Australian Government
Geoscience Australia

Country Report: Australia

Calibration & Validation Activities

Presented by Medhavy Thankappan

Contributors

Geoscience Australia

CSIRO

Space Policy Unit (DIICCSRTE)

Terrestrial Ecosystem Researh Network (TERN)

Joint Remote Sensing Program (QLD/NSW)

University of Queensland

Monash University

University of Wollongong

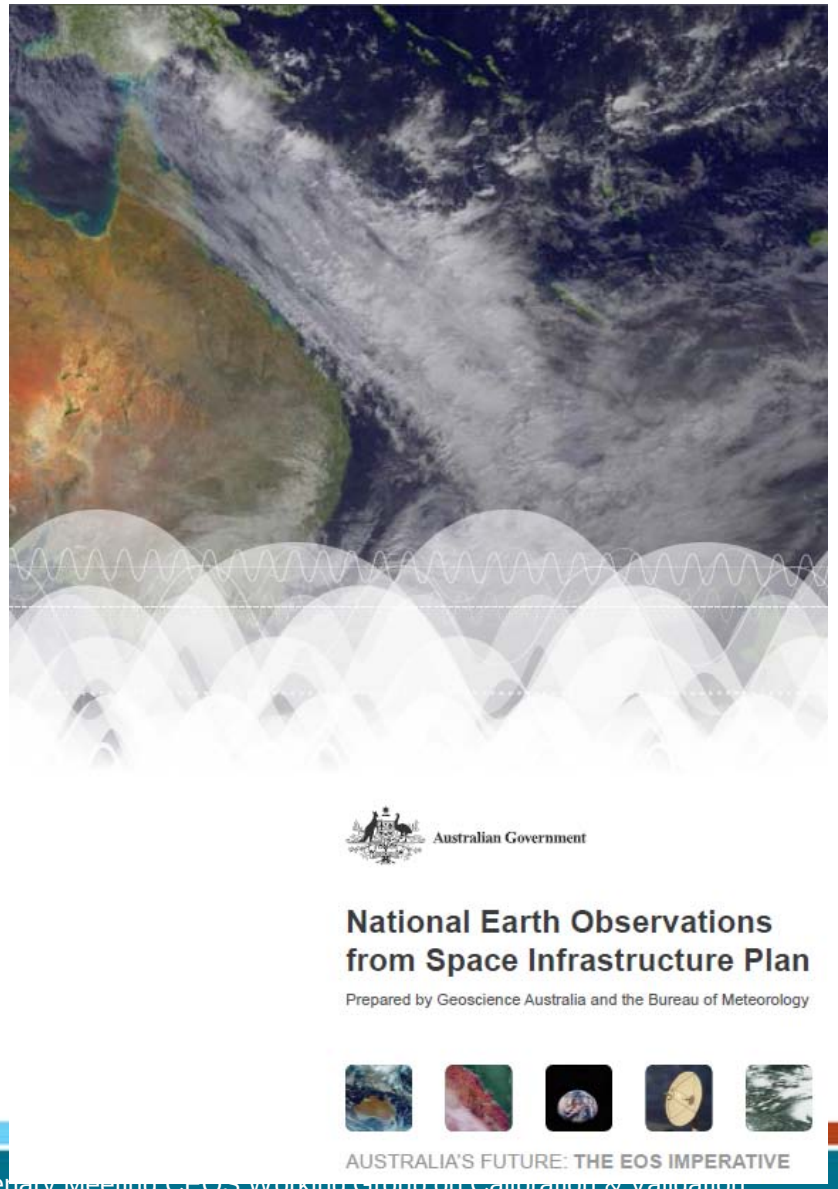
University of Technology Sydney

Recognising the Value of Earth Observation

National Earth Observation Infrastructure Plan

The NEOS-IP is a plan to focus activity on five priority areas for EOS:

1. *Coordination*
2. *Continuing the observations, including commercial sources*
3. *Ground segment and calibration capabilities*
4. *Extracting information from the data*
5. *Sustaining the skills and knowledge base*

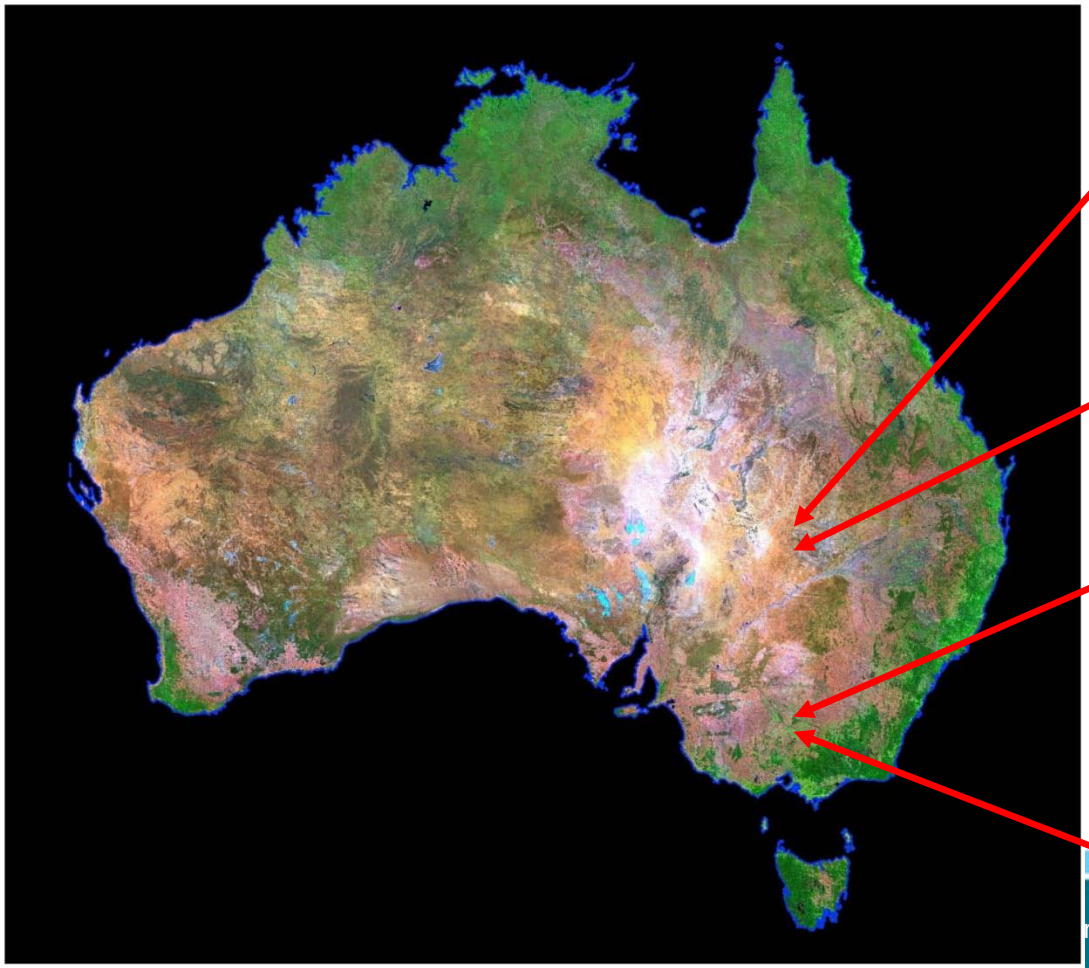


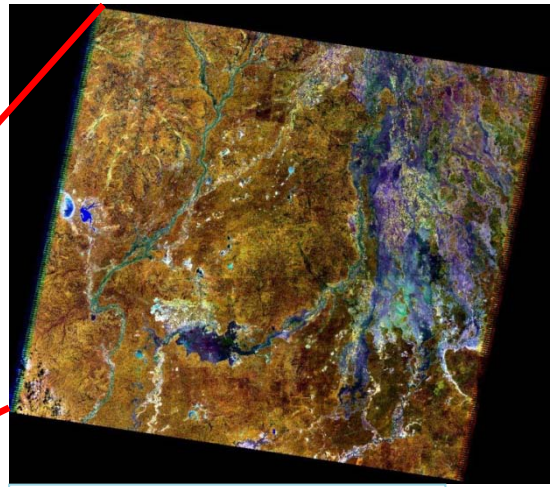
TCP in Earth Observation Informatics

- Transformational Capability Platform (TCP)
- Recognises that EO is fundamental to Australia and that research across CSIRO and outreach needs to be better coordinated
- ~$10m annual investment in EO research in CSIRO (~$100m national investment)
- Aims to integrate capabilities and to provide a ‘capability portal’ for national and international engagement
- Key objectives:
  - Develop capability
  - Leverage infrastructure
  - Develop efficient networks
- Investment $1M for 2012-13, $1M+ for 2013-14, growing thereafter

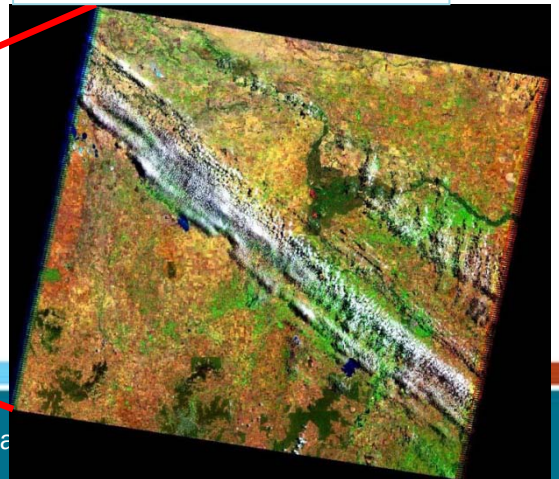
Big Data @ National Computational Infrastructure

- Australian Reflectance Grid (ARG25) Landsat Data produced through the *Unlocking the Landsat Archive Project.*
- Web Catalogue (Metadata), Web Map (Quicklook images), Web Coverage Services (Full Resolution Data)





Landsat



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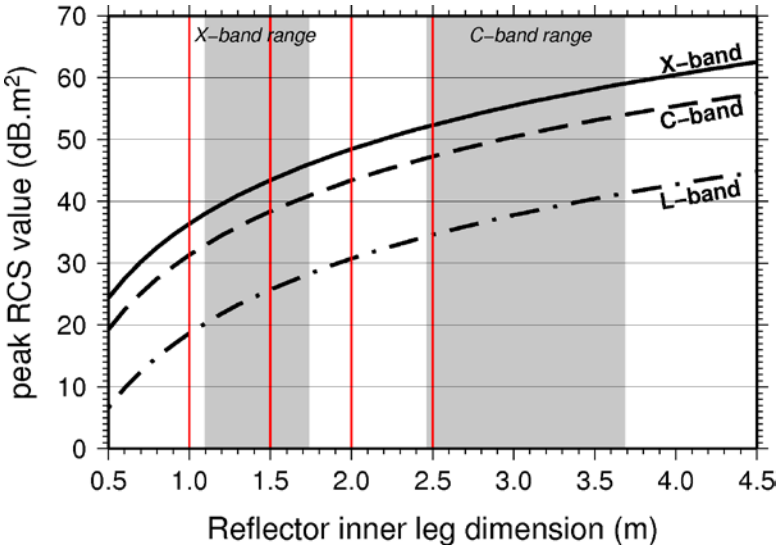
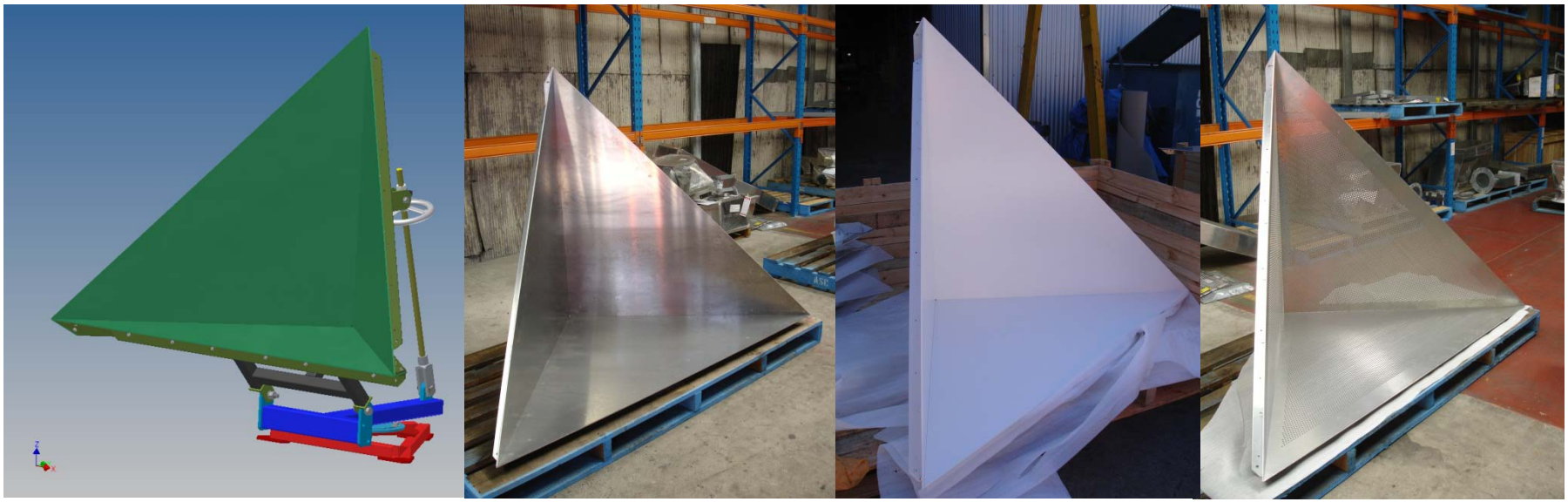
AGOS SAR Calibration Infrastructure

- Design, prototype and manufacture a corner reflector network for measuring subtle ground deformation and contribute to SAR satellite calibration and validation





Robotic Antenna Calibration System

The Global Navigation Satellite System (GNSS) calibration facility at GA has two robotic systems to improve accuracy of positioning

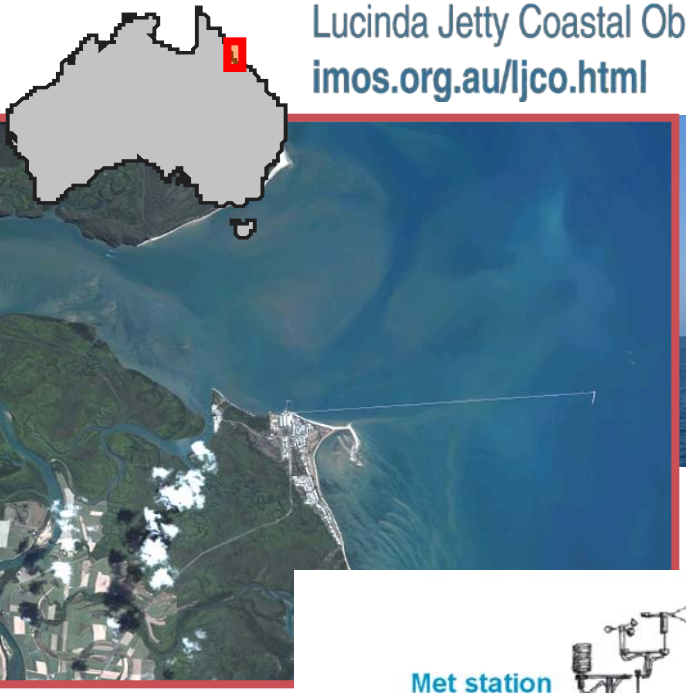
Only one of its kind in the southern hemisphere (one of three in the world)

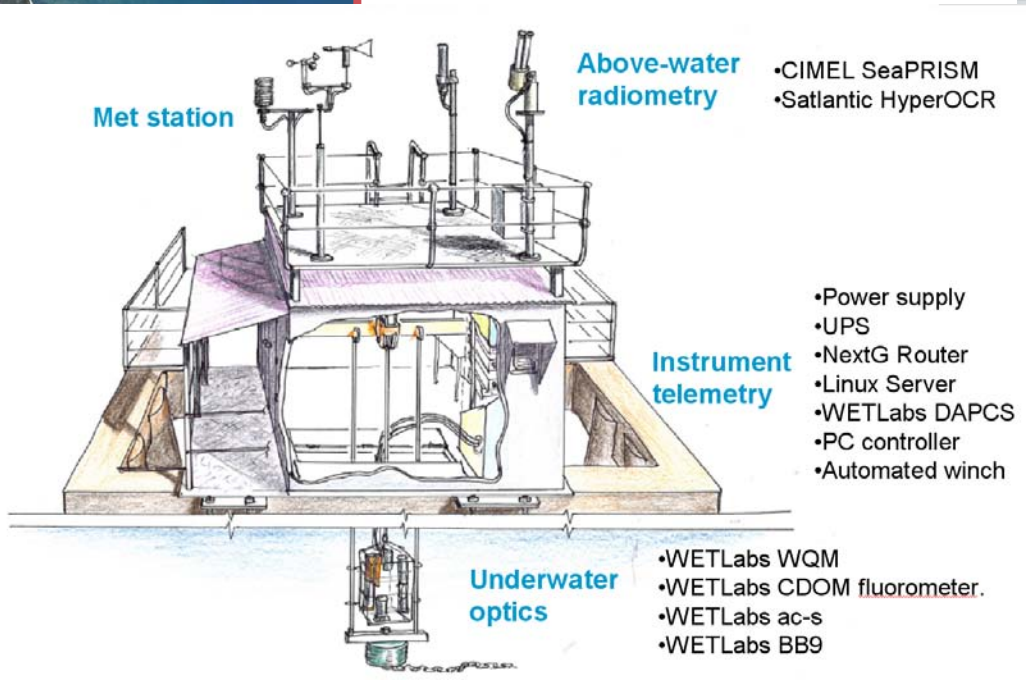
Will enable the calibration and certification GNSS equipment used for high accuracy GNSS positioning applications

IMOS Integrated Marine Observing System

Southern Hemisphere Vicarious Aquatic Calibration and Validation Site LJCO

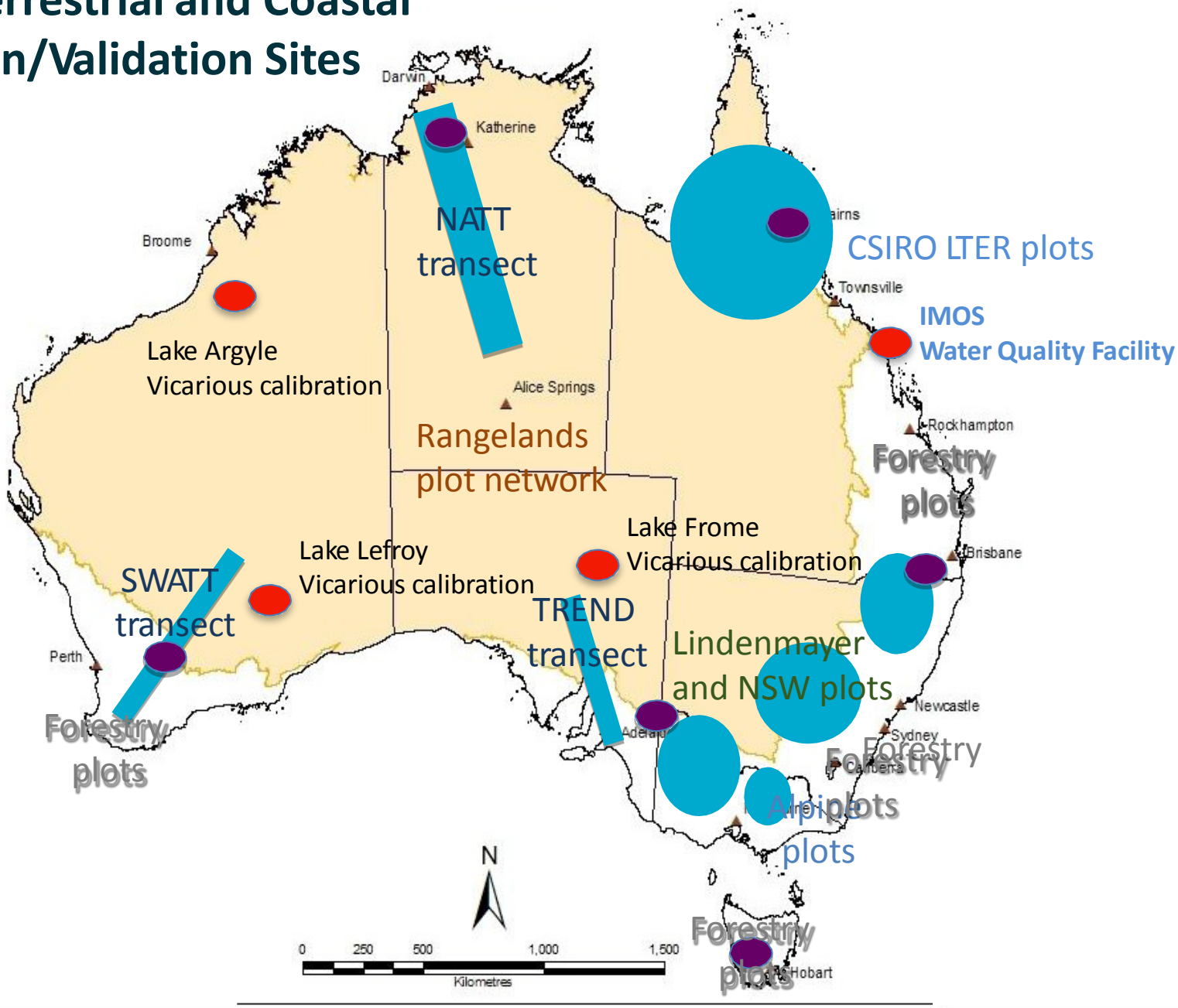
Lucinda Jetty Coastal Observatory (LJCO)
imos.org.au/ljco.html



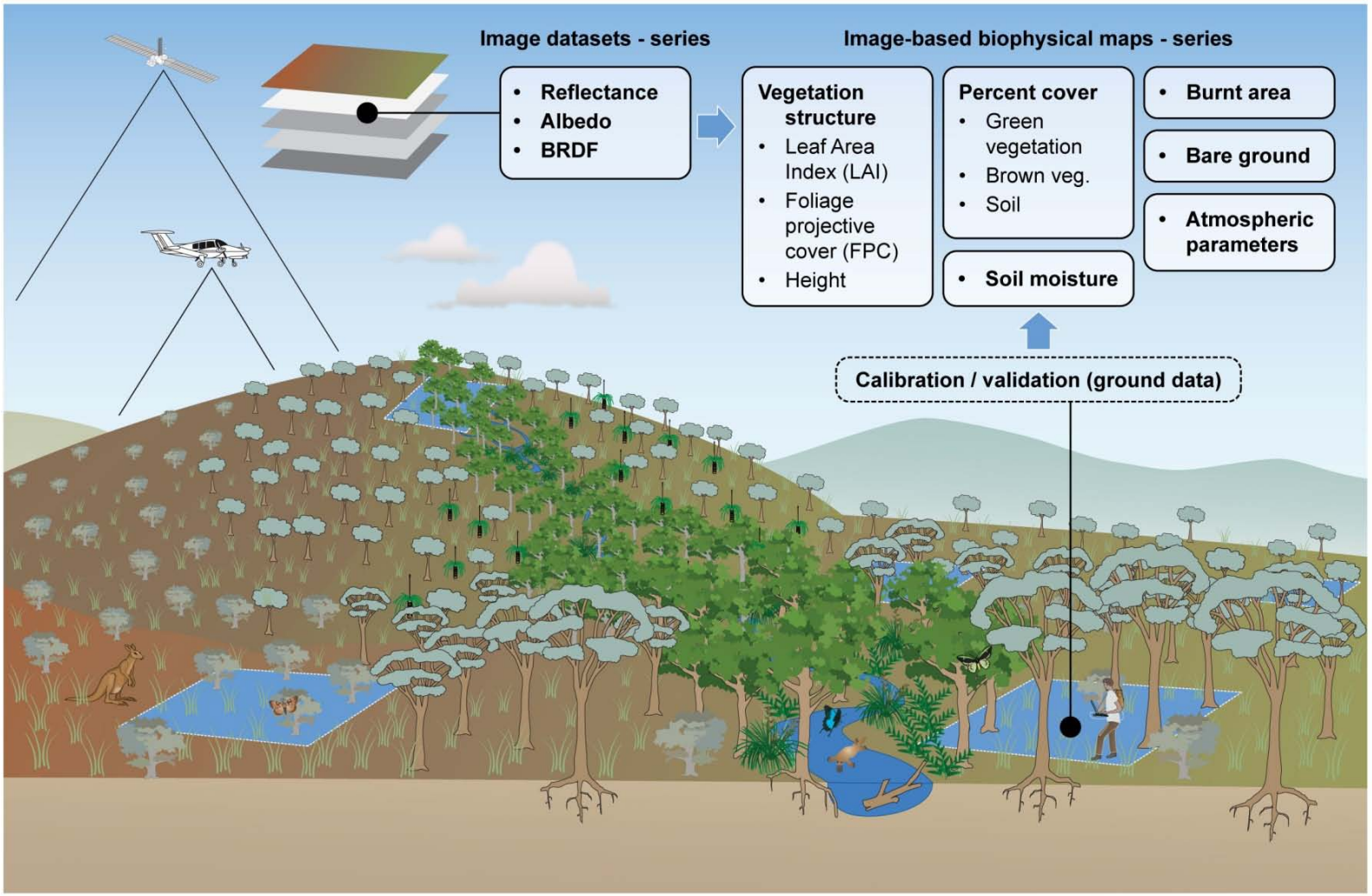


CSIRO

Several Terrestrial and Coastal Calibration/Validation Sites



TERN AusCover Activities and Products

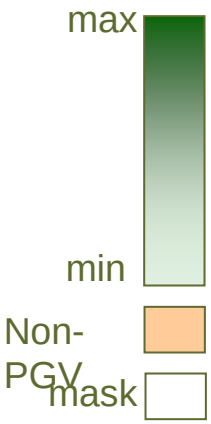


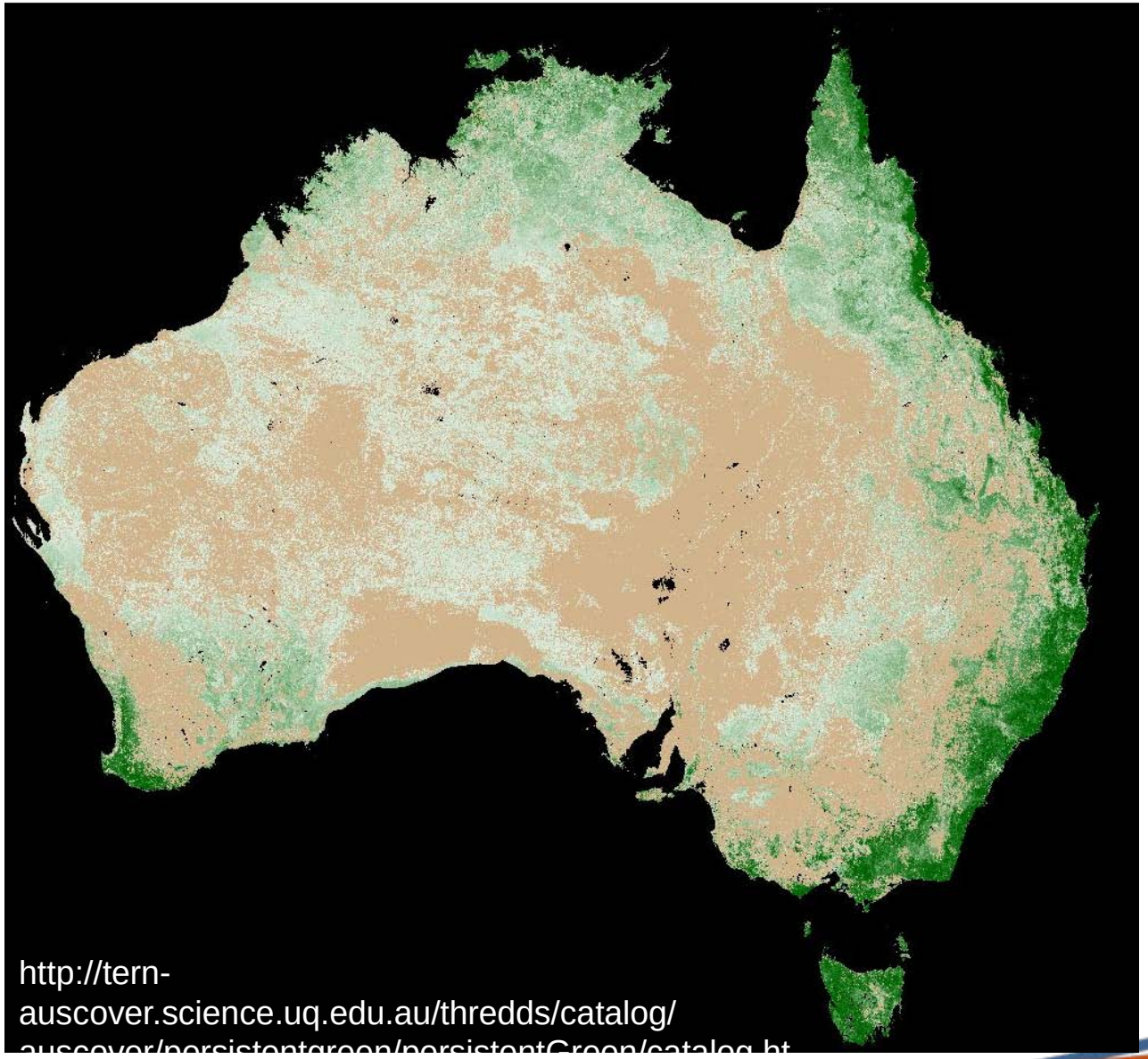
TERN Terrestrial Ecosystem Research Network

The University Of Queensland

Queensland Government

Persistent Green Vegetation Fraction





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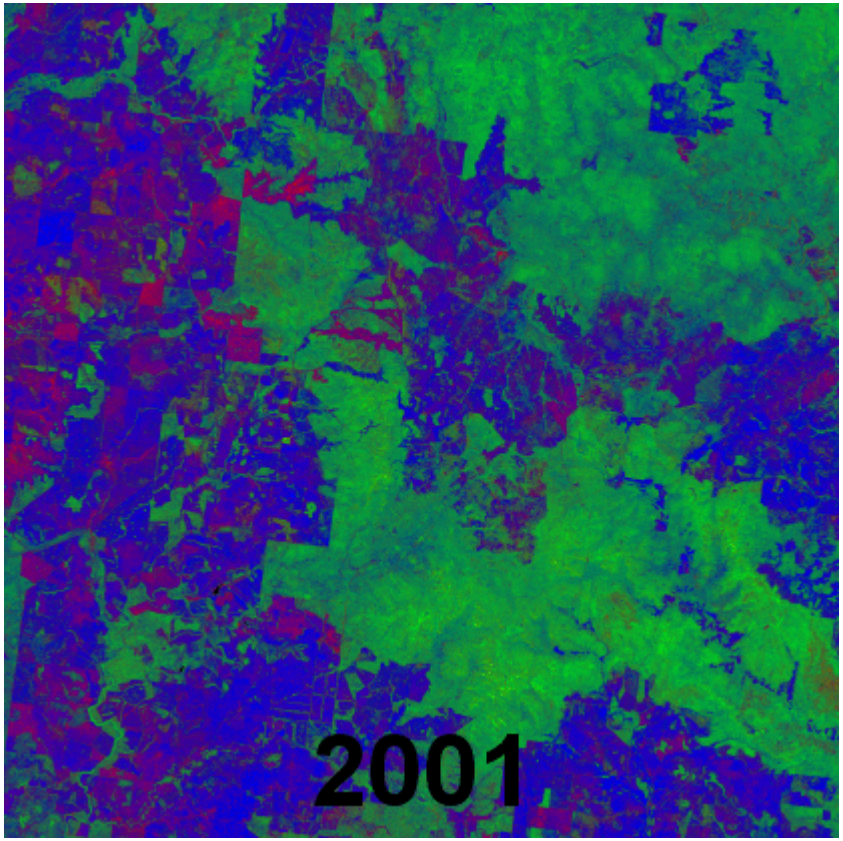
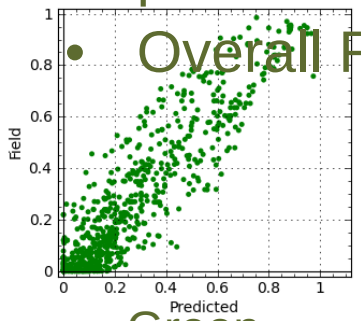
Queensland Government

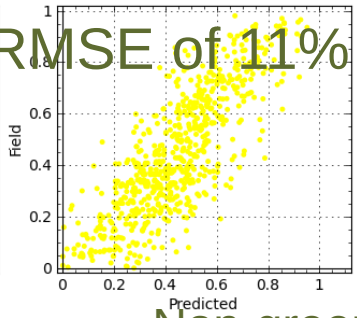
Fractional Cover Time-Series

- Fractional cover uses a constrained unmixing model with endmembers derived from field sampling.
- Creates an image with the percentage Bare, Green and non-green fractions
- Field data from 800 sites collected using consistent, nationally agreed protocol
- Overall RMSE of 11%

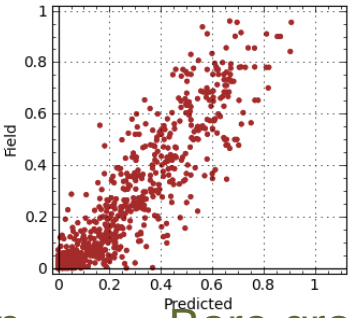




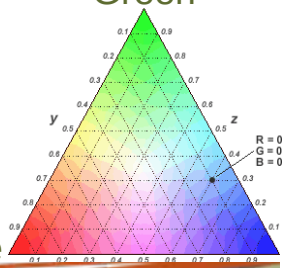
Green



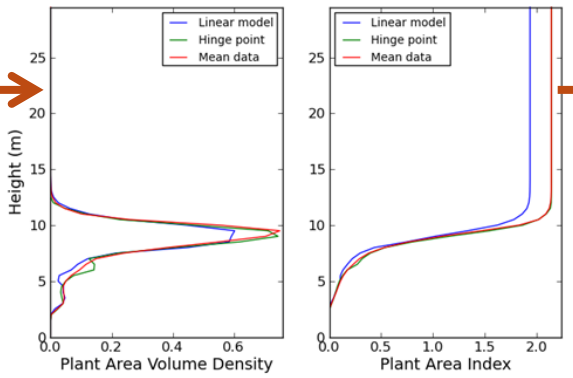
Non-green



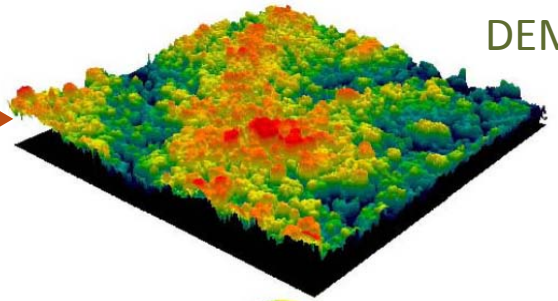
Bare ground



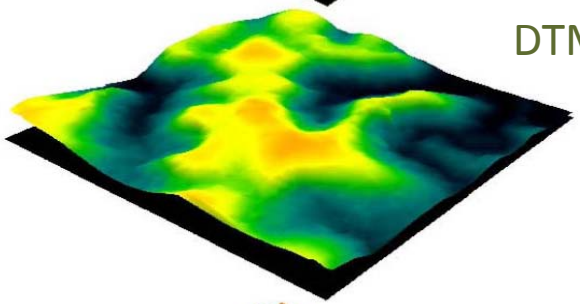
AusCover Field and Airborne Campaigns



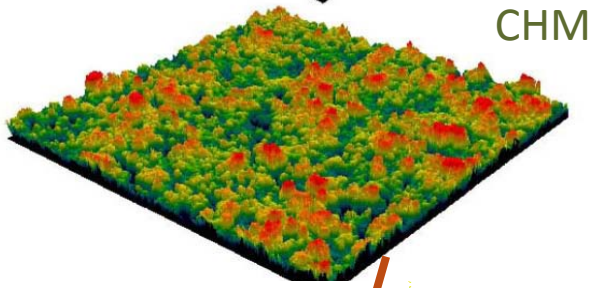
DEM

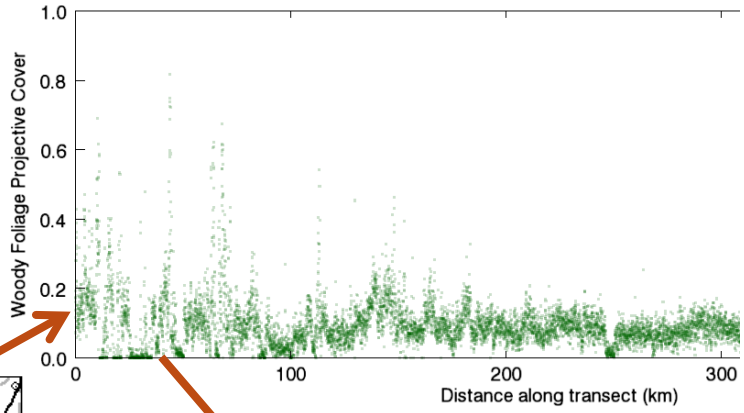


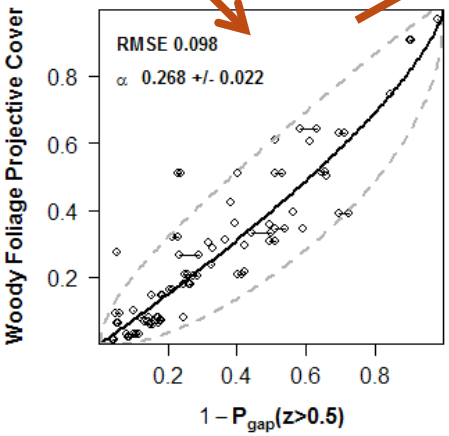
DTM

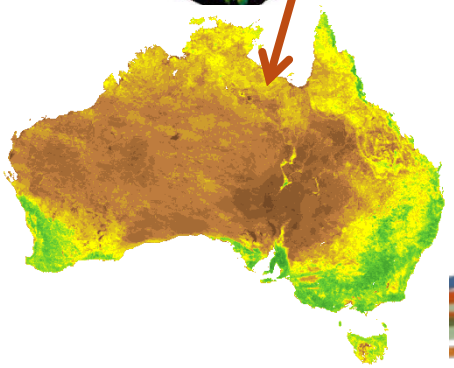


CHM

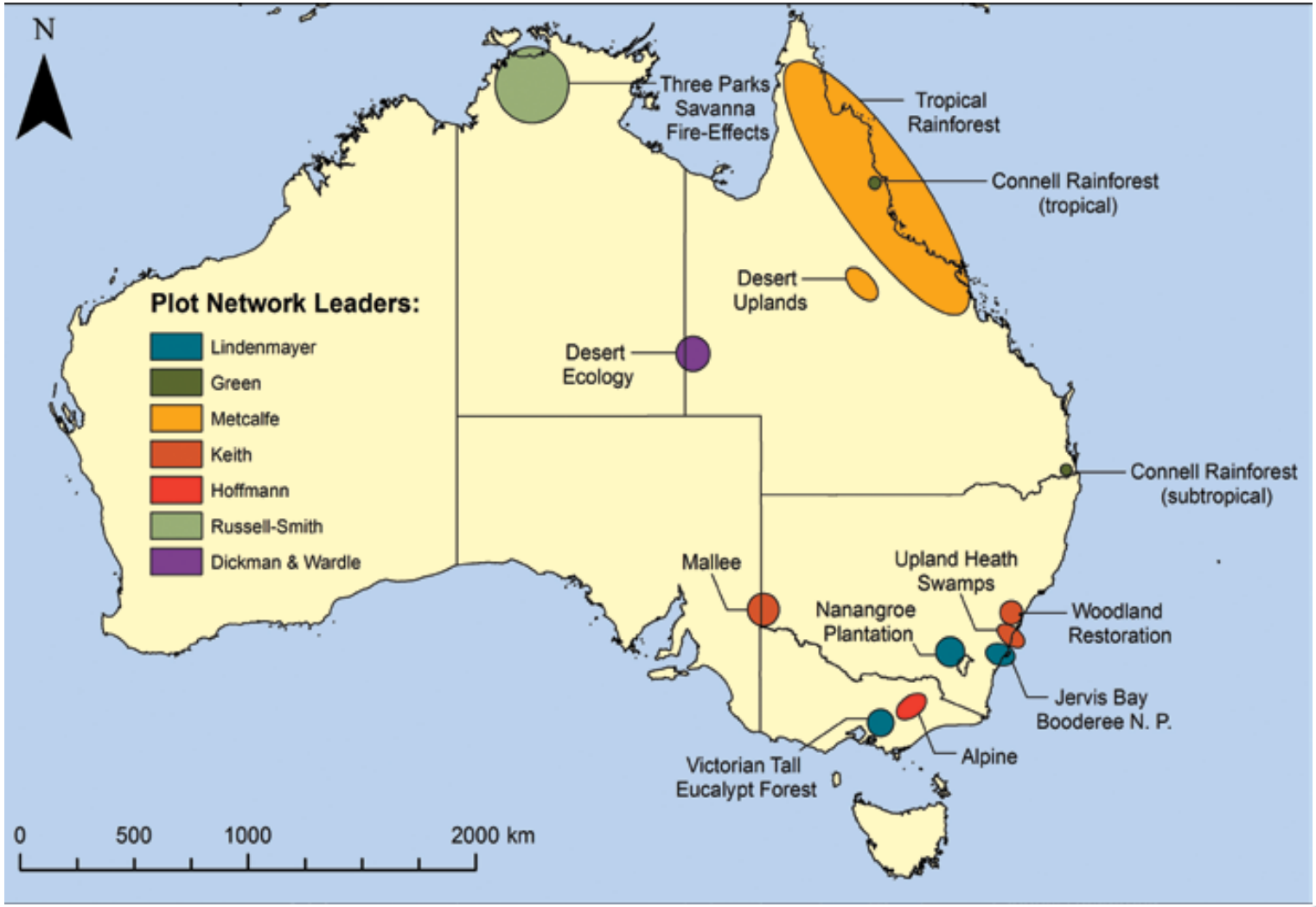






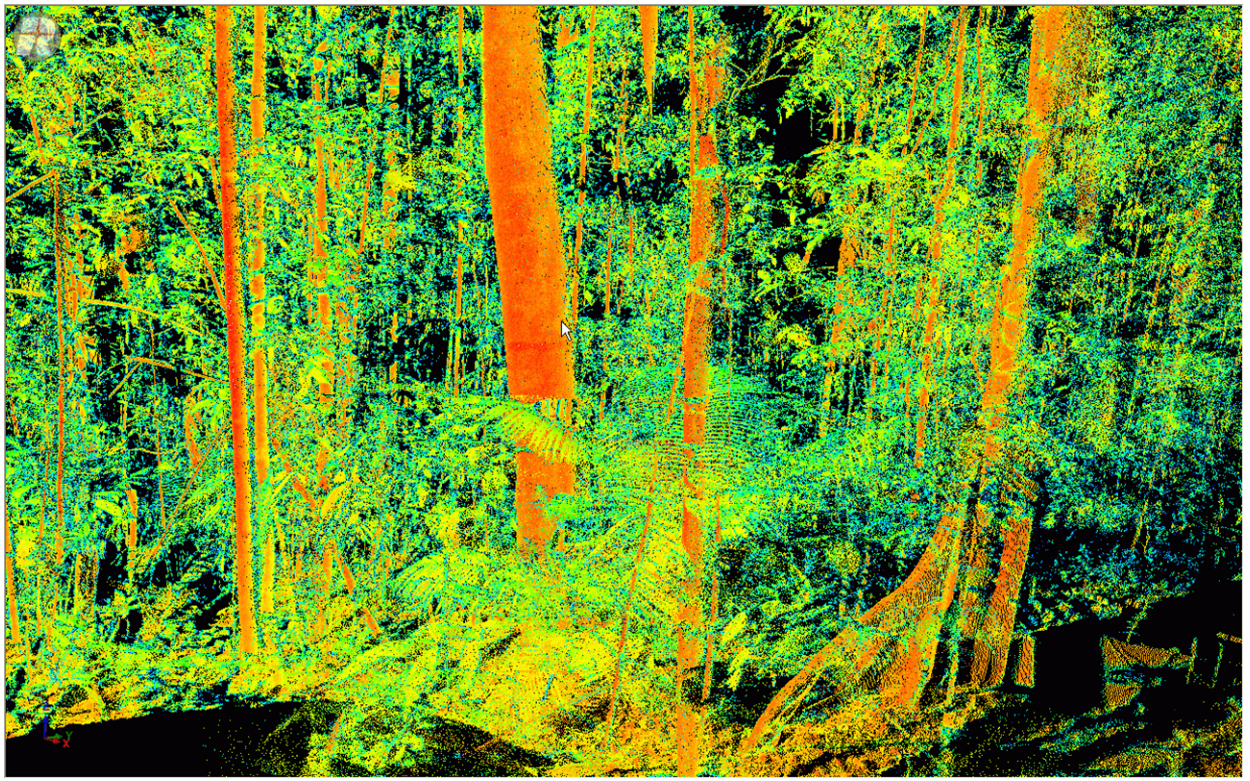


Plot Locations : Long Term Ecological Research Network



TERN
Terrestrial Ecosystem Research Network

Field Data Collection: Terrestrial Laser Scanning



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Field Data Collection: Phenology

Field Data Collection: Spectral Calibration

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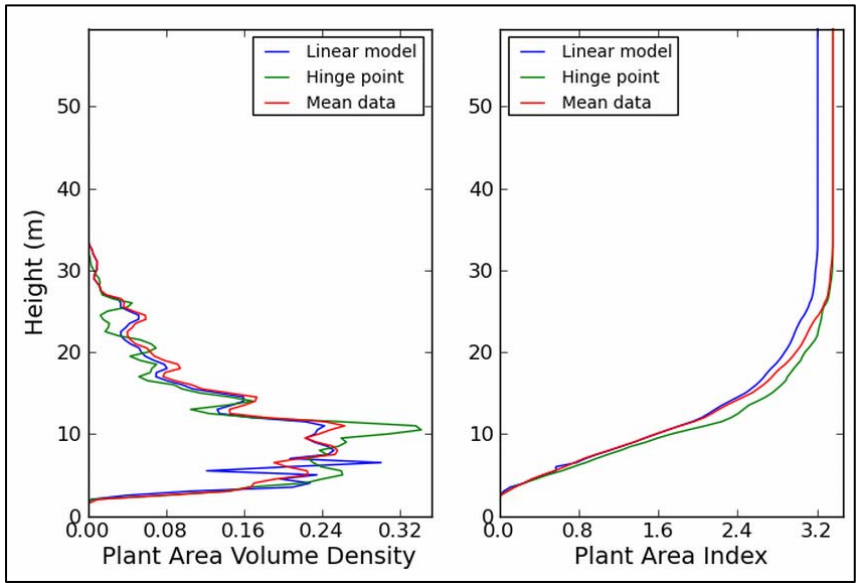
Terrestrial Ecosystem Research Network

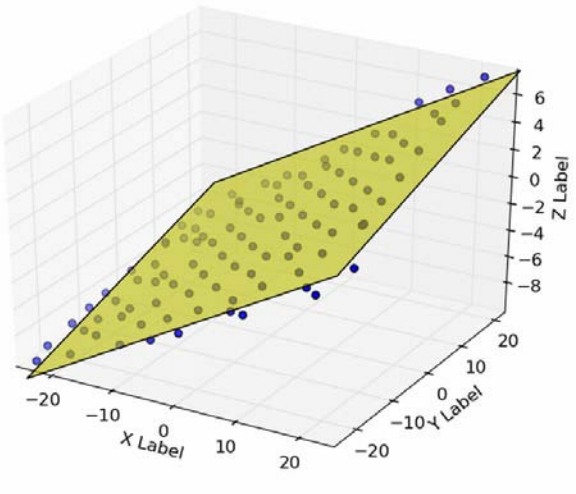
Field Data Collection: Atmospheric Measurements

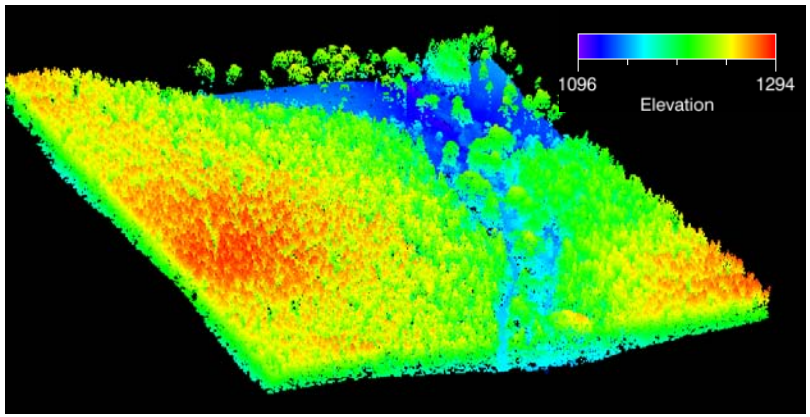
TERN
Terrestrial Ecosystem Research Network

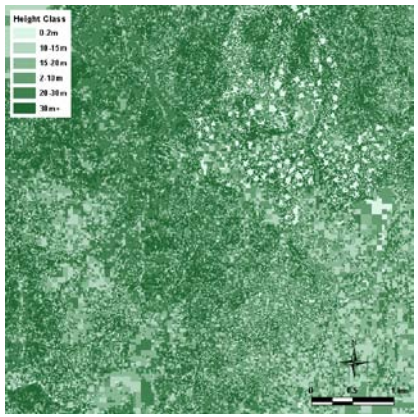
Airborne Data Collection: LiDAR and Hyperspectral Data

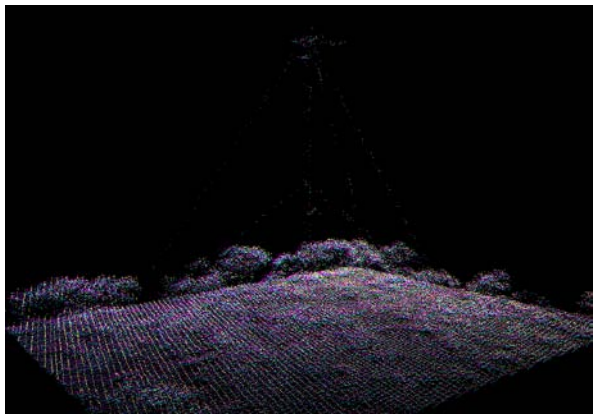


Site	PAI
rapid1	3.673067
rapid2	3.363939
rapid3	2.279929
rapid4	2.62392
rapid5	4.901737
rapid6	3.14998
rapid7	3.335957
rapid8	3.652275
rapid9	3.190056
rapid10	6.049383
rapid11	2.897515
rapid12	3.360222

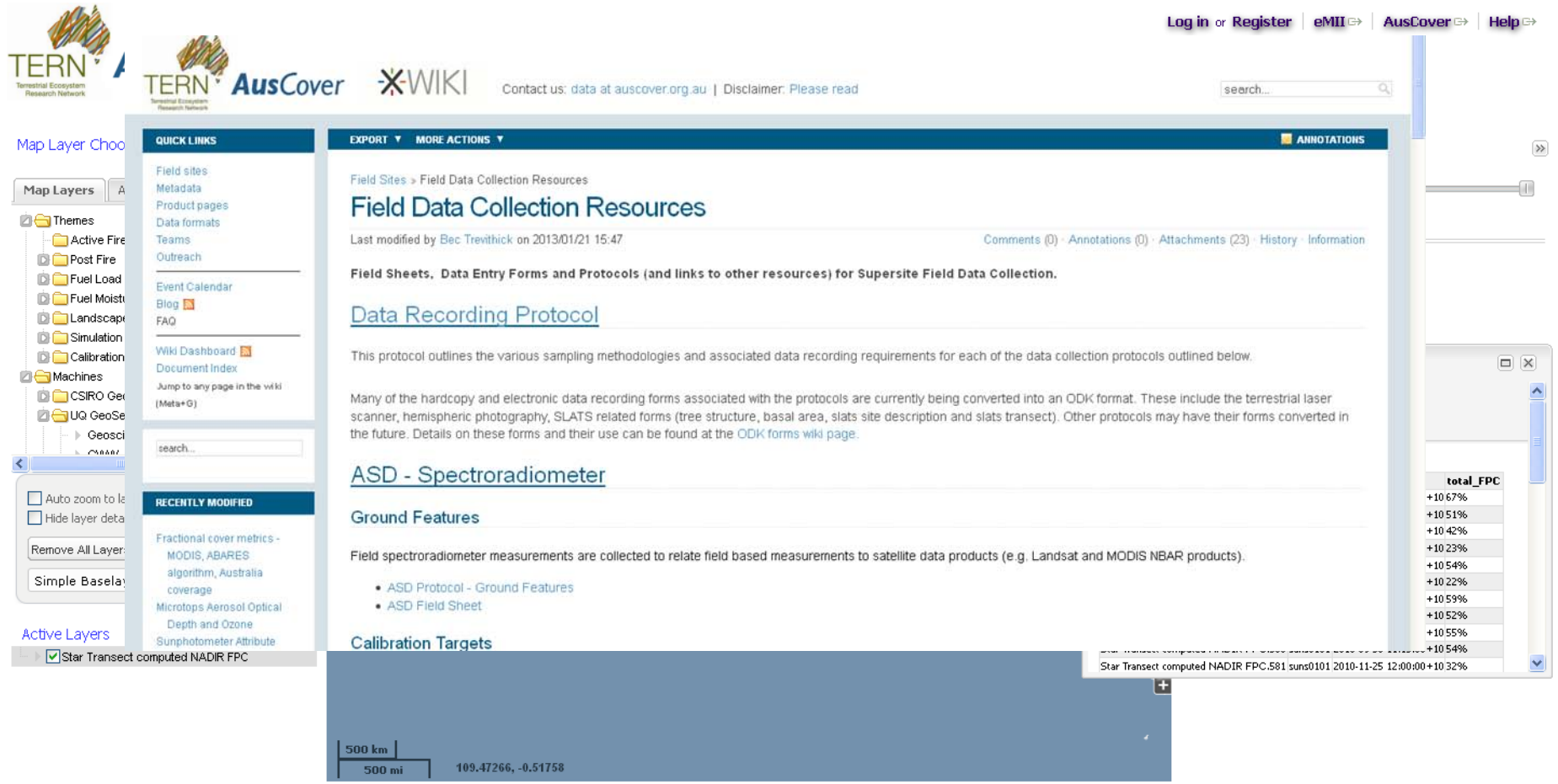








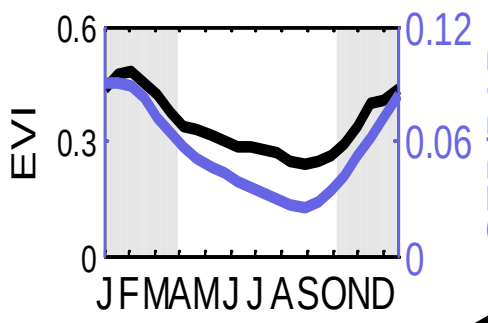
Accessing Field Data

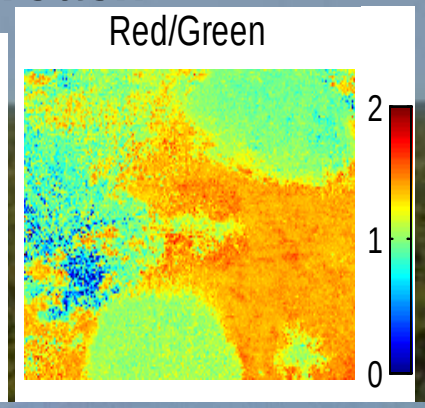


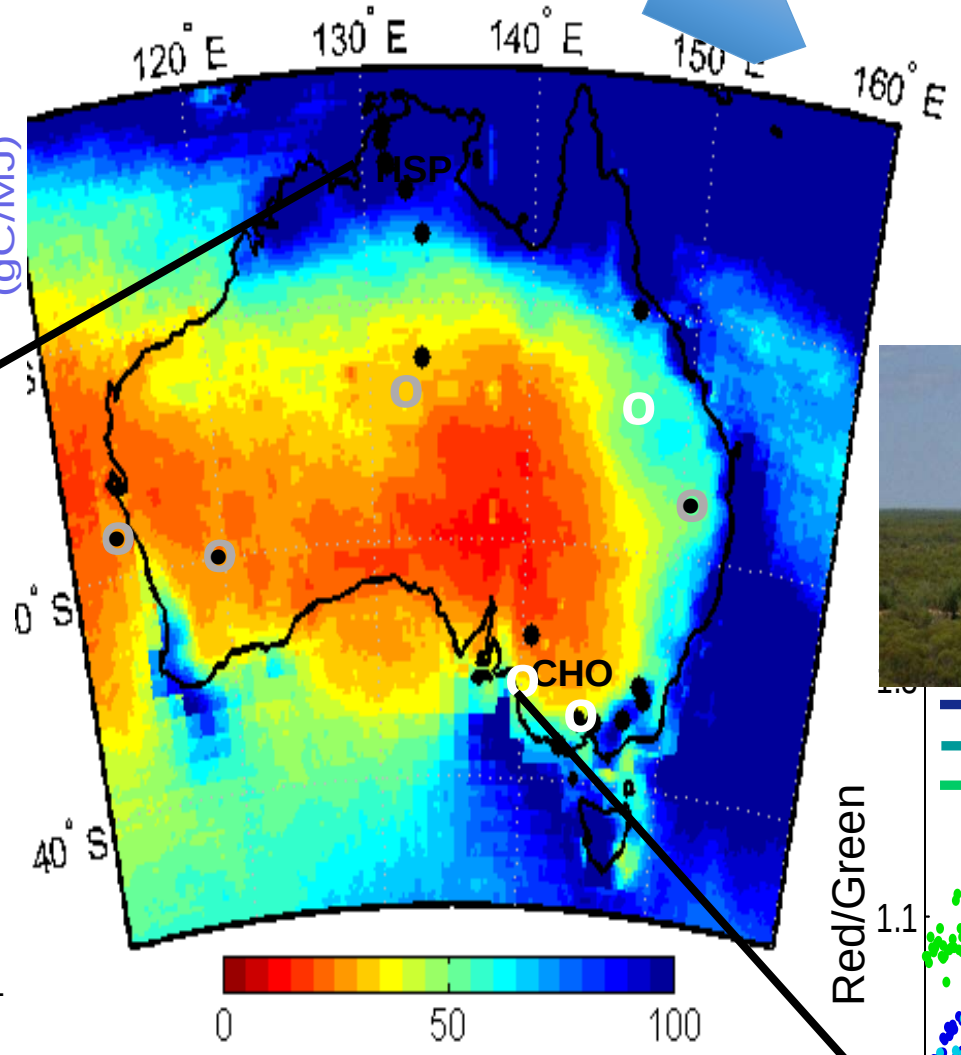
(http://data.auscover.org.au/xwiki/bin/view/Field+Sites/WebHome).

Australian Phenology Product Validation:

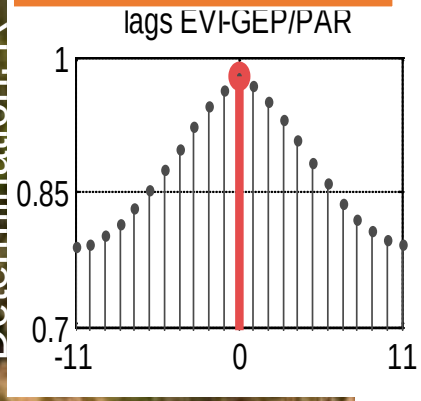
An Eddy-flux Tower Data and Phenocam Network Approach







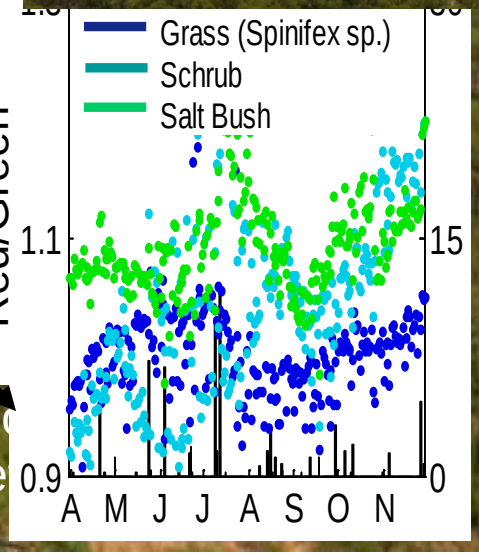
Howard Springs wet tropical savanna site



Correlation vs. 16-day lags in key phenology timing metrics between MODIS EVI vs. GEP/PAR series

Mean monthly precipitation (mm m

(•) OZflux sites (•) Phenocam ne

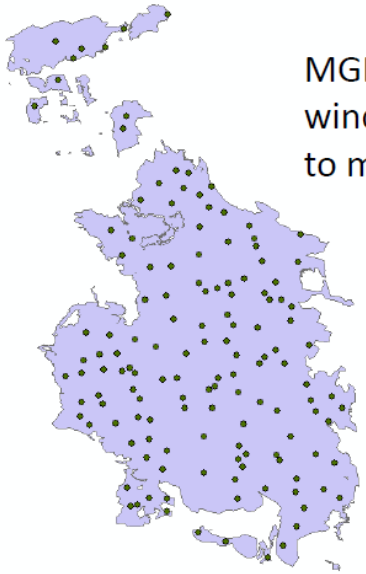


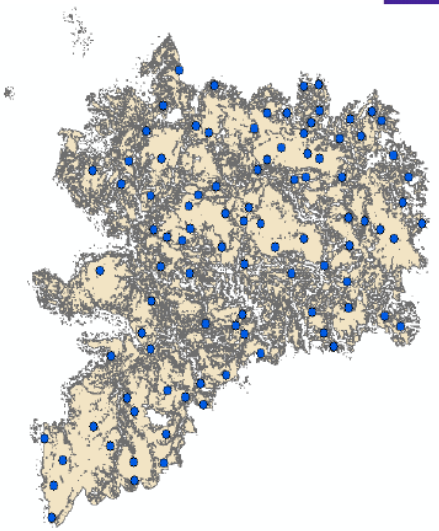
MODIS Global Disturbance Index Validation

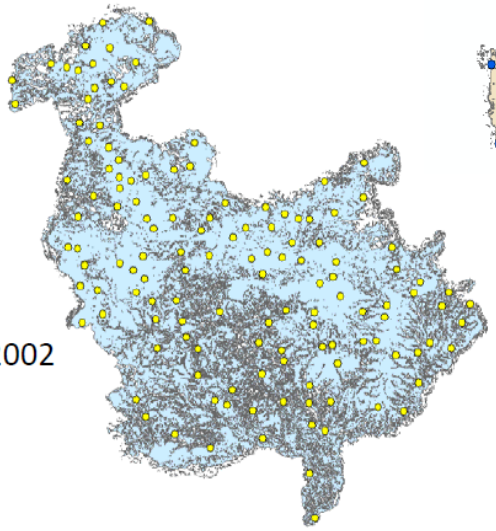
Canberra Fire (ACT)
Duration : 09/01/2003-19/01/2003
Area Burnt : 247 596 ha (One part of the fire)
Sample Points : 135

Wollombi Complex Fire(NSW)
Duration : 06/01/2003-269/02/2003
Area Burnt : 52083ha
Sample Points : 95

MGDI is calculated for a temporal window of 6 months (October –March) to match the fire season





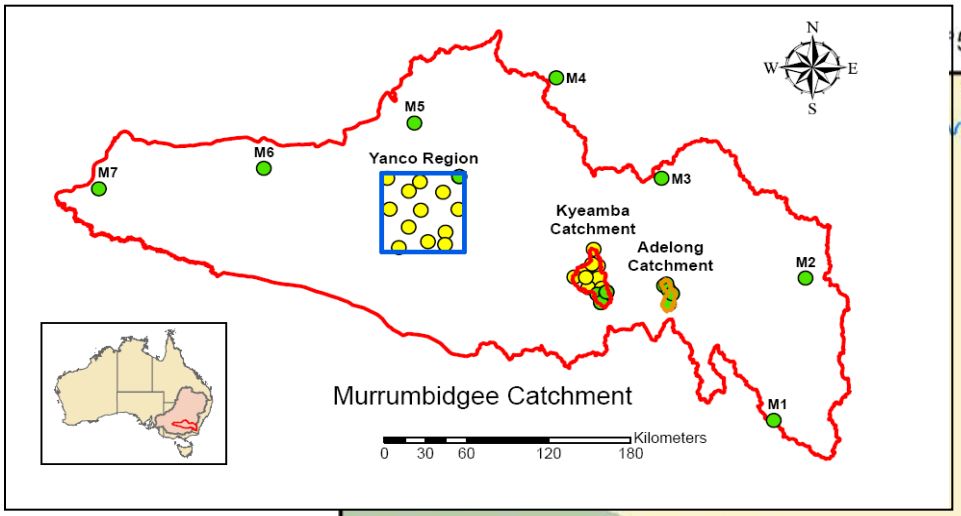


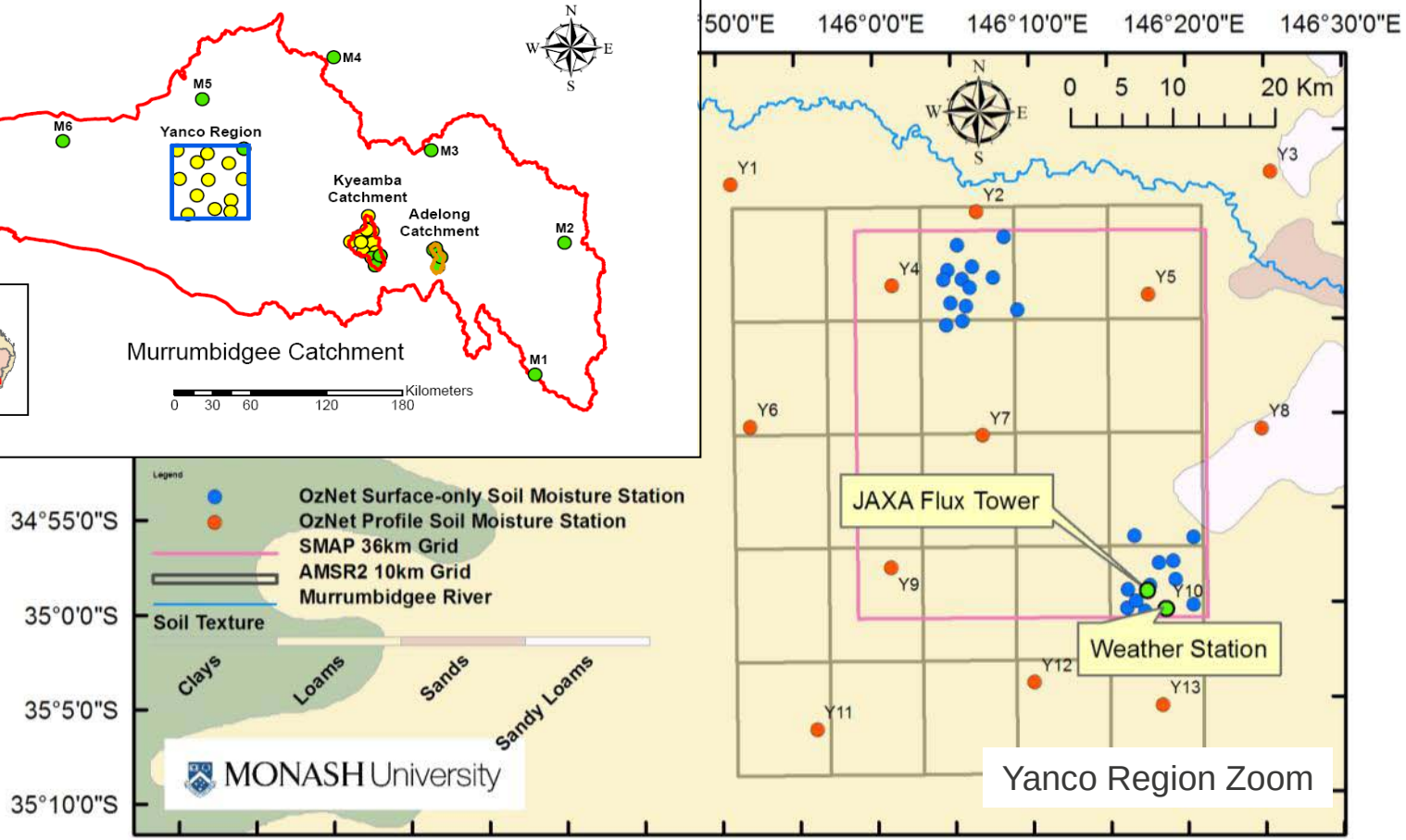
Bala Fire(NSW)
Duration : 05/10/2002-21/12/2002
Area Burnt : 92487 ha
Sample Points : 120

UNIVERSITY OF WOLLONGONG

EO within the OzNet Network

- Extensive Cal/Val activities for SMOS, SMAP, GCOM-W1 missions

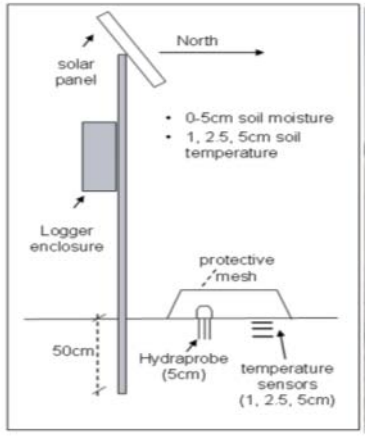




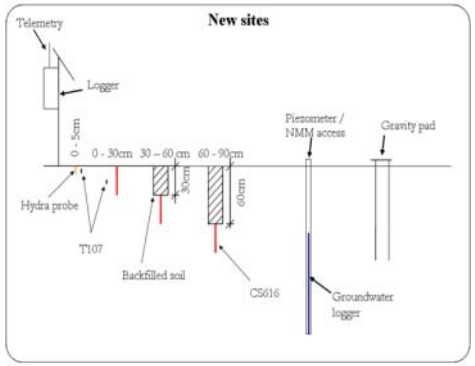
Data available in www.oznet.org.au

In-situ monitoring – Yanco site

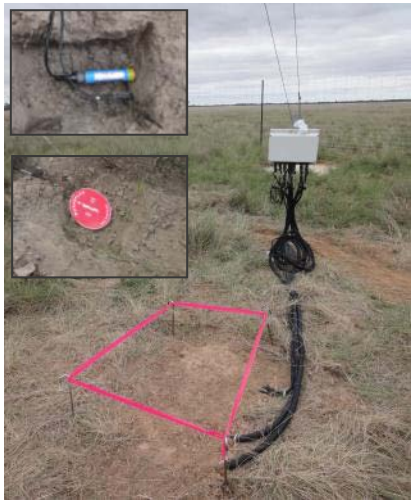
SMAPEx Stations (YA and YB sites)

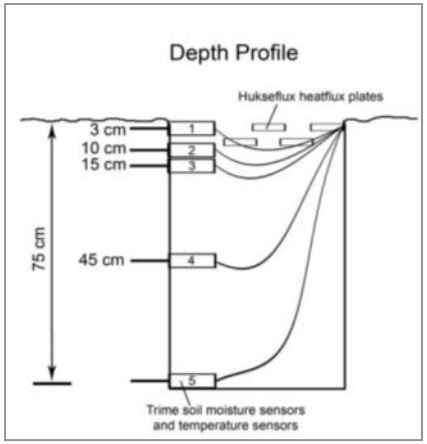


OzNet Stations (Y sites)



JAXA EC Station





In-situ monitoring – Yanco site

Scintillometers

Optical X 2 (Sensible Heat)

Microwave X 1 (Latent Heat)

Installation in progress

JAXA Flux Tower

Temperature/ Humidity Sensor

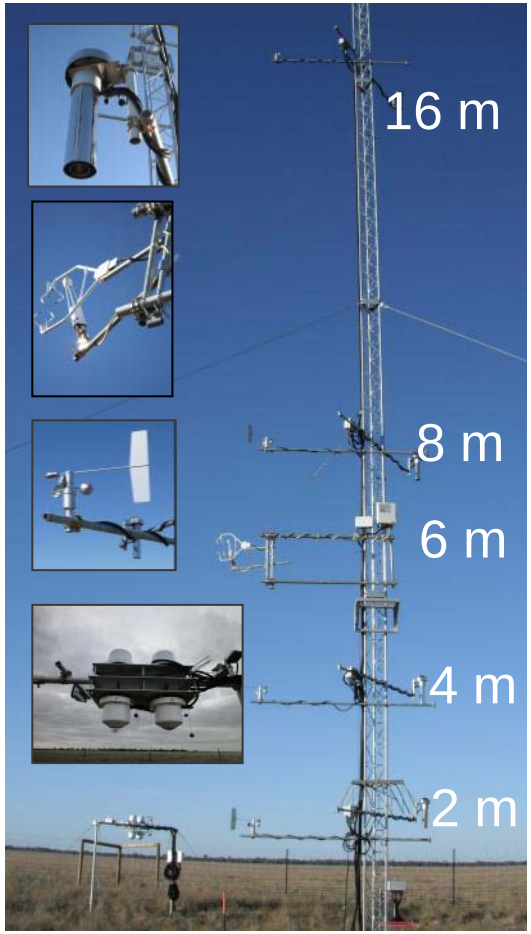
3-D Ultrasonic Anemometer

Infrared gas analyzer

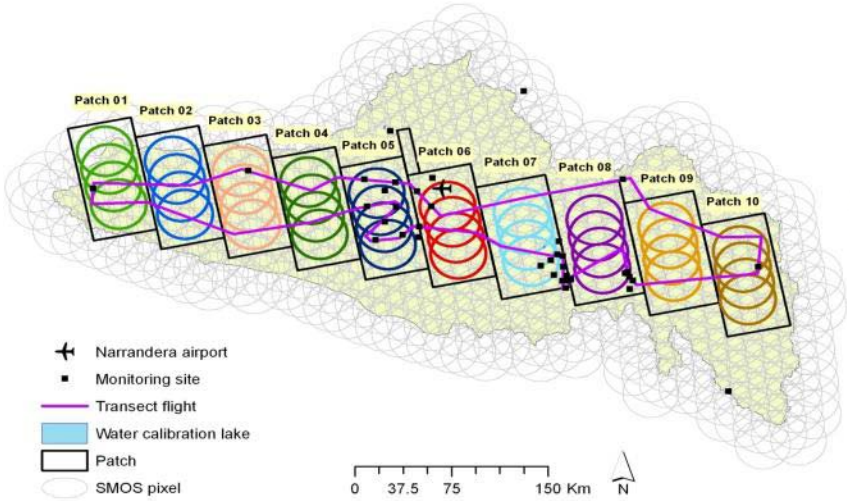
Wind sensor

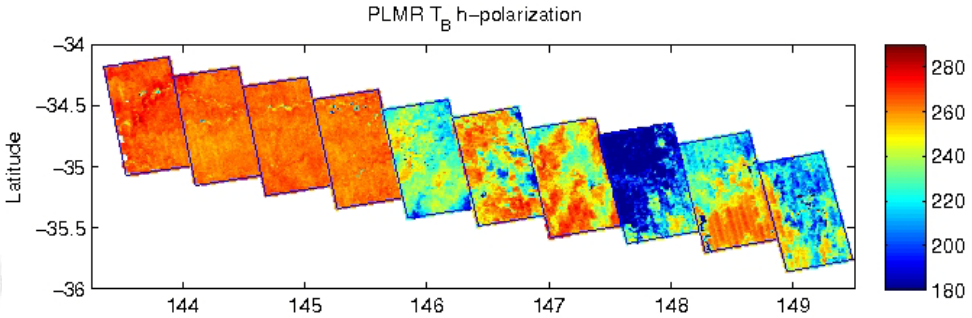
6 component radiation sensors

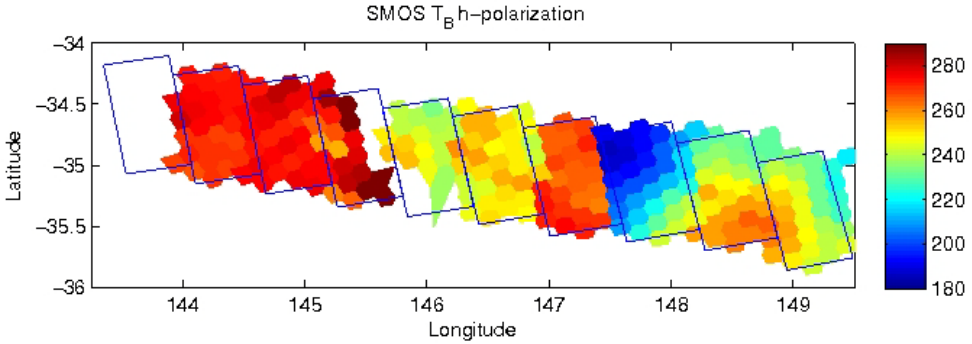
May 2012 - Current

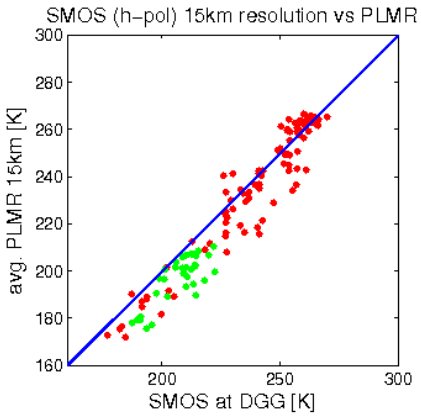


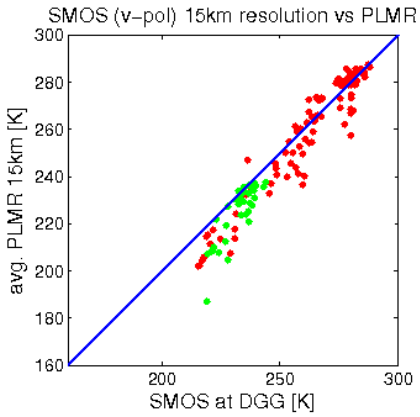
SMOS Cal/Val – AACES campaigns







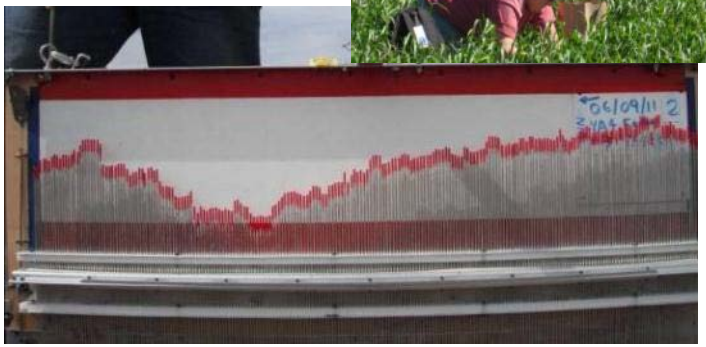


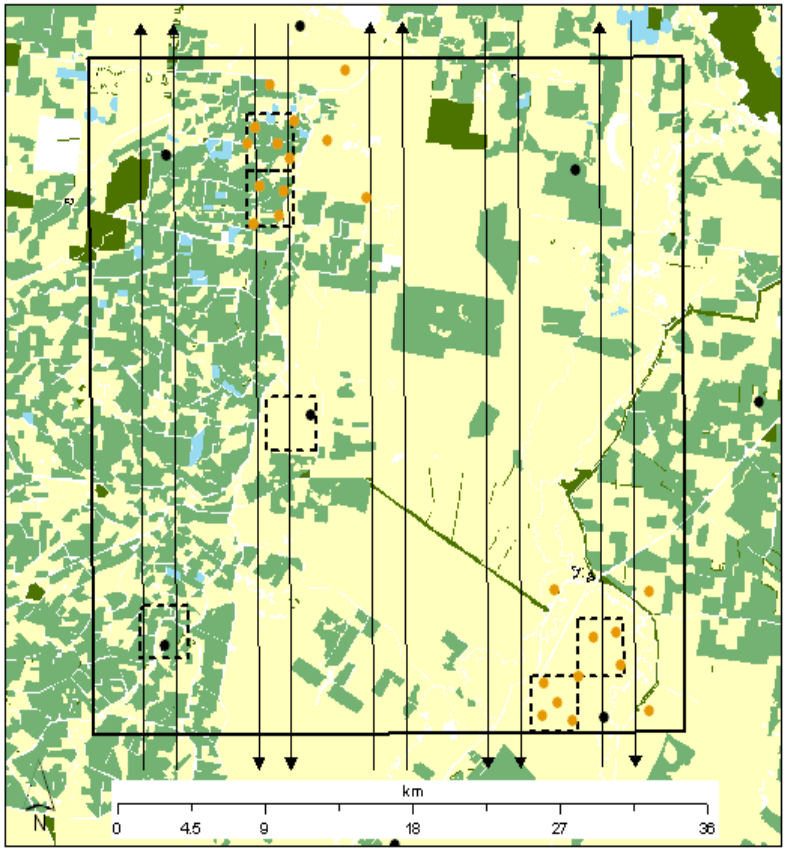


AACES data available online:
http://www.moisturemap.monash.edu.au/aaces/index.php

Plots from Rüdiger et al. (2013), submitted.

SMAP Cal/Val Rehearsal - SMAPEx



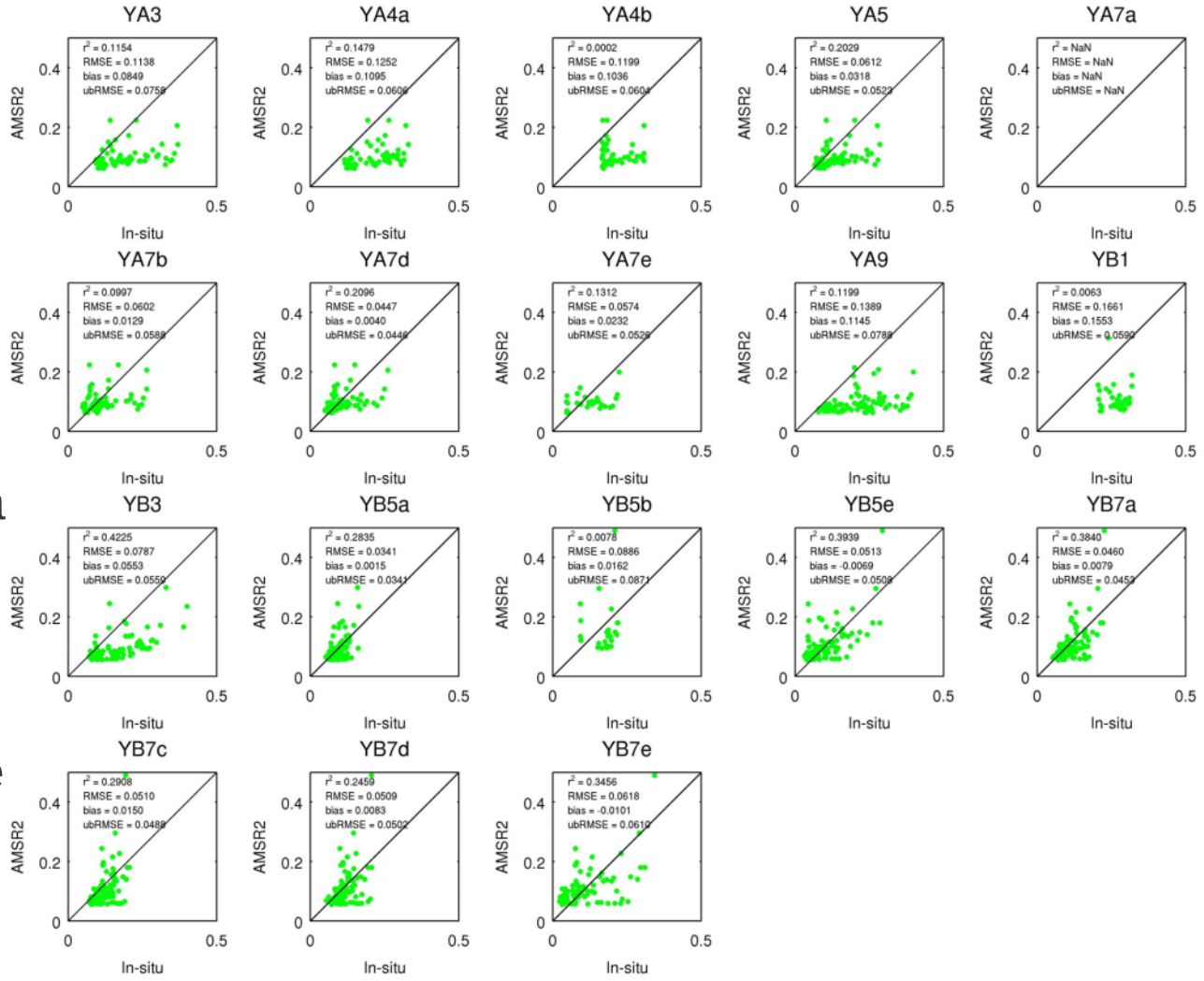


- Coverage: 34km × 38km
- Ground resolution: 1km PLMR, 10-30m PLIS

GCOM-W1 Cal/Val

- Comparison of AMSR2 soil moisture against in-situ from the OzNet monitoring stations in the Yanco Region
- Viewer of the data from the flux tower:

http://www.arts.monash.edu.au/ges/research/climate/jaxa/



Australia to Chair CEOS in 2016

- Via CSIRO, Australia has recently been invited to become Chair of the Committee on Earth Observation System (CEOS (http://www.ceos.org)) for 2016
- Dr Alex Held (tentative Chair)
- Developing budget and forward plan, in close consultation with central government and associated agencies.
- Suggestions welcome from WGCV for areas or activities which could be emphasized during the 2015-2017 term.

Australian Government
Geoscience Australia

Thank you

36th Plenary Meeting CEOS Working Group on Calibration and Validation
Shanghai, 13-17 May 2013