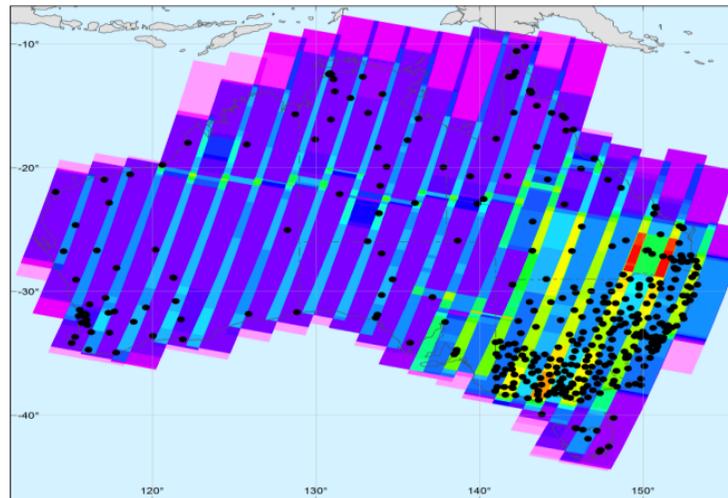
Calibration CRs at Yarragadee - Sentinel-1B



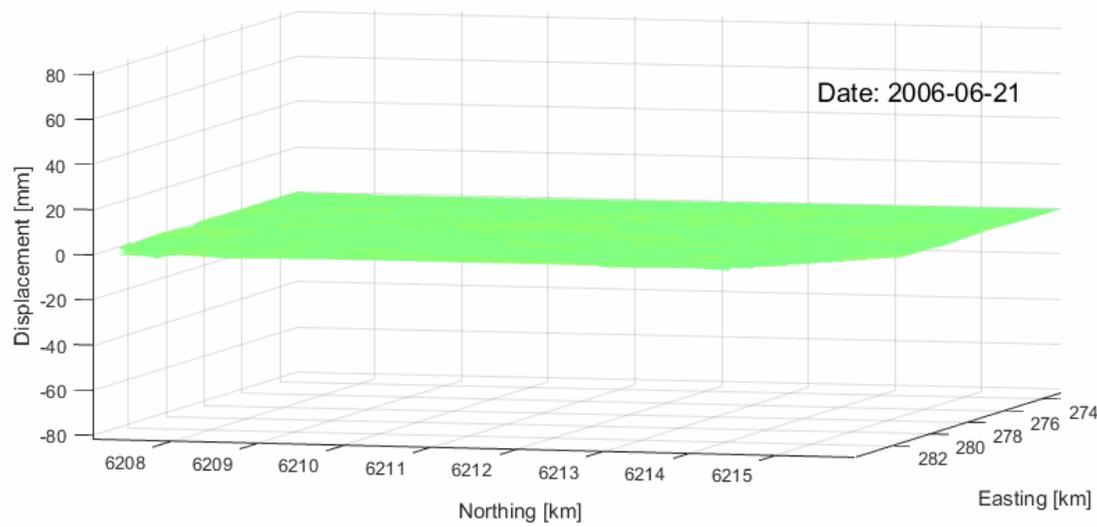
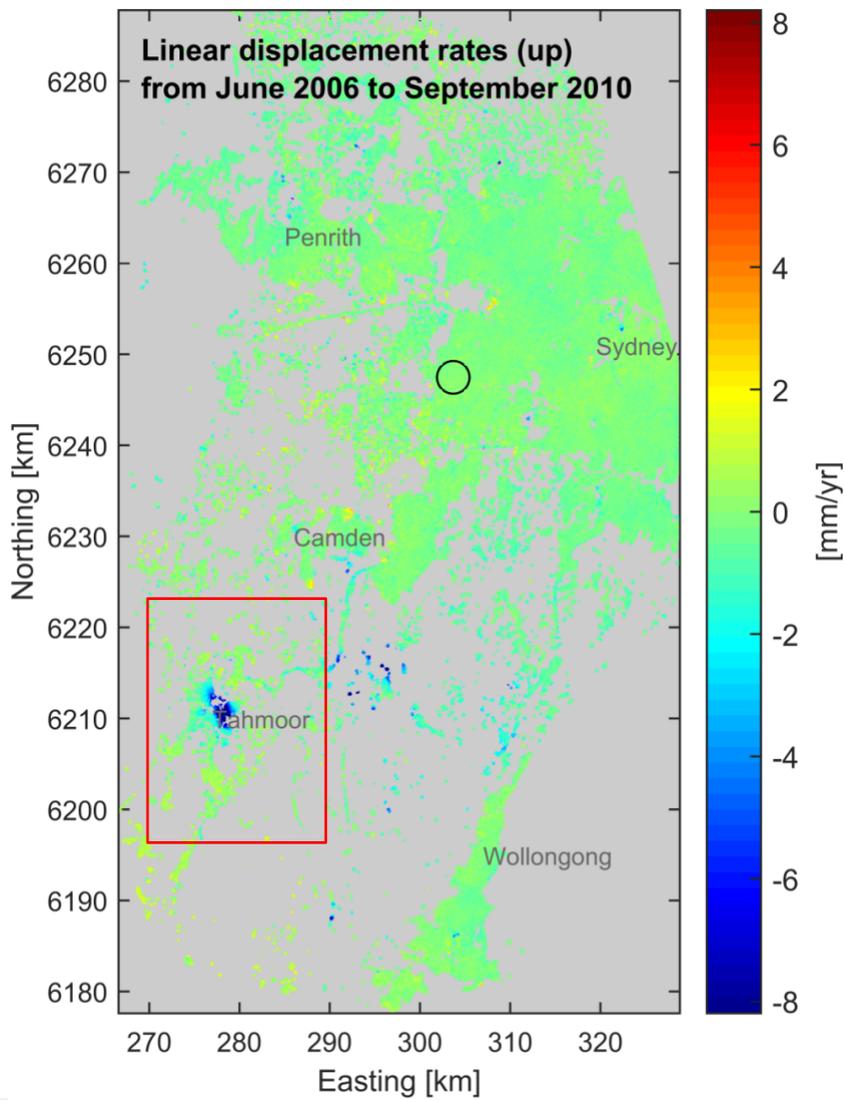
Operational ARD processing for InSAR applications

- Scaling up processing of Sentinel-1 SAR ARD data in Australia through a DEA InSAR Project
- As part of the project GA is contributing to definitions for InSAR ARD products, working with LSI-VC:
 - Interferogram
 - Coherence

Workflow to be implemented for the Australian State of Victoria and validated for scaling up to a national product

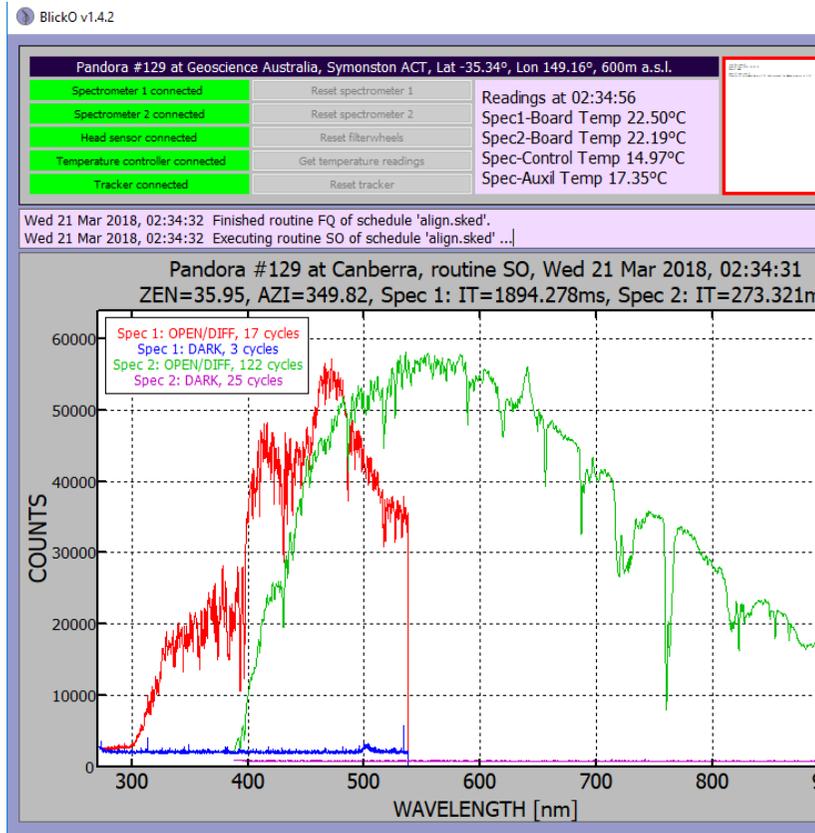


Ground deformation time-series



Hosting ESA Pandora instruments

Pandora spectrometers fill gap in satellite validation network



by Kate Lehane - 3 hours ago



GA has successfully installed and deployed two Pandora spectrometers on behalf of the [European Space Agency](#). The instruments fill a key gap in southern hemisphere data for the [Pandonia network](#), a ground-based instrument network for monitoring air pollution and satellite validation. Data are now being generated by the two spectrometers, and can be accessed through the [network servers](#). [Read the full story on our website](#).

Successful execution of this project was achieved across GA through close collaboration between the National Earth and Marine Observation Branch in the Environmental Geoscience Division, and the Observatories and Science Support Branch in the Community Safety and Earth Monitoring Division.

GA operating two Pandoras supporting

Upcoming meetings

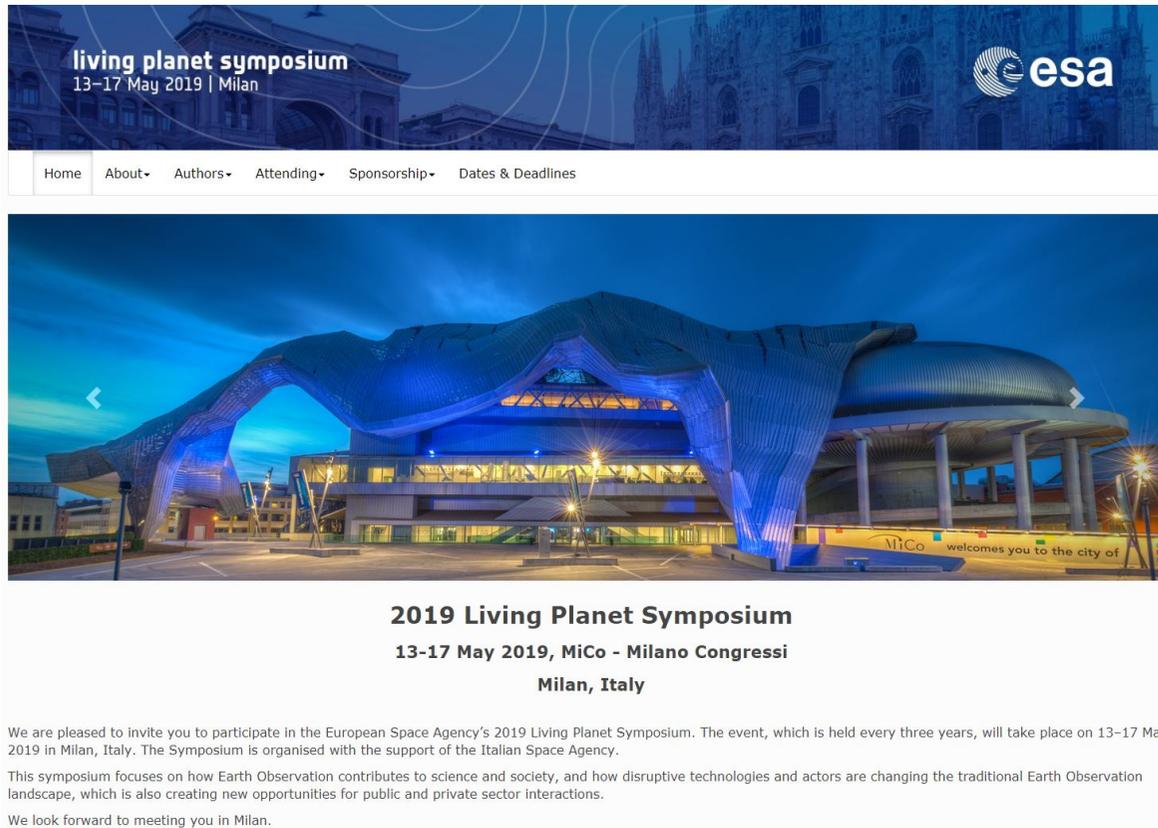
Attending the LSI-VC6 meeting JRC Ispra Italy 5-7 Sep 2018

Attending the JACIE + ECCOE workshops 17-20 Sep 2018

Support for hosting IVOS 31 at Perth Australia – 26 March 2019

Living Planet Symposium May 2019, Milan

ARD session at Living Planet Symposium 2019



living planet symposium
13-17 May 2019 | Milan

esa

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2019 Living Planet Symposium
13-17 May 2019, MiCo - Milano Congressi
Milan, Italy

We are pleased to invite you to participate in the European Space Agency's 2019 Living Planet Symposium. The event, which is held every three years, will take place on 13-17 May 2019 in Milan, Italy. The Symposium is organised with the support of the Italian Space Agency.

This symposium focuses on how Earth Observation contributes to science and society, and how disruptive technologies and actors are changing the traditional Earth Observation landscape, which is also creating new opportunities for public and private sector interactions.

We look forward to meeting you in Milan.

LPS 2019: Session on Analysis Ready Data

The ARD session will consolidate the current state of knowledge, uptake and benefits of global efforts towards producing Analysis Ready Data (ARD) for Earth observations across the optical, thermal and microwave domains.

Potential topics for this session would include: maturity of ARD products and frameworks; ARD methods, and the availability of ARD products from government and commercial sources; comparison of multi-sensor ARD products; validation of ARD products; and user-uptake of ARD.

You are invited to submit abstracts on these ARD related topics through the LPS 2019 website by **11 November 2018**:

<https://lps19.esa.int/QuickEventWebsitePortal/living-planet-symposium-2019/website>



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