



Geoscience Australia Report on Cal/Val Activities

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Geoscience Australia

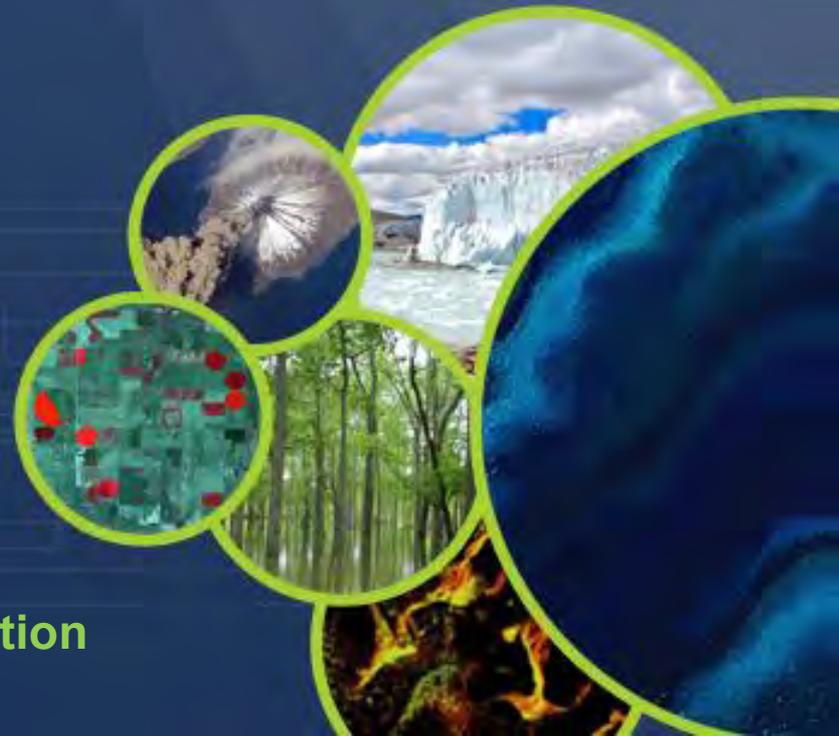
Agency Reports - 1

WGCV Plenary # 40

Canberra

March 14-18, 2016

Working Group on Calibration and Validation





Calibration / Validation

- Ground based infrastructure
- EO Data Calibration / Validation
- Australian Geoscience Data Cube

International Collaboration

- CEOS Agencies, EC, GEO, UN
- Copernicus Regional Data Hub



Aim: Improve the frequency, reliability, quality and impact of Earth observations for Australia



Geoscience Australia (working with BoM and CSIRO) continues to implement the National Earth Observations from Space Infrastructure Plan endorsed by the Government in 2013. Uses a national governance framework to coordinate and target national EO priorities, including engagement with international satellite operators, facilitating scientific collaboration, and promoting better preparation for new EO data streams.

SECURING
AUSTRALIA'S
WATER
RESOURCES

MANAGING
AUSTRALIA'S
MARINE
JURISDICTIONS

PROVIDING
FUNDAMENTAL
GEOGRAPHIC
INFORMATION

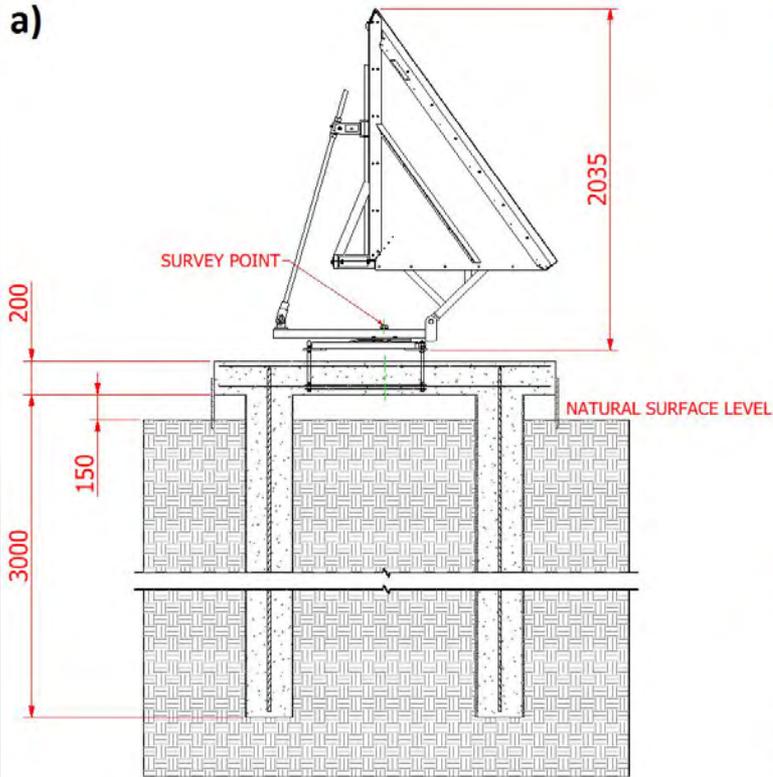
MAINTAINING
GEOSCIENCE
KNOWLEDGE
AND CAPABILITY

BUILDING
AUSTRALIA'S
RESOURCE
WEALTH

ENSURING
AUSTRALIA'S
COMMUNITY
SAFETY



An array of 40 CRs of 1.5, 2.0 and 2.5m sizes has



Sentinel-1

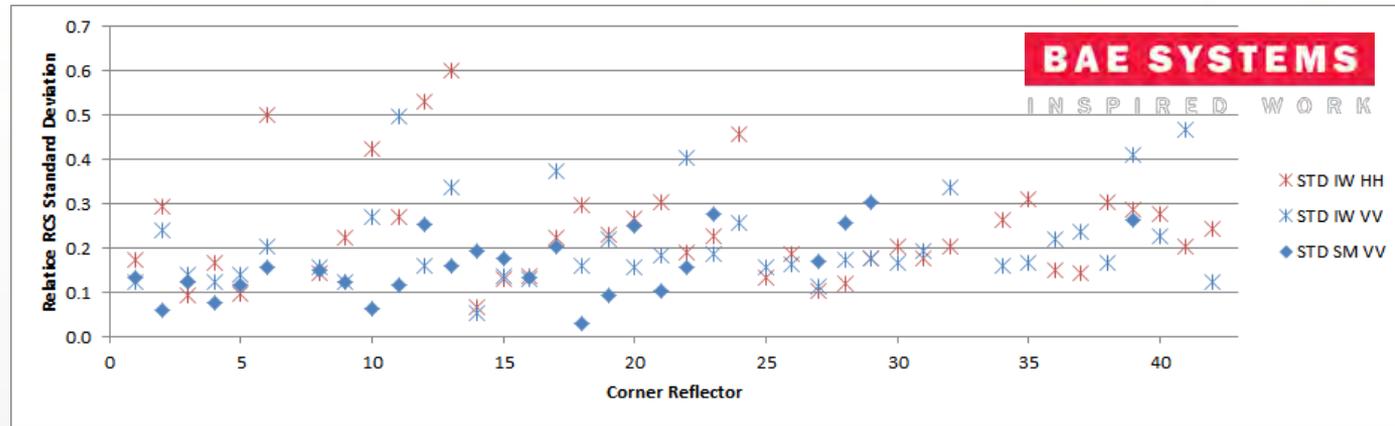
Link to paper with details of CR coordinates:

<http://www.tandfonline.com/doi/full/10.1080/08120099.2015.1040073#.Vim8lvmqpBc>

Working Group on Calibration and Validation

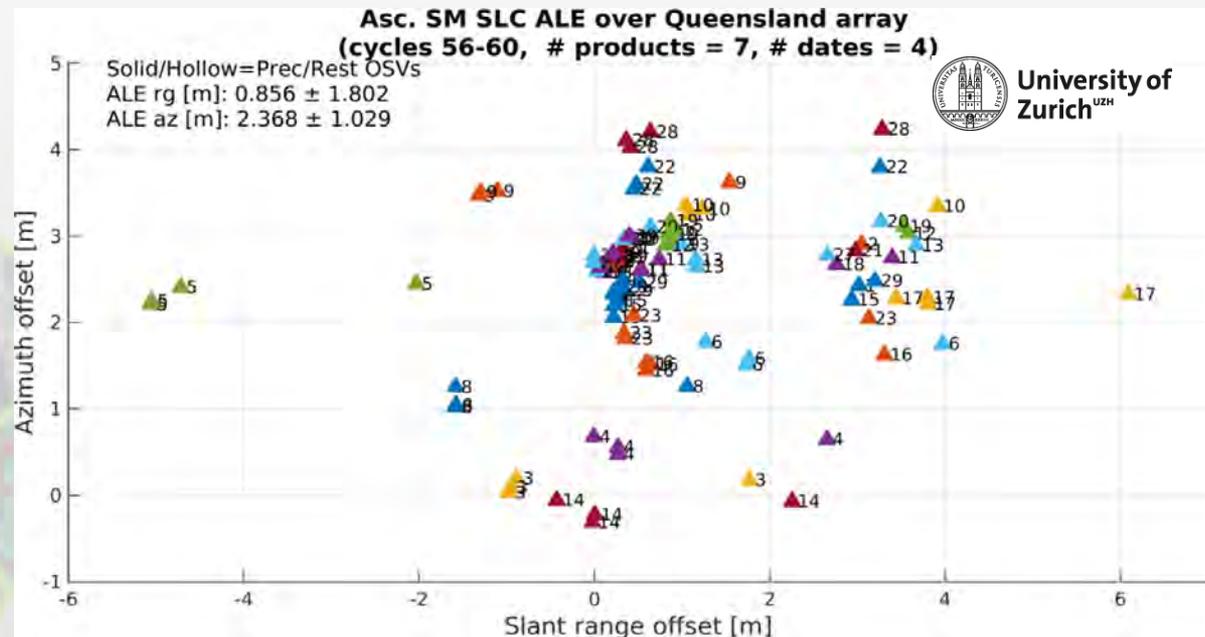


Sentinel-1A radiometric and geometric calibration using the CRs (results were reported at the CEOS SAR 2015 Workshop, ESTEC)



Radiometric stability of CRs assessed for VV and HH

Geometric calibration: IW/SM scatter similar; some observed anomalies being investigated





Australian CR array details are in the CEOS SAR Subgroup point and distributed targets database

<http://sarcv.ceos.org/targets/>

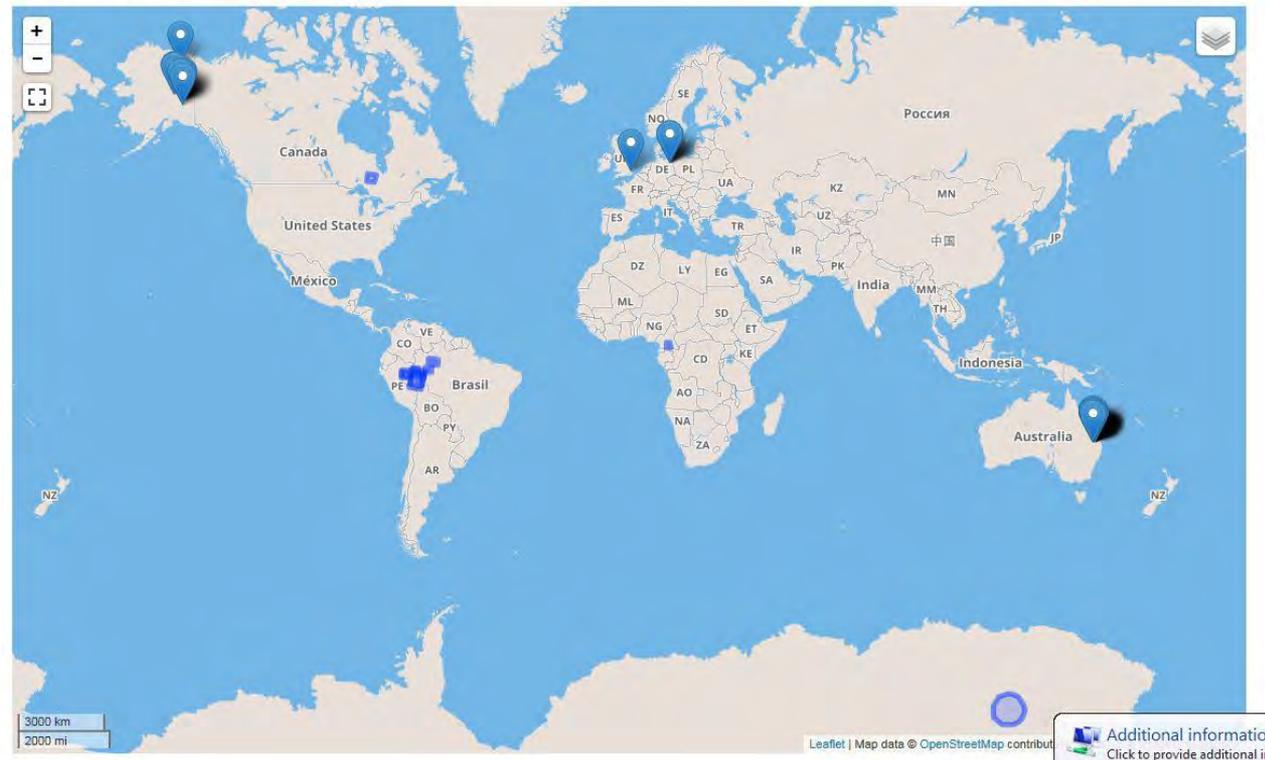


CEOS-WGCV – SAR Subgroup

The Committee on Earth Observation Satellites
Working Group on Calibration and Validation
Synthetic Aperture Radar Subgroup

Point and Distributed Targets Database

Our database currently lists 55 point and 11 distributed targets:



Additional information
Click to provide additional information



Proposal to host ground-based instruments (two Pandora Spectrometers) for the European Space Agency

Spectrometers will support calibration of optical missions through profile measurement of atmospheric constituents and sun / sky irradiance

Geoscience Australia will work with ESA and local stakeholders to install and operate the instruments



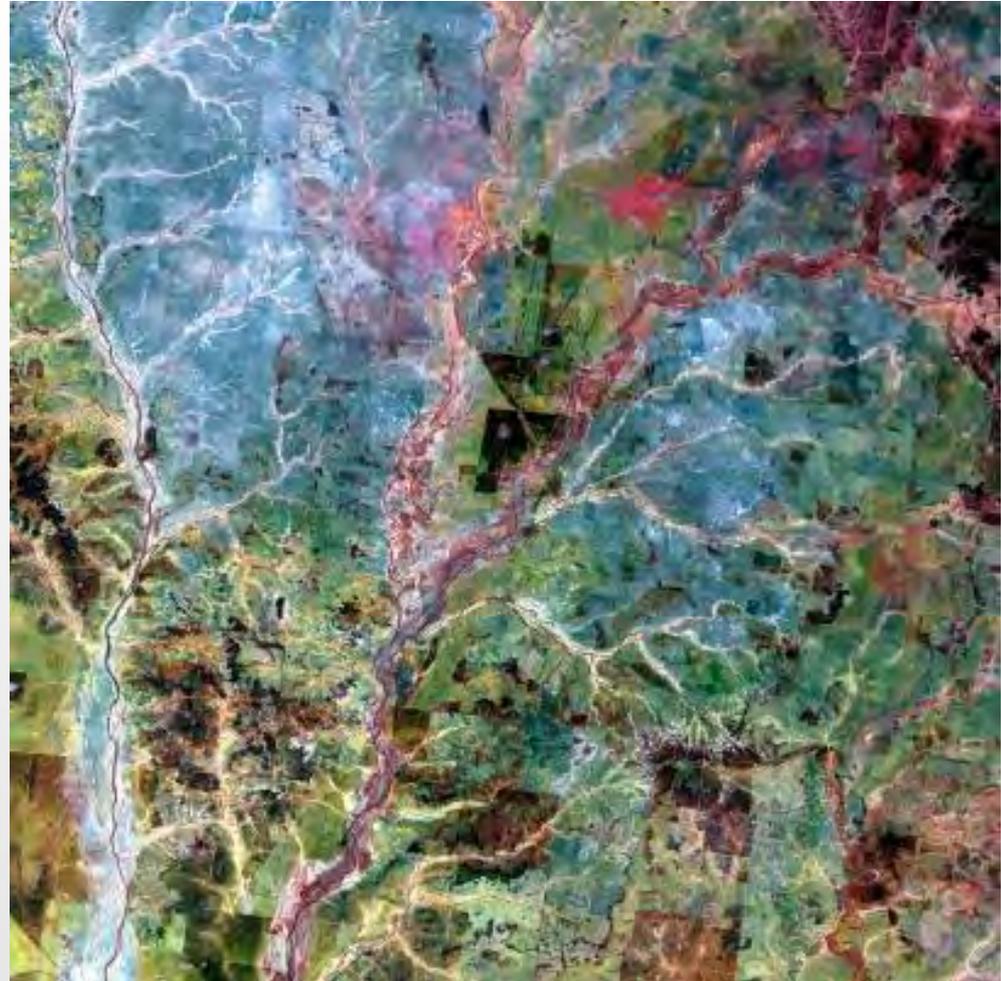


Calibration of all Landsat data collections at GA to Surface reflectance (terrain illumination correction to be rolled out soon)

Commenced work on Sentinel-2 surface reflectance products for time series analysis, including:

- atmospheric correction
- normalization to nadir view, and 45 degree solar angle
- terrain illumination correction

Work on Himawari-8 data being progressed through collaboration within the EO community

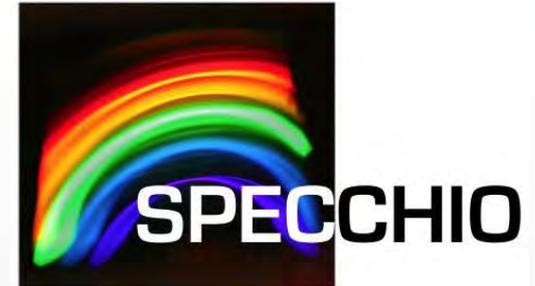




AusCover Good Practice Guidelines
(A technical handbook supporting calibration and validation activities of remotely sensed data products)



2013



GA operates a Field Spectrometer Loan Facility to support spectral field data collection

Support for TERN, IMOS work on calibration validation

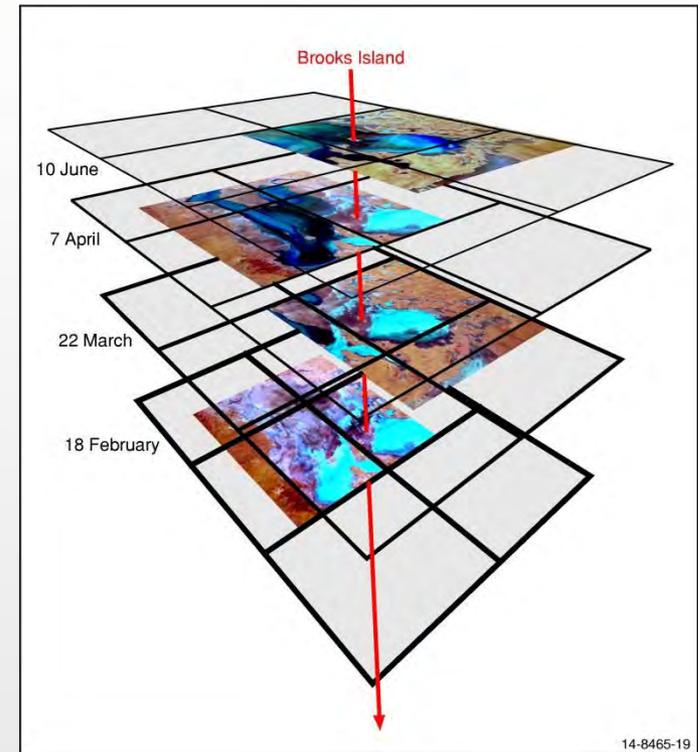




Transformational capability for data-intensive applications; collaboration between GA, CSIRO and NCI;

Earth Observation data are calibrated to surface reflectance observations and to a standard spatial grid framework

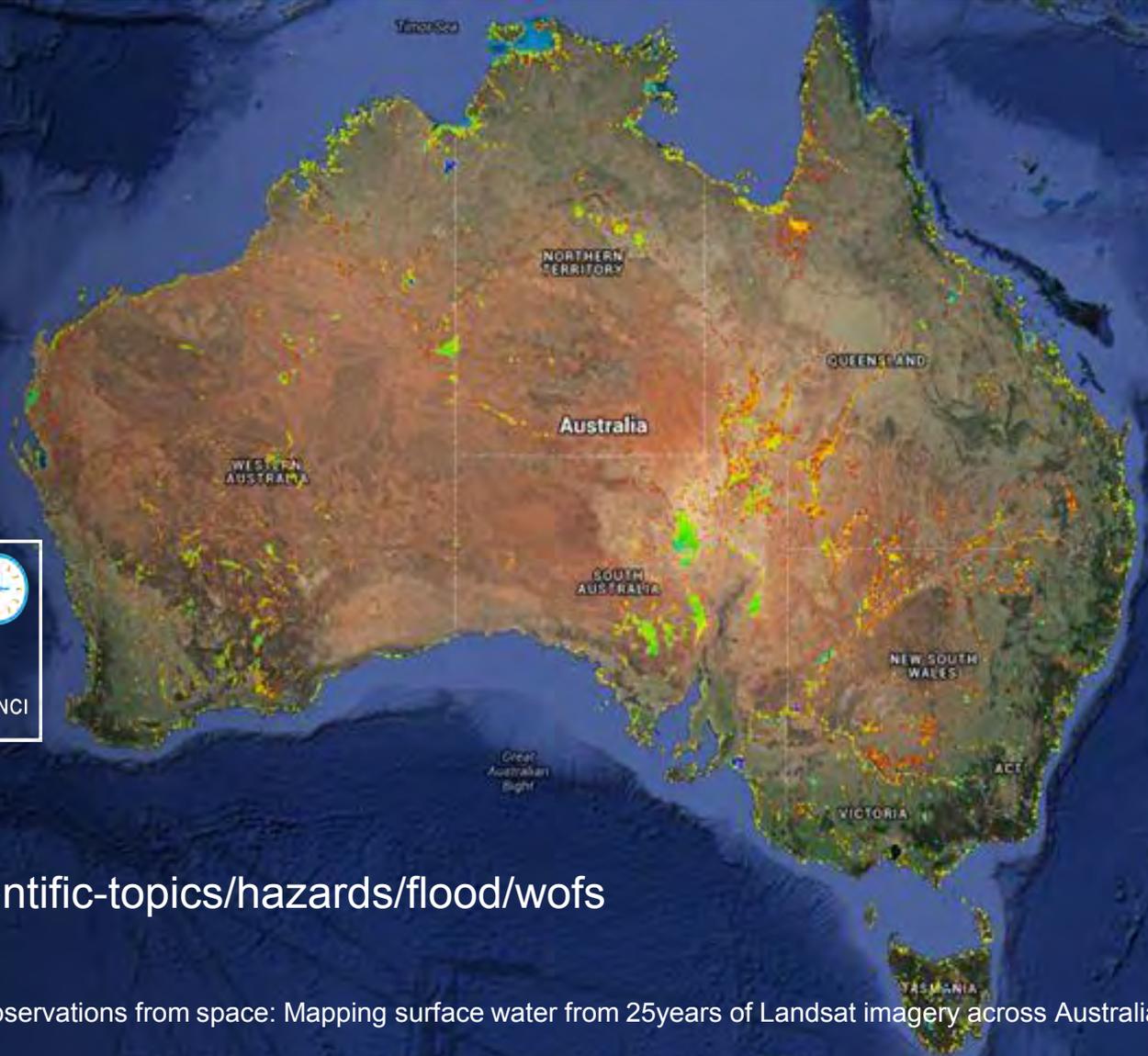
Consistent data standard + high speed processing access in the AGDC enables rapid continent-scale analyses through time



Lake Eyre from February to June 2011



| | | |
|--|--|---|
|  27 YEARS 1987-2014 DATA |  25 METRE PIXEL RESOLUTION | |
| 300 000 SCENES 20 000 PASSES | | |
|  93x10¹² PIXELS |  0.75 PETABYTES |  3 HOURS COMPUTE @ NCI |



<http://www.ga.gov.au/scientific-topics/hazards/flood/wofs>

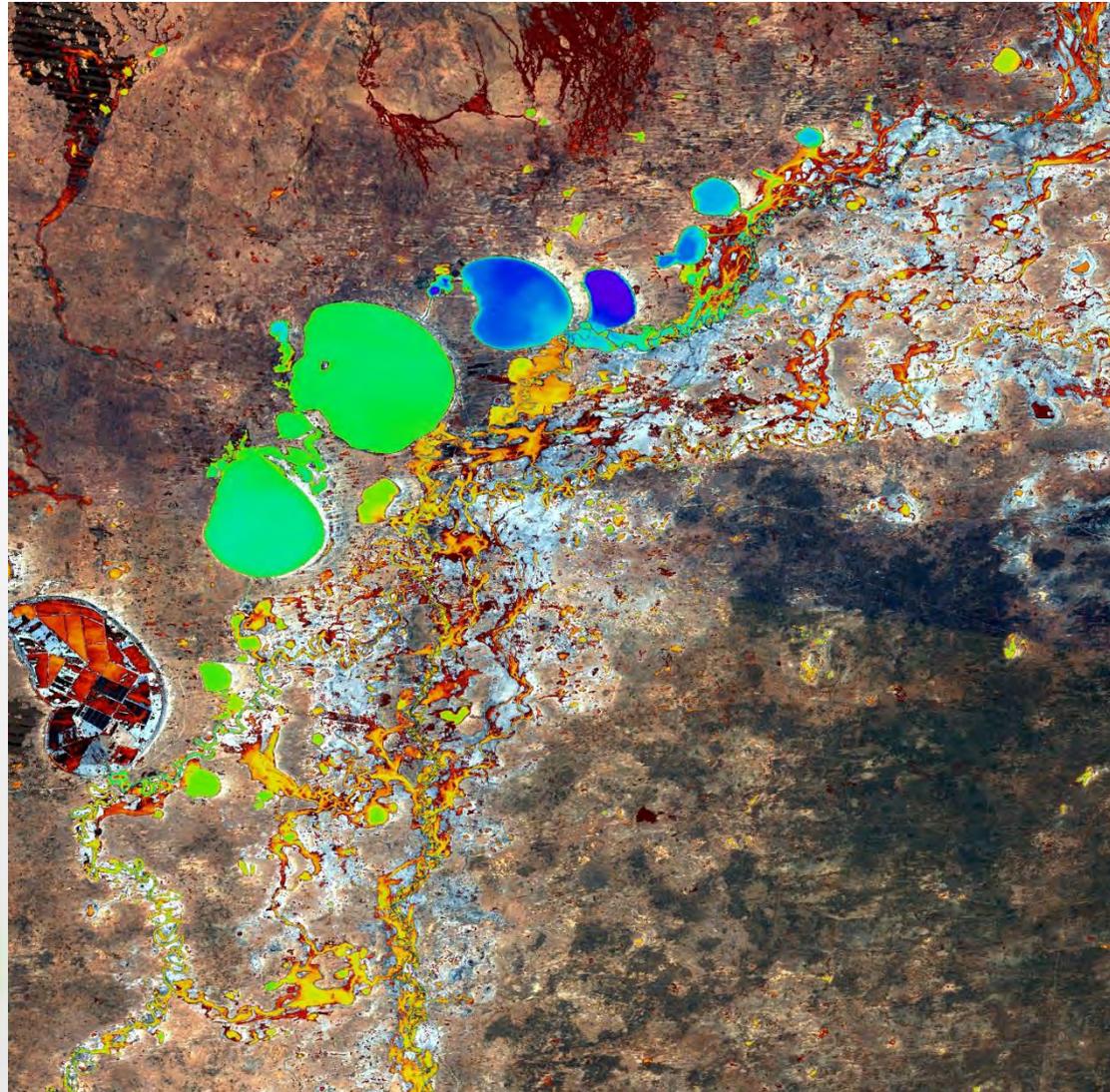


Poor information on perenniality of water bodies in arid areas of Australia

WOfS provides a mechanism to assess the perenniality of all detectable water bodies

Previously the Menindee Lakes system was mapped as “non-perennial”

WOfS shows the variation in perenniality of the system

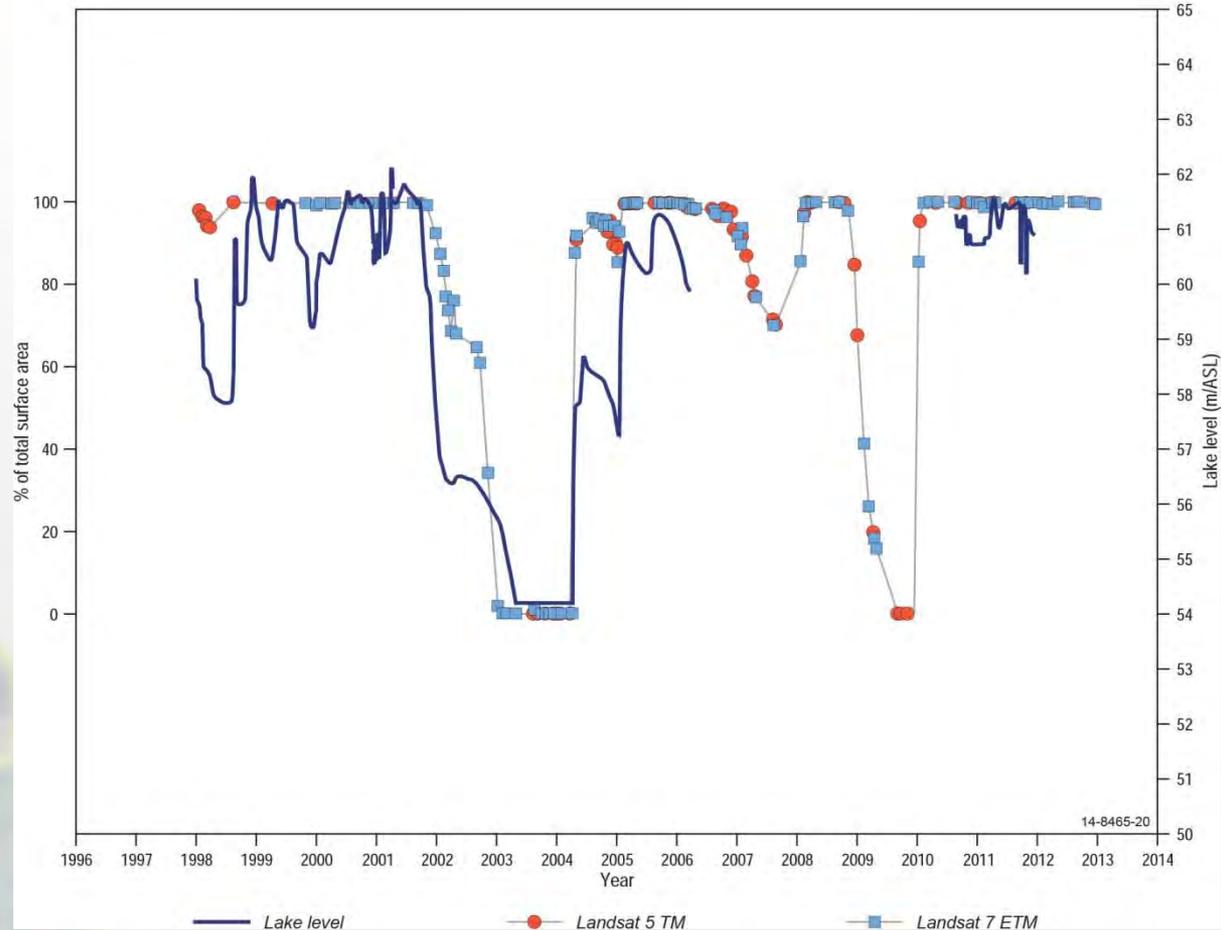


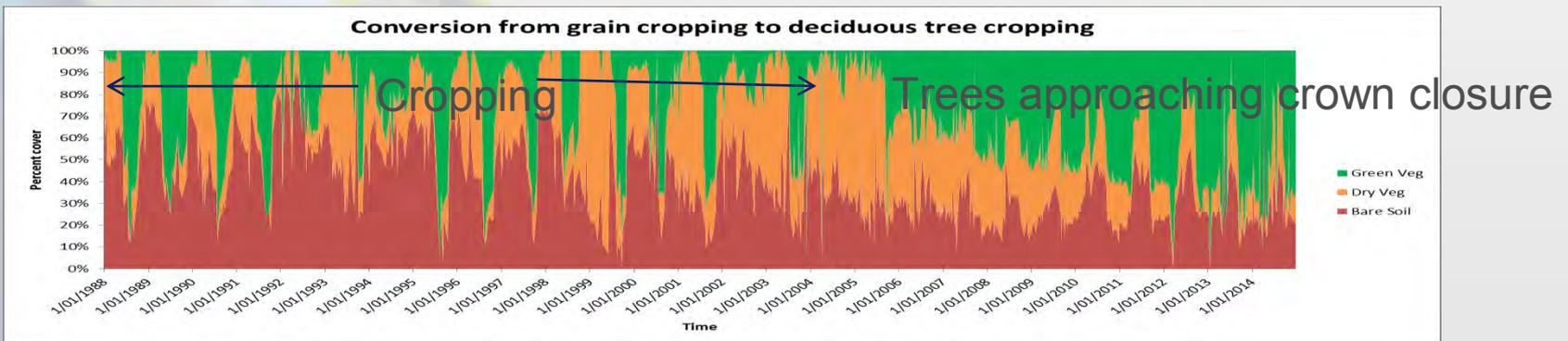
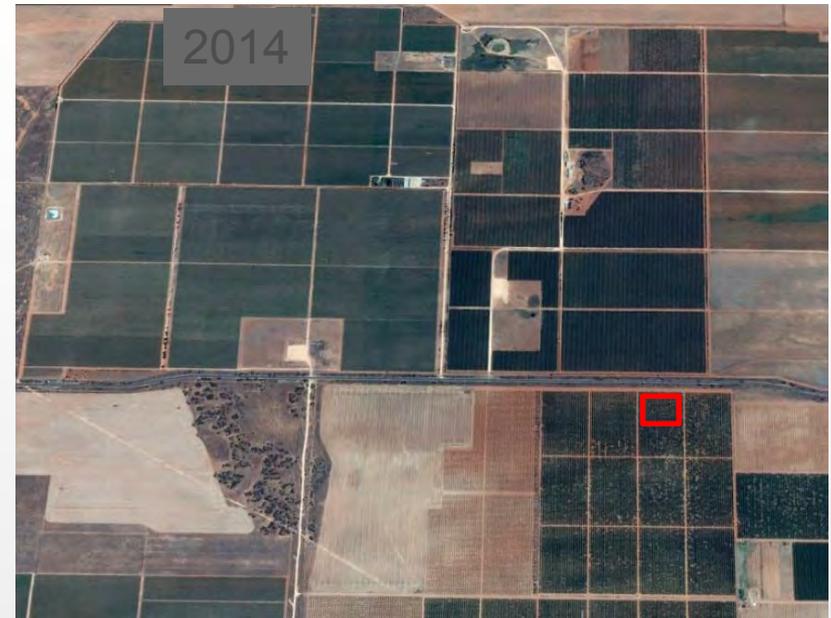


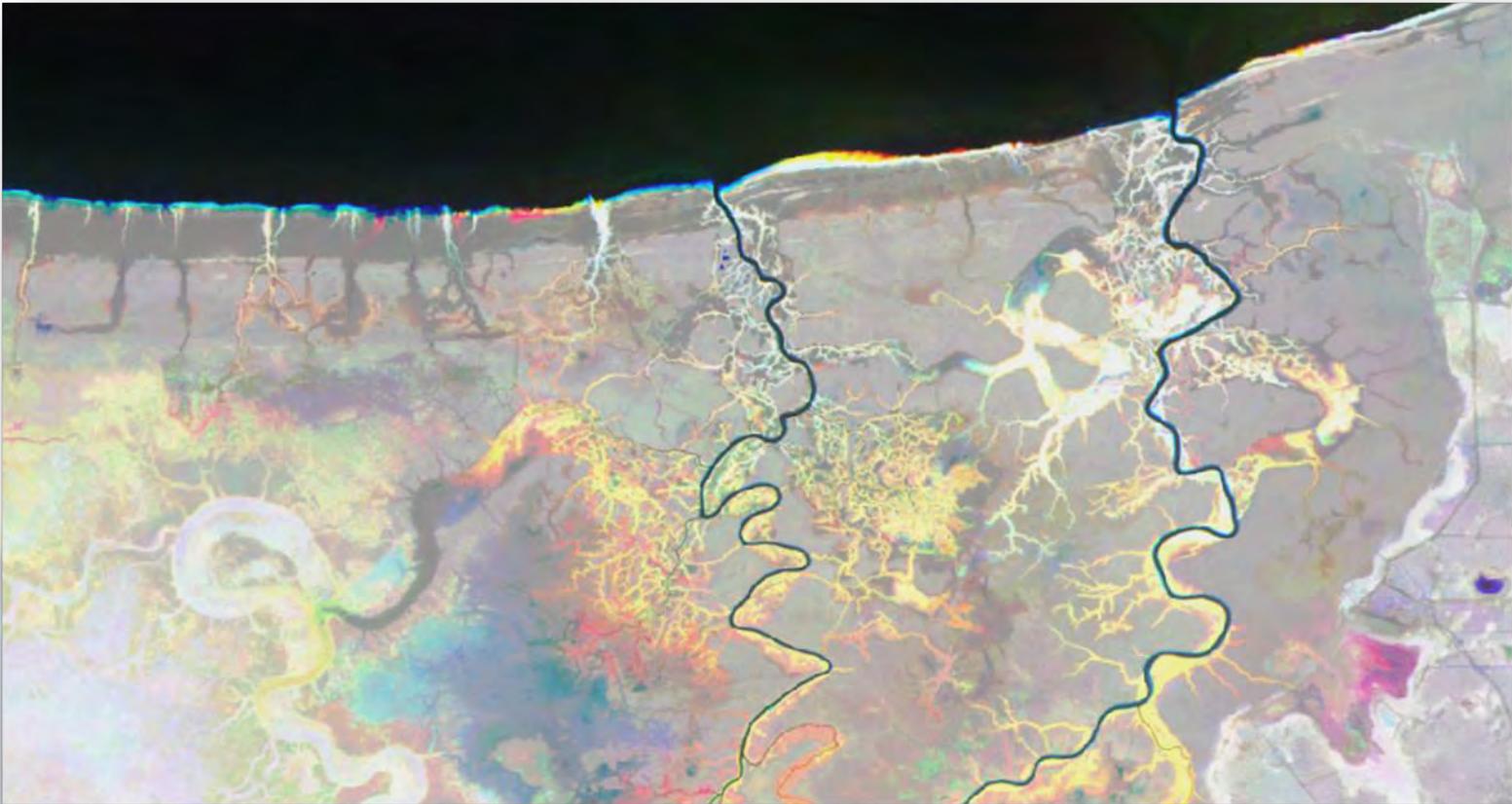
Surface area of lakes measured by WOfS can be compared with the in-situ measurements of water level

Example of Lake Pamamaroo, the most permanent of the Menindee Lakes system

Comparison for length of time that lake level measurements were available (1997 to 2013)







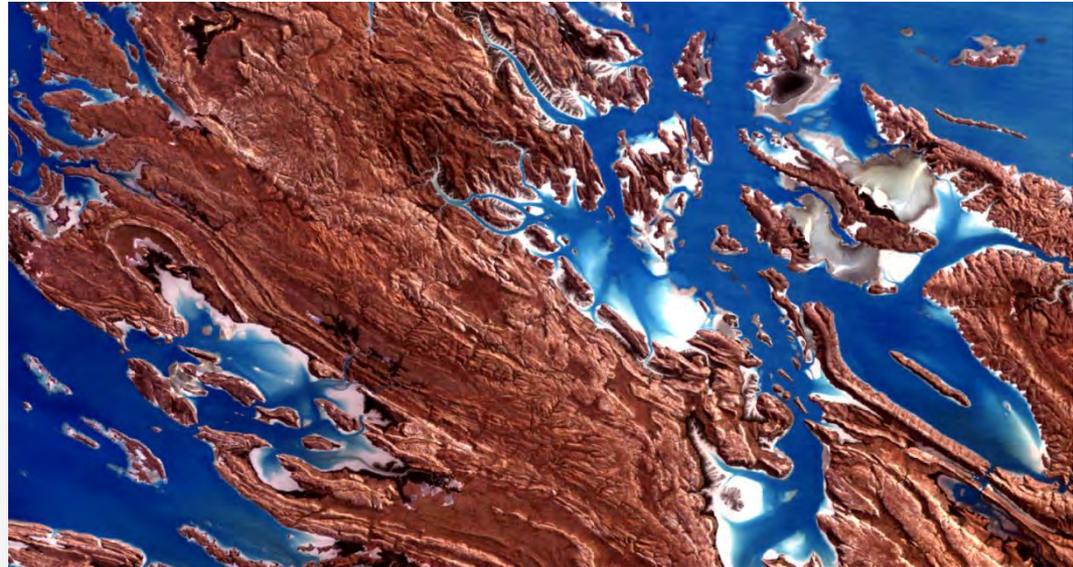
Vegetation advance (Red)

Vegetation retreat (Blue)

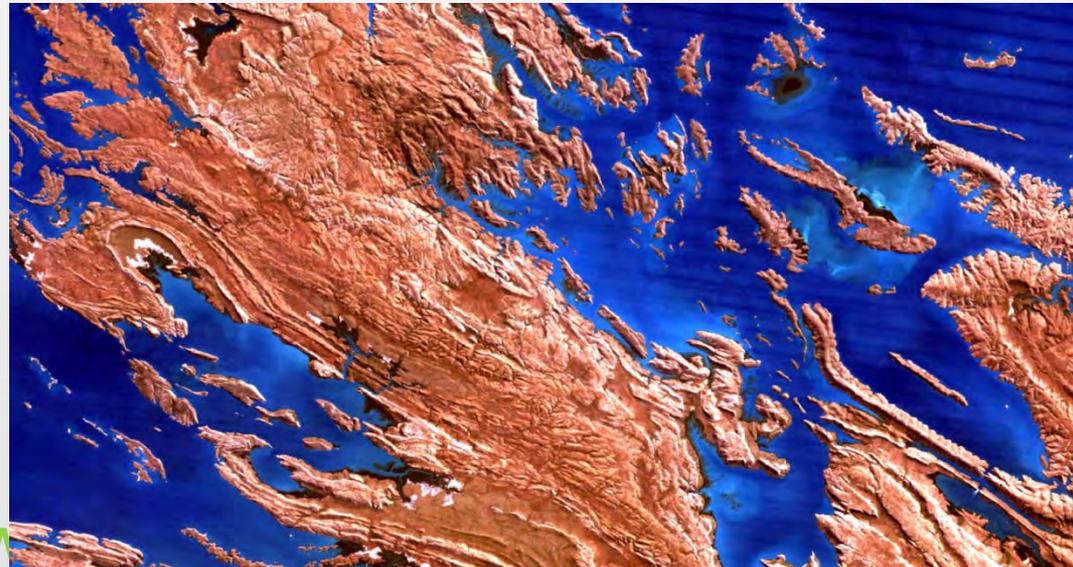


Kimberly, Western Australia

Low
Tide



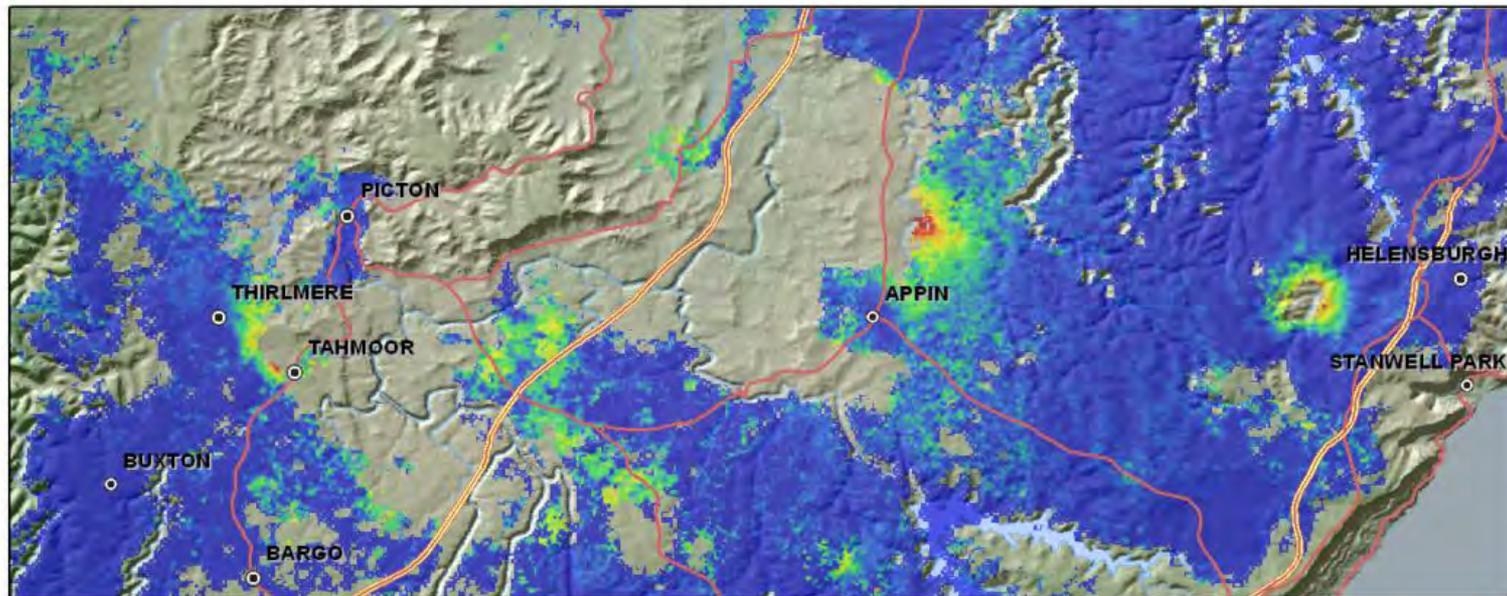
High
Tide



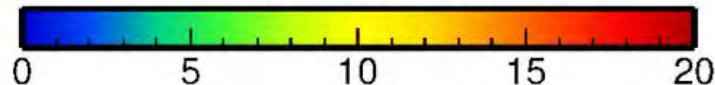


Monitoring regions where resource extraction may cause subsidence (e.g. Surat Basin, QLD; southern NSW coalfield)

For more information: insar@ga.gov.au



Line of Sight Velocity (mm/yr)





EC/ESA – High level agreement for cooperation on Copernicus Programme



USGS – Collaboration on the AGDC; joint GA-USGS work plan



NASA – GA, CSIRO collaborating to deliver ‘KenyaCube’ for GFOI /GEOGLAM)



UK SA Catapult / UKSA – Demonstrator for SAR data applications

GEO – GA represented on ExCom; land cover, agriculture CoP



Empowered lives. Resilient nations.



UNDP – EO based input for Sustainable Development Goals

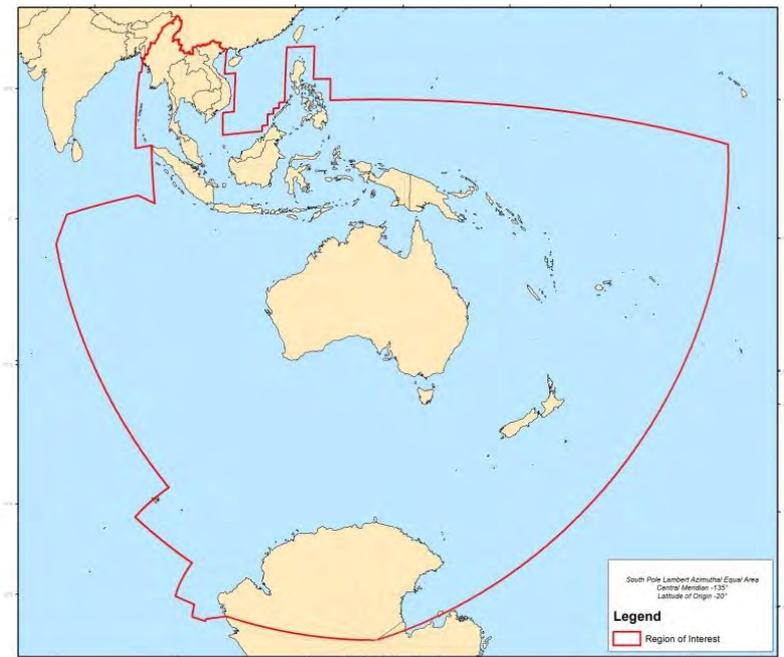
Working Group on Calibration and Validation



'Team Australia' approach to:

- Support government information requirements
- Support the broader objective of enhancing access to satellite Earth observation data by research, industry and community
- Facilitate collaboration between Australians, Europeans and inhabitants of the South-East Asia-South Pacific region in exploitation of Earth observation data
- Benefits for: Australia, the region, EC/ESA/EUMETSAT, and the global satellite EO community

All Sentinel Products For



Supporting

Consortium

Partners

Collaborators





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40th Plenary Meeting CEOS Working Group on Calibration & Validation,
Canberra, Australia 14-18 March 2016