Australian Government
Geoscience Australia

National Planning and Coordination for the Use of Satellite Data in Australia

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Outline – policy, planning, and paradigms

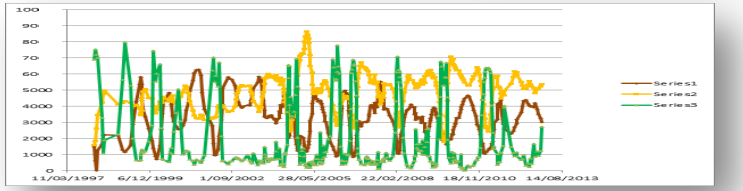
Geoscience Australia

Australia's Satellite Utilisation Policy

Priorities for Earth Observation capabilities and cooperation between agencies

Extracting information from EOS for land and water uses

Convergence of meteorological and land/water EOS



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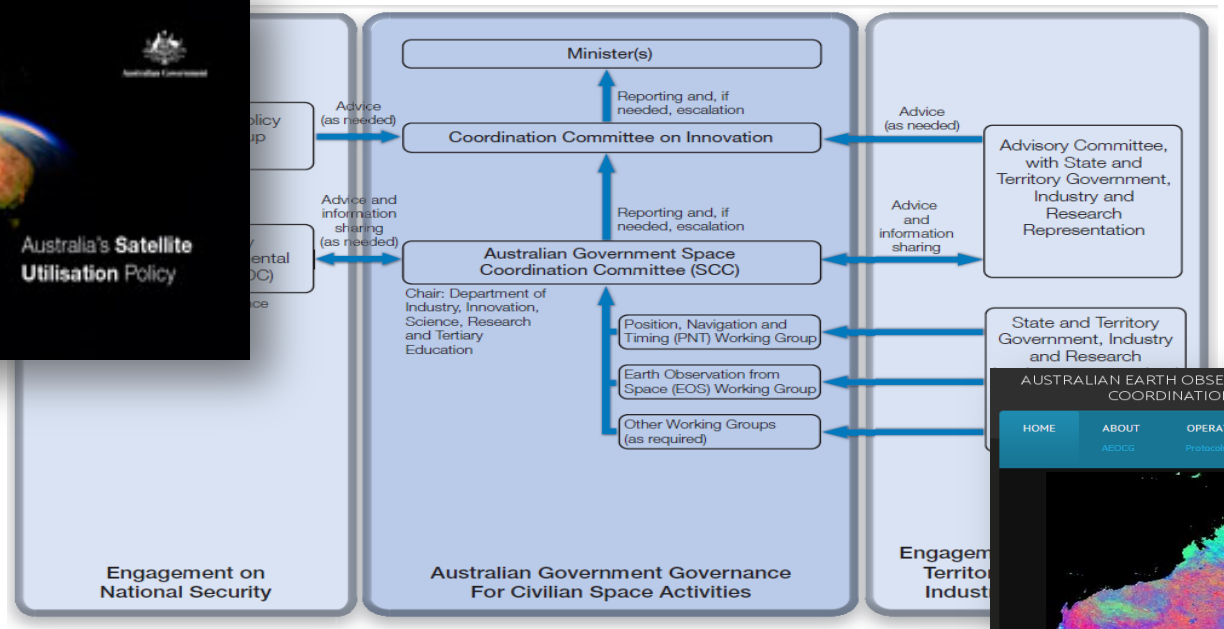
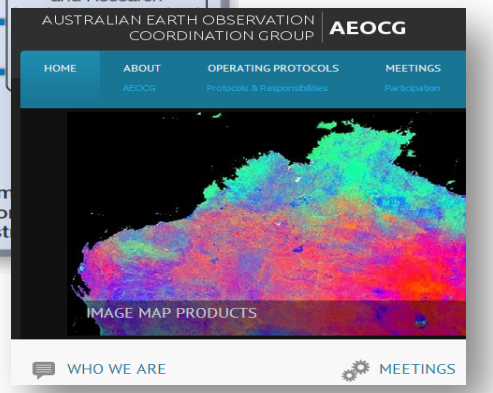
Space policy (satellite utilisation policy)

Policy





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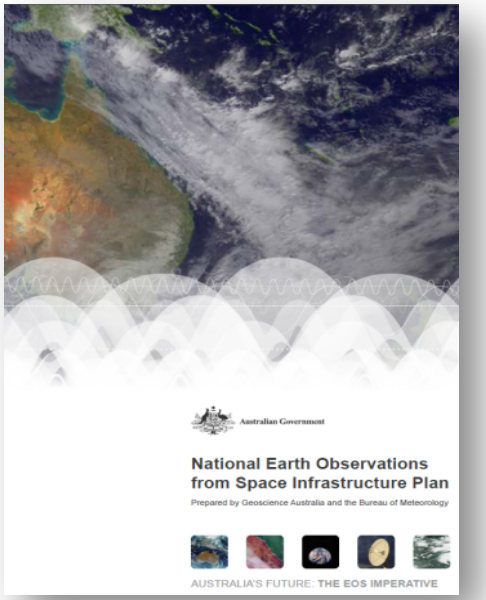
Earth Observation Planning

Five priority areas for EOS :

Policy



1. Coordination
2. Continued observations
3. Ground segment
4. Extracting information
5. Sustained capability

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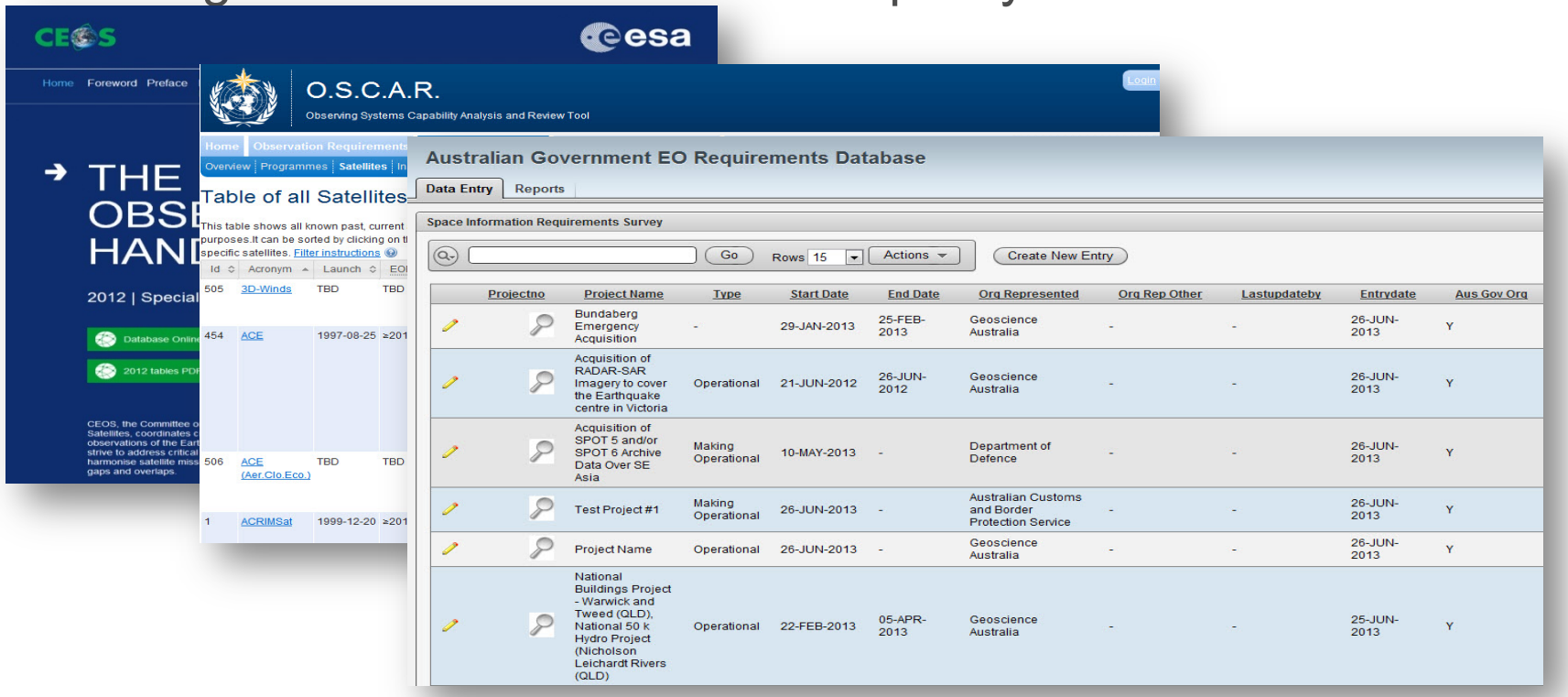
Coordination – Rolling Review of EOS needs

Providing an evidence base for EOS policy and infrastructure.



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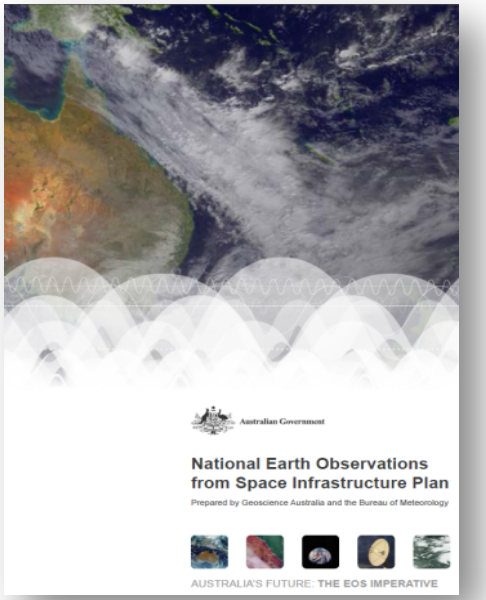
Earth Observation Planning

Five priority areas for EOS :

Policy



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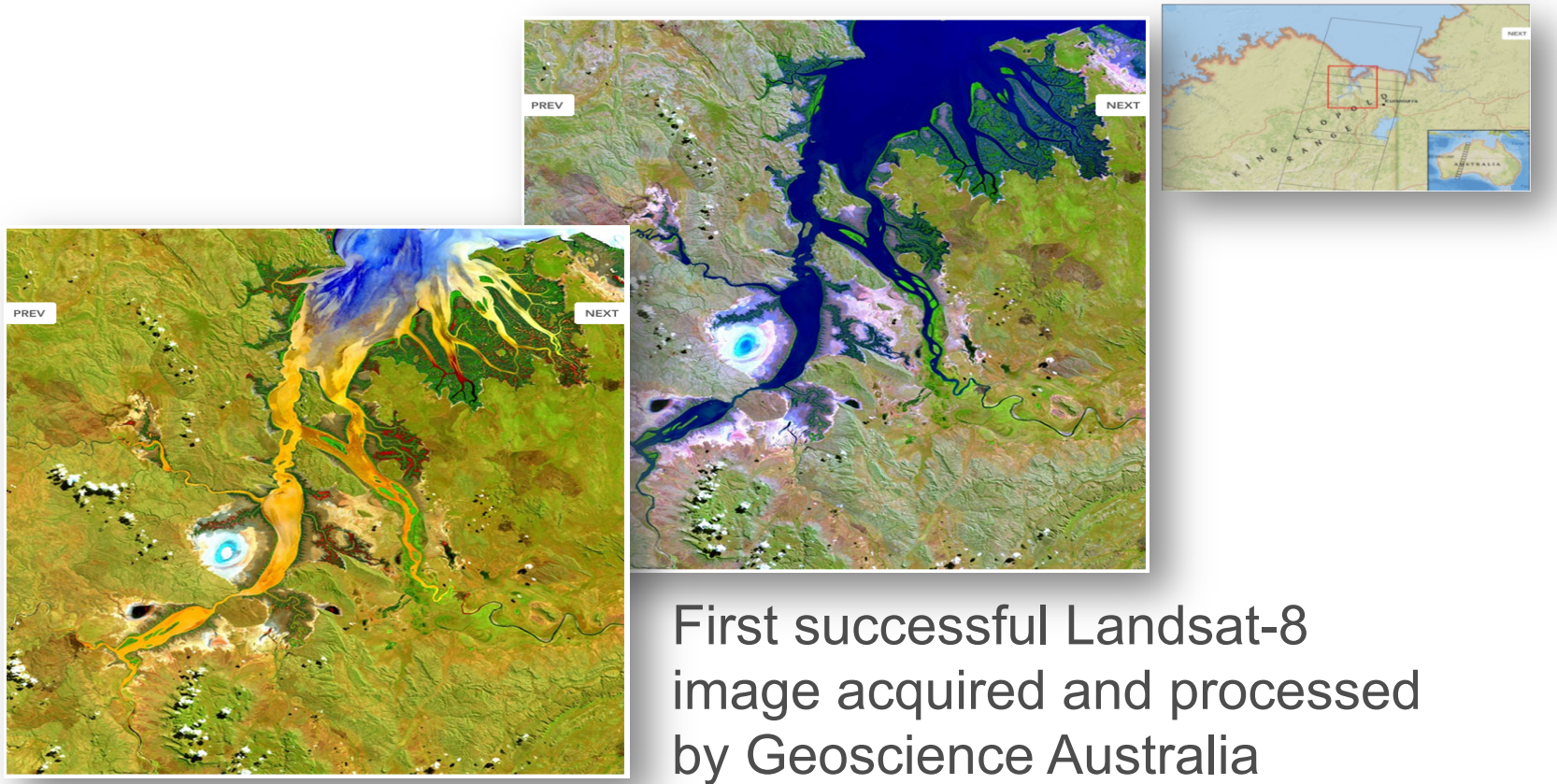
Future missions – Landsat



First successful Landsat-8 image acquired and processed by Geoscience Australia

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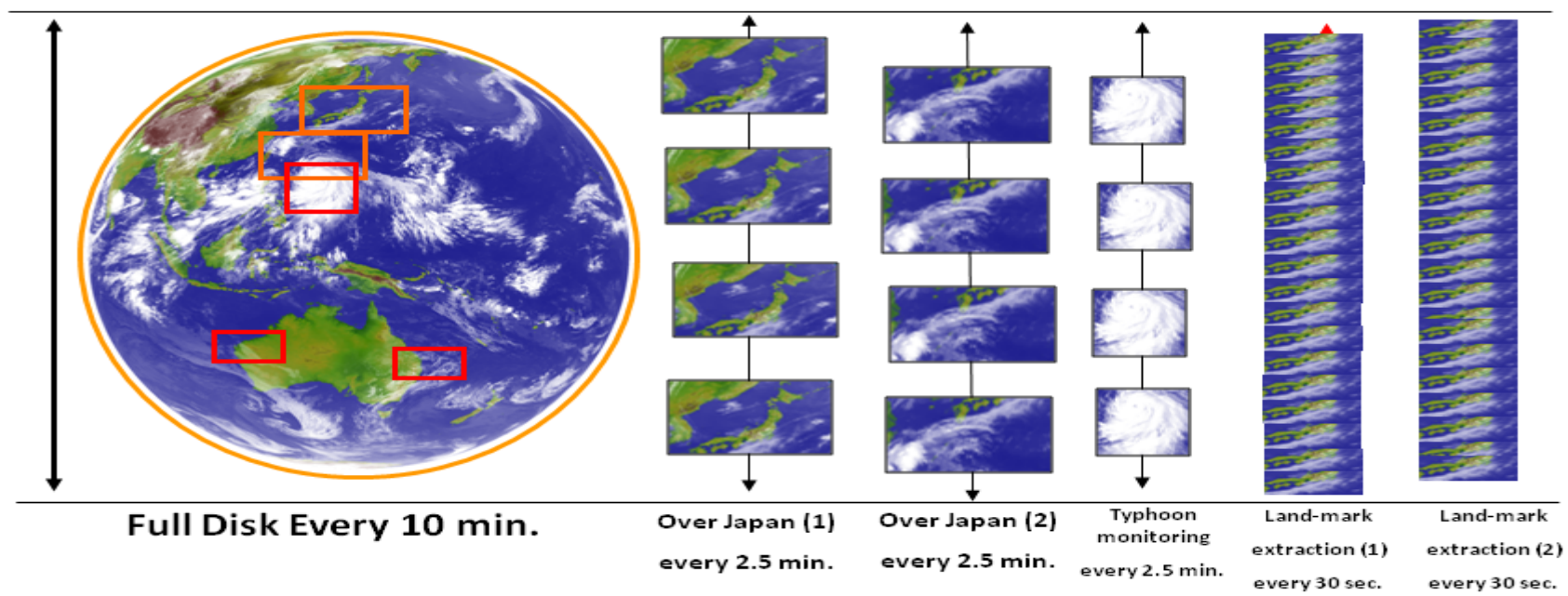
Future missions - Himawari 8/9



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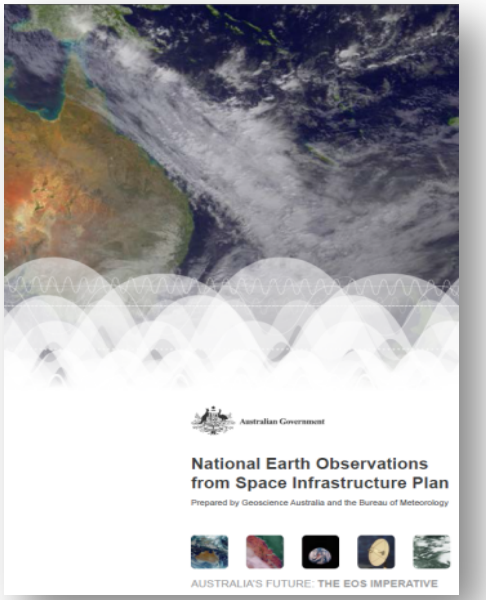
Earth Observation Planning

Five priority areas for EOS :

Policy



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Extracting information with high performance computing - National Computational Infrastructure

Raijin - Fujitsu cluster, June 2013)

- 57,000 cores, 160 TB of RAM, 10 PB disc, 1.2 petaflops
- Bureau of Meteorology, CSIRO, ANU, GA.
- Addressing climate change, earth systems science and national water management issues.

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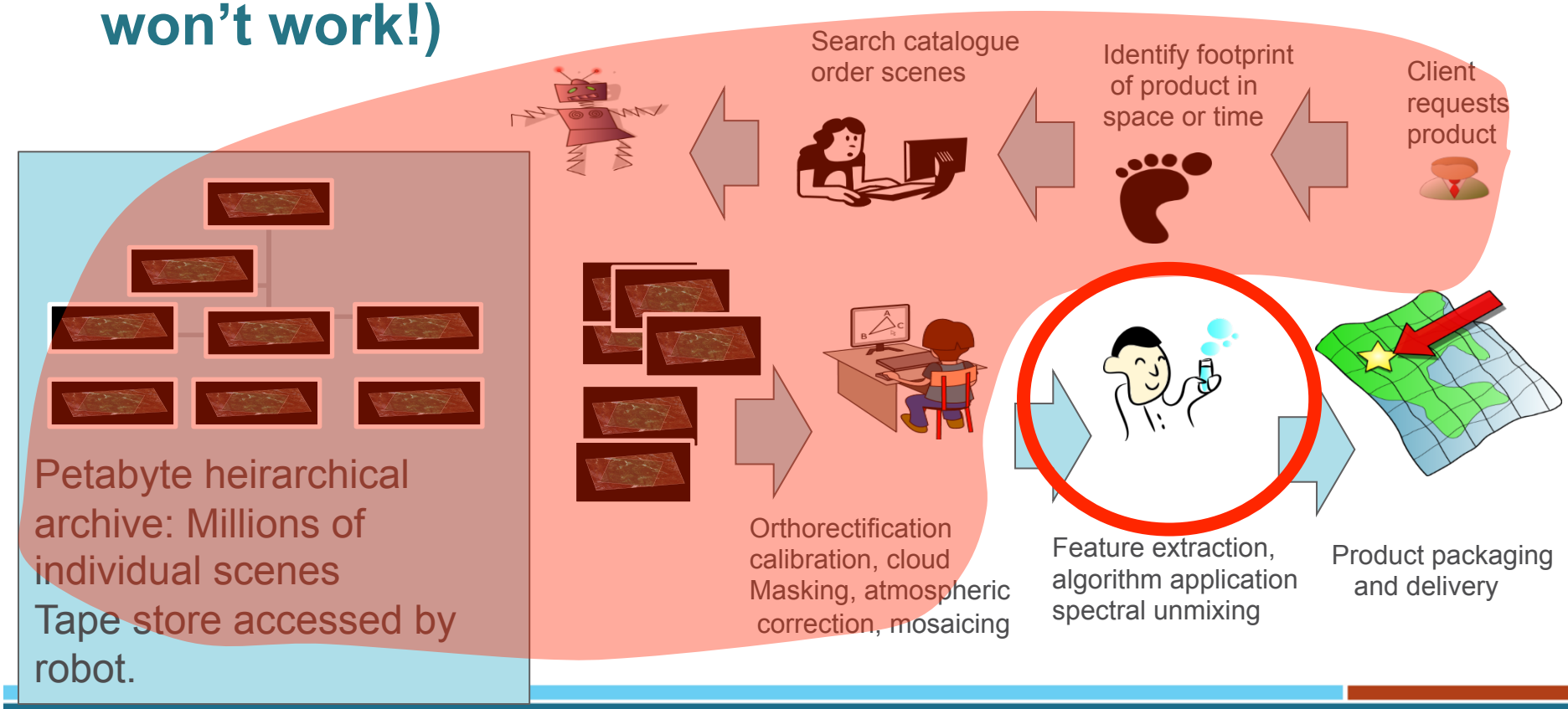
New paradigm in remote sensing (old methods won't work!)



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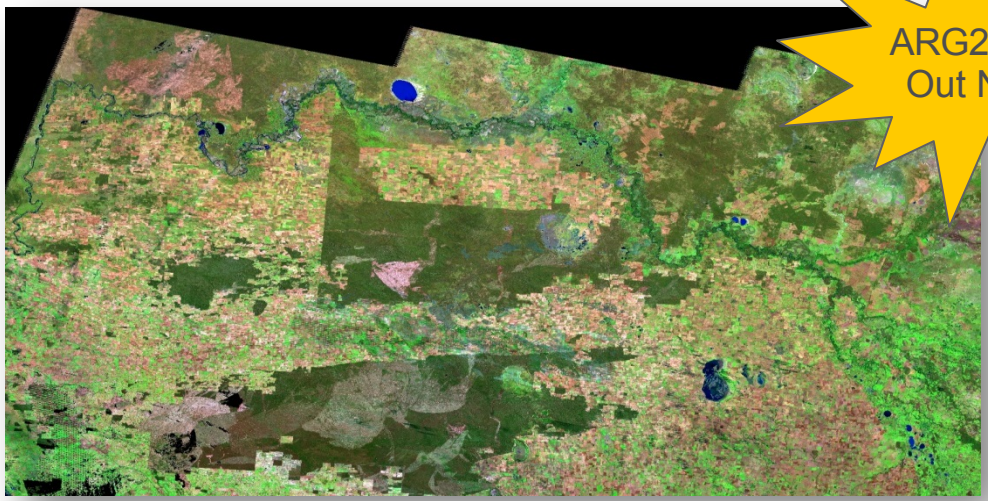
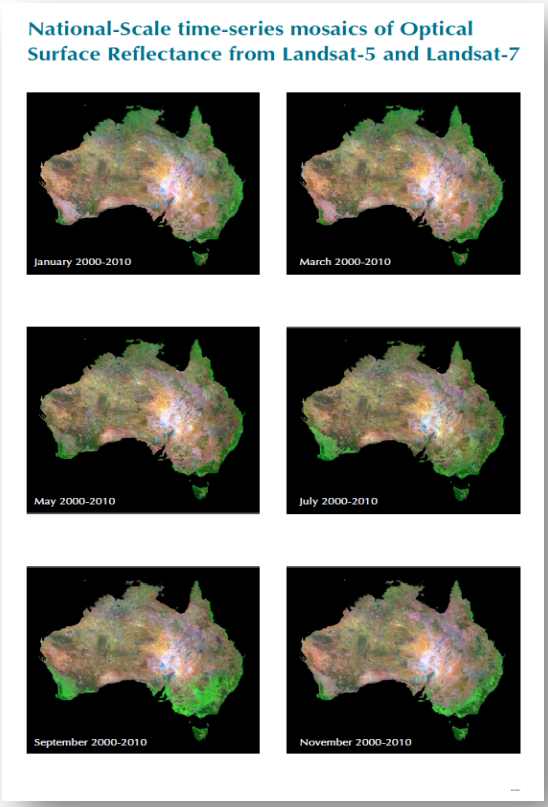
Calibrated observations of surface reflectance



ARG25 v0.1
Out Now!



2000-2010 Landsat surface reflectance data available via GA's Discovery and Delivery System (www.ga.gov.au/search/index.html)

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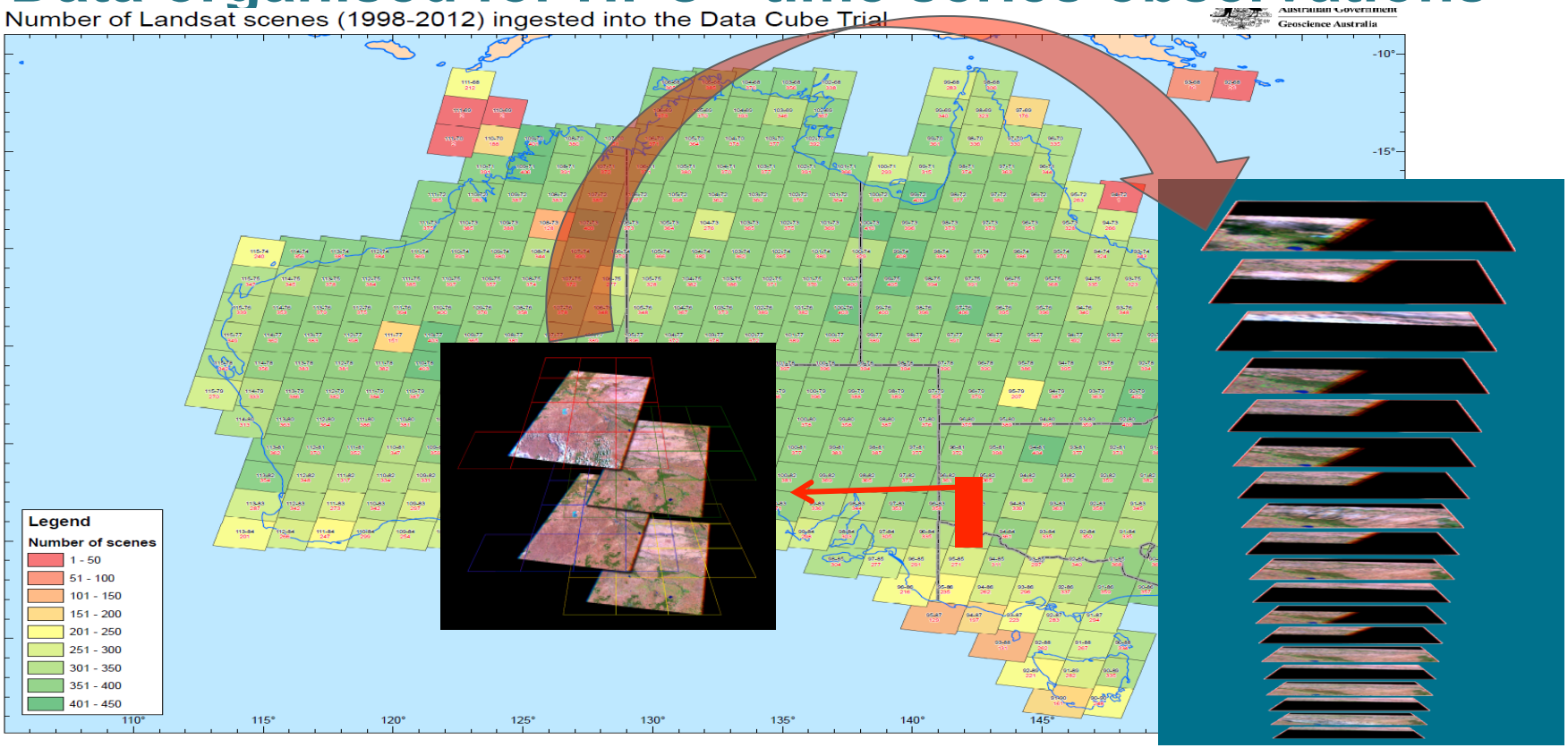
Data organised for HPC - time series observations



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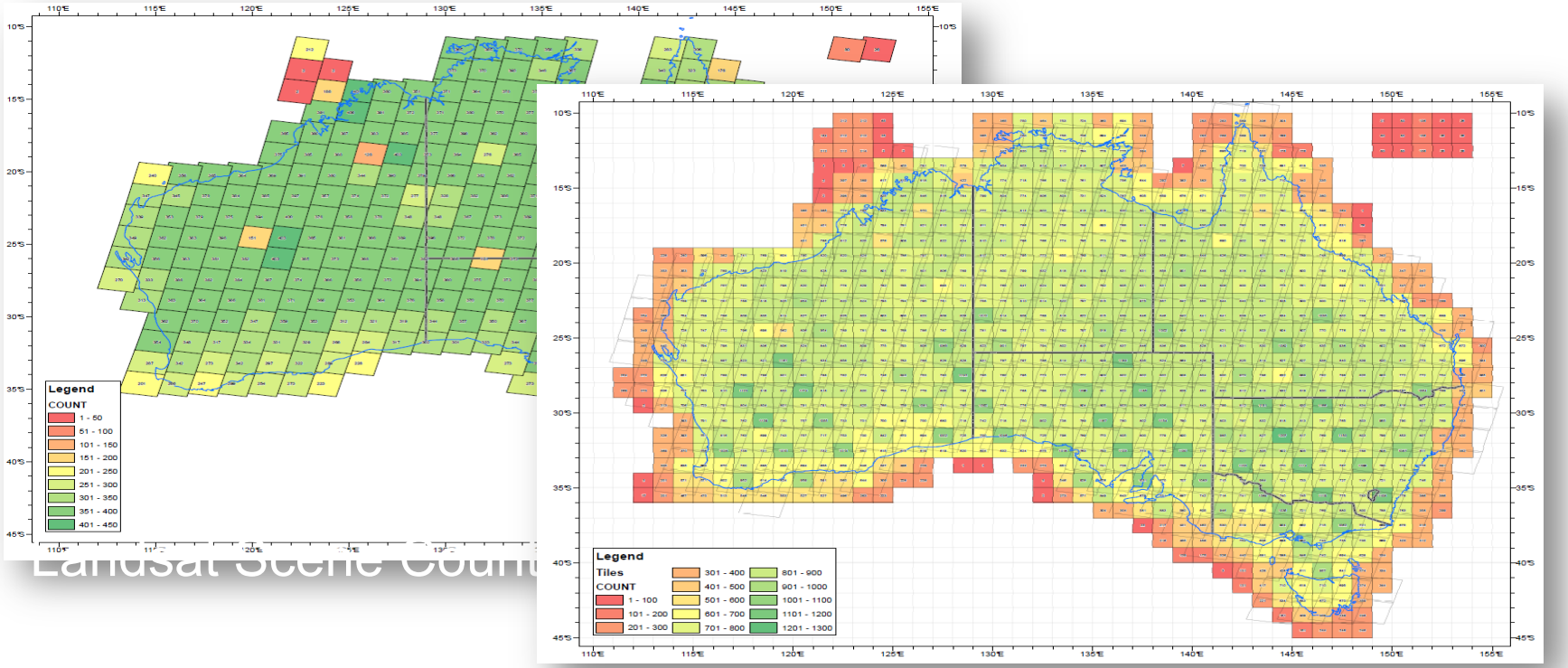
Data organised for HPC - time series observations



Landsat Scene Count

scenes)

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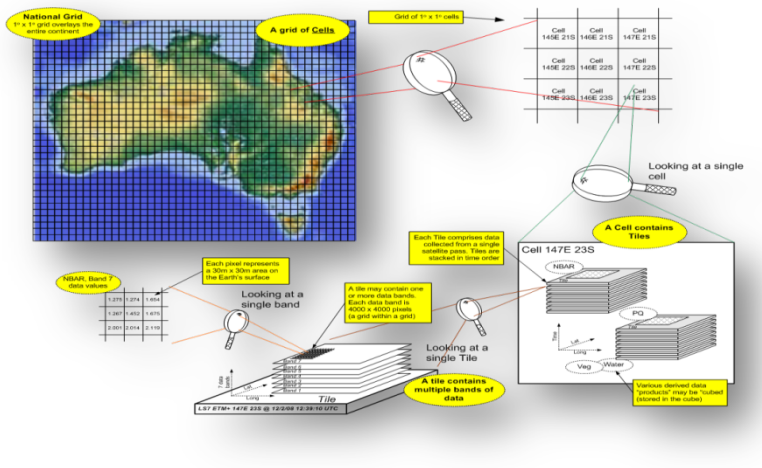
The “data-cube” concept (OGC development)



[Data-cube vocabularies for the web: http://www.w3.org/TR/vocab-data-cube/](http://www.w3.org/TR/vocab-data-cube/)

5.2 The cube model - dimensions, attributes, measures

This section is non-normative.

A statistical data set comprises a collection of observations made at some points across some logical space. The collection can be characterized by a set of dimensions that define what the observation applies to (e.g. time, area, gender) along with metadata describing what has been measured (e.g. economic activity, population), how it was measured and how the observations are expressed (e.g. units, multipliers, status). We can think of the statistical data set as a multi-dimensional space, or hyper-cube, indexed by those dimensions. This space is commonly referred to as a *cube* for short; though the name shouldn't be taken literally, it is not meant to imply that there are exactly three dimensions (there can be more or fewer) nor that all the dimensions are somehow similar in size.

A cube is organized according to a set of *dimensions*, *attributes* and *measures*. We collectively call these *components*.

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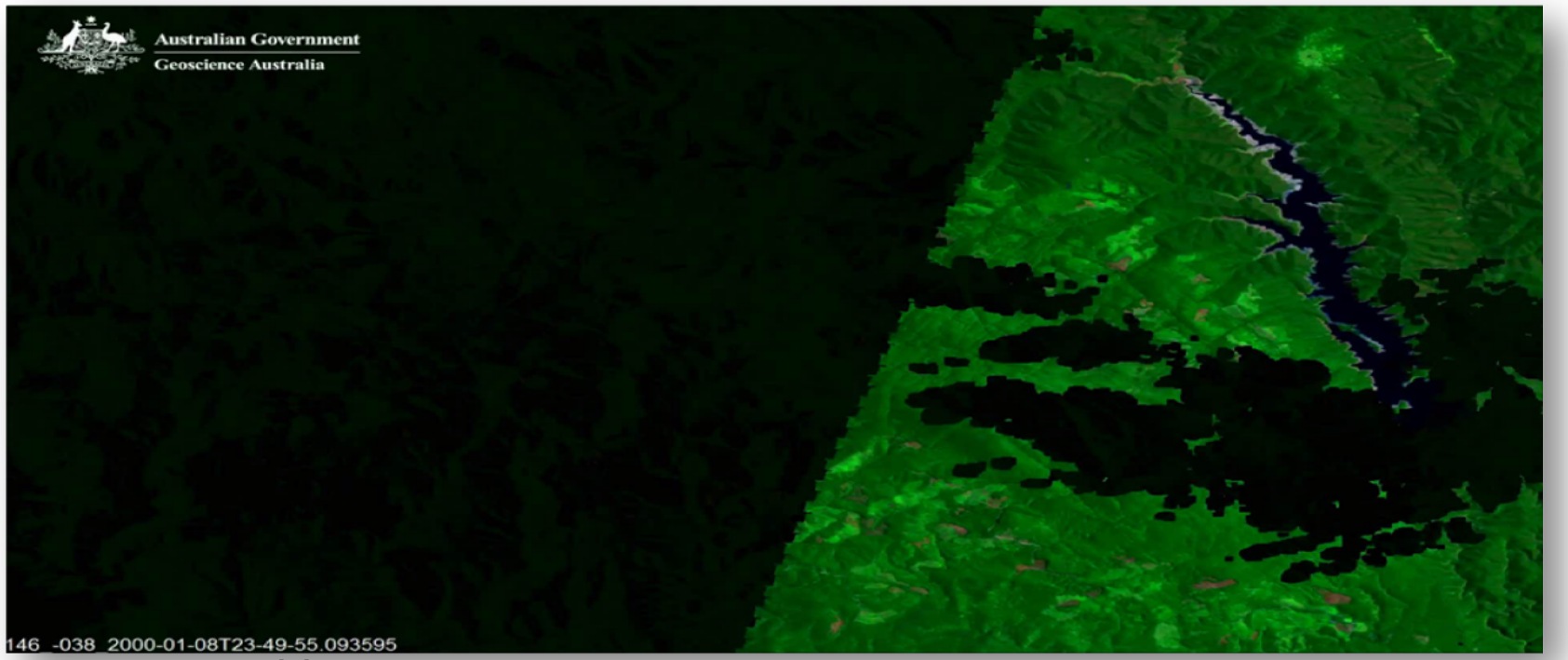
Change visualisation

Forest Management – Thomson Catchment, Victoria. False colour.



yyyy-mm-dd

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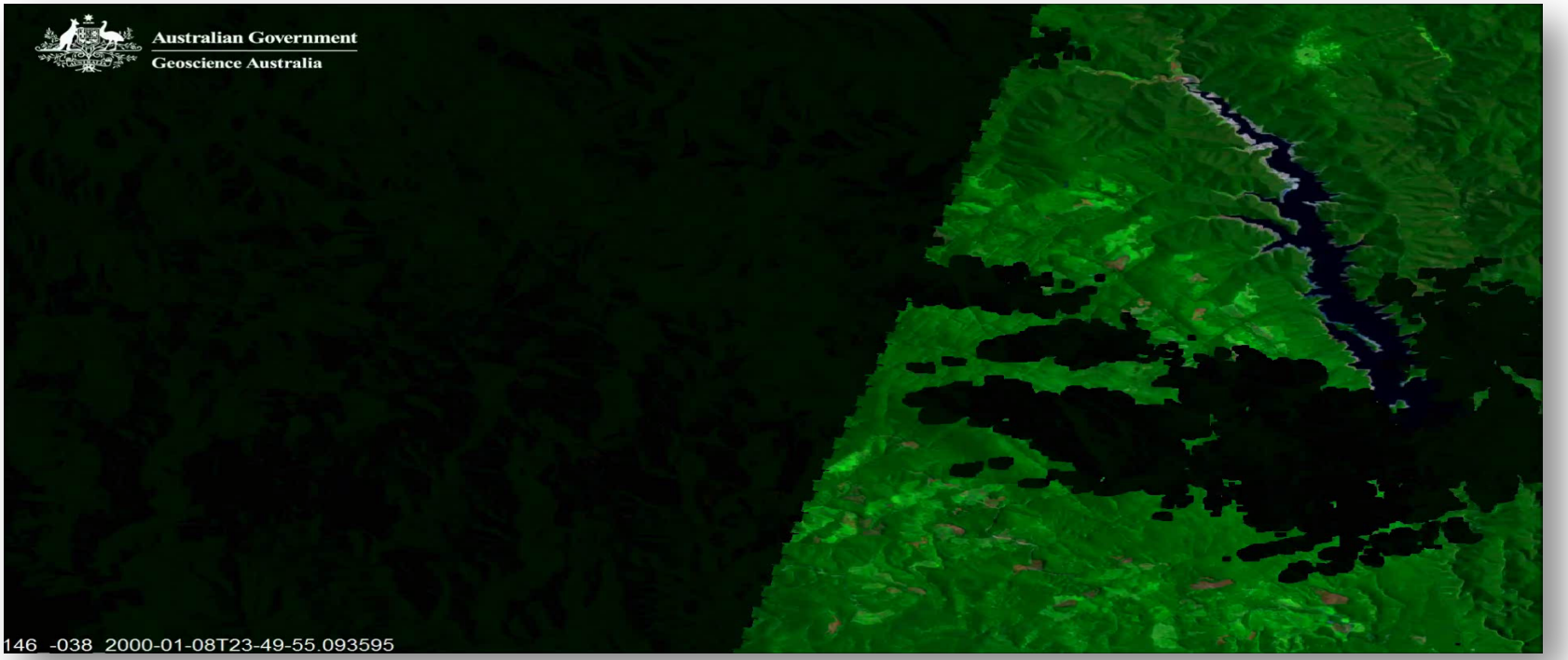
Visualising time-series

Forest Management – Thomson Catchment, Victoria. False colour.



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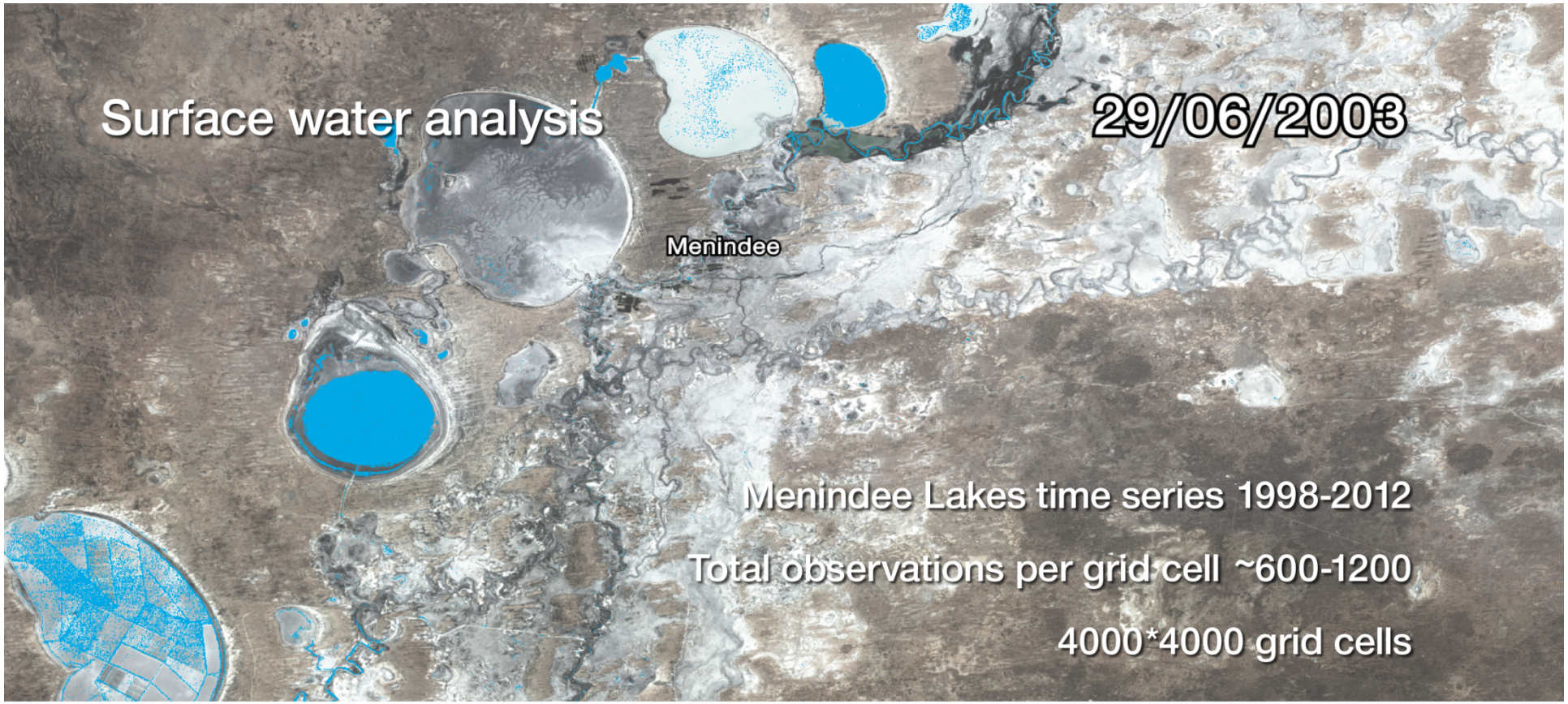
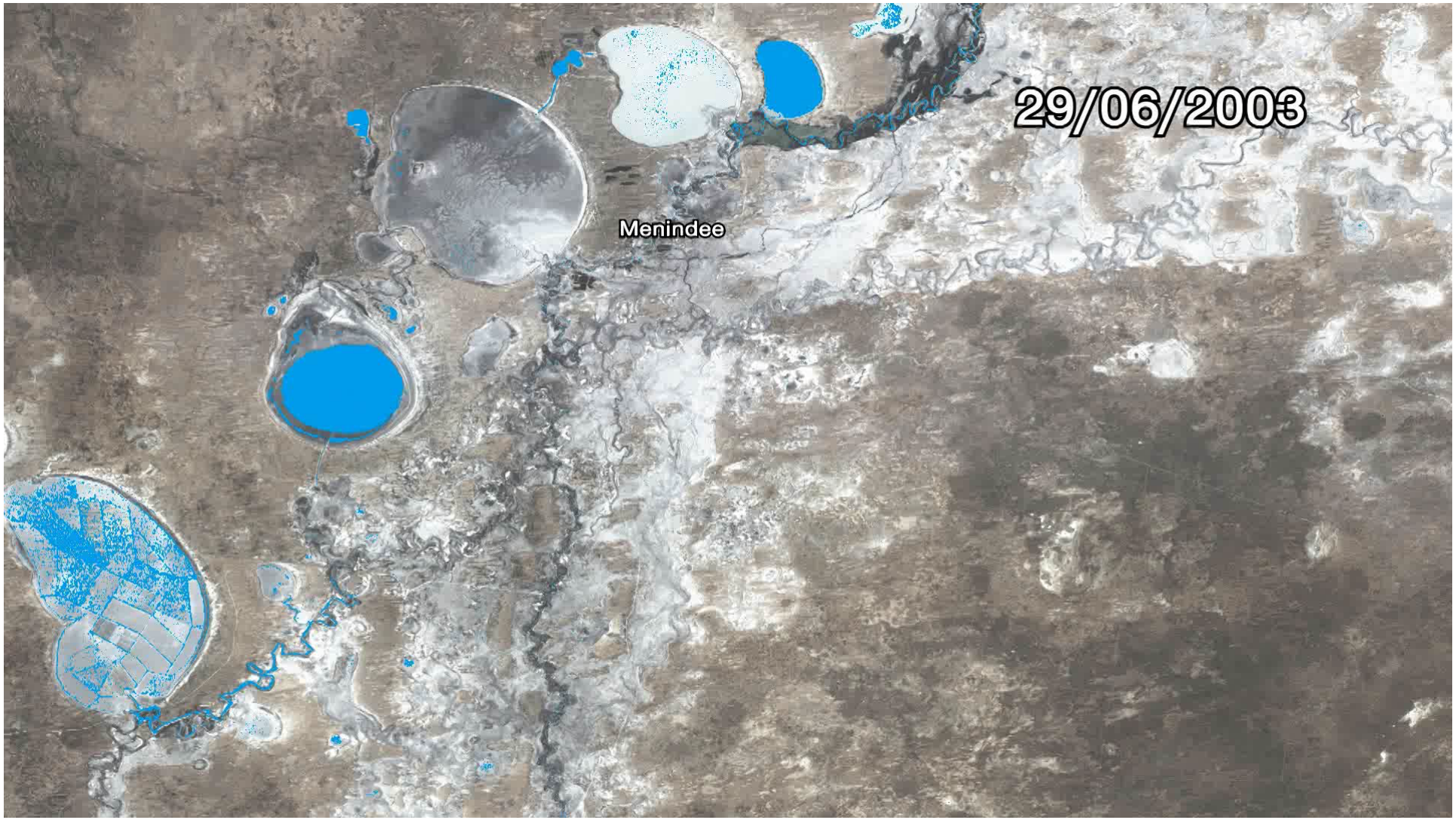
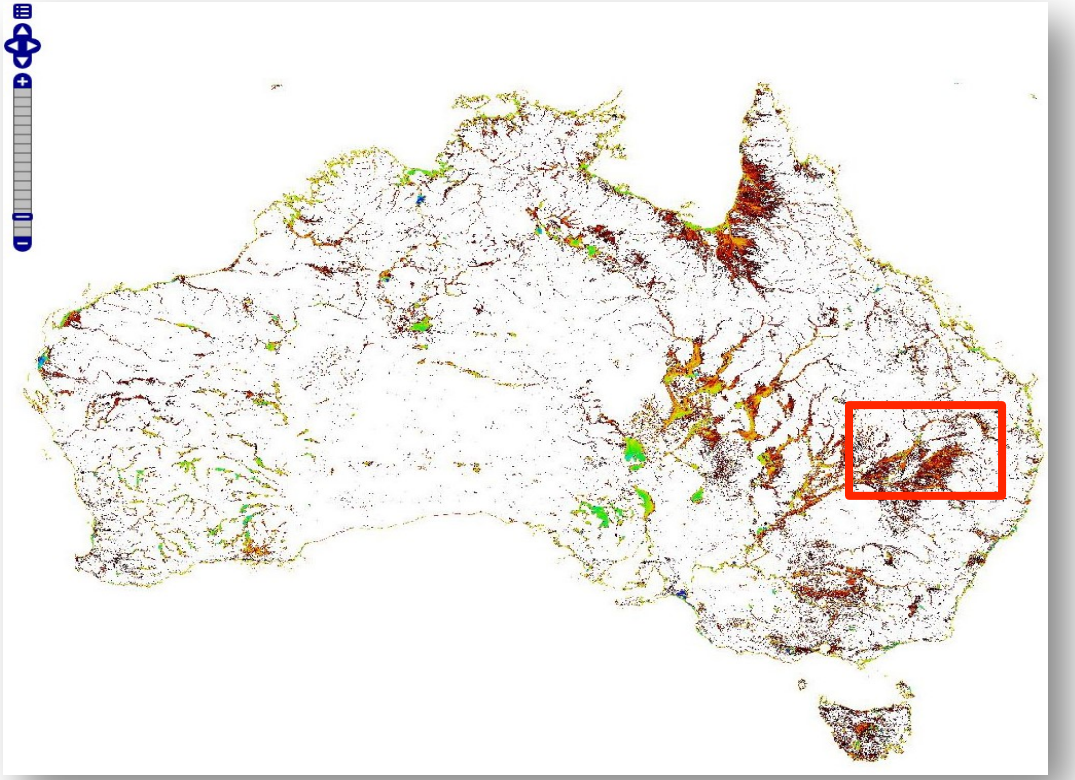

Surface water analysis
29/06/2003
Menindee
Menindee Lakes time series 1998-2012
Total observations per grid cell ~600-1200
4000*4000 grid cells


29/06/2003
Menindee

Normalised 15-year surface water count (25m)



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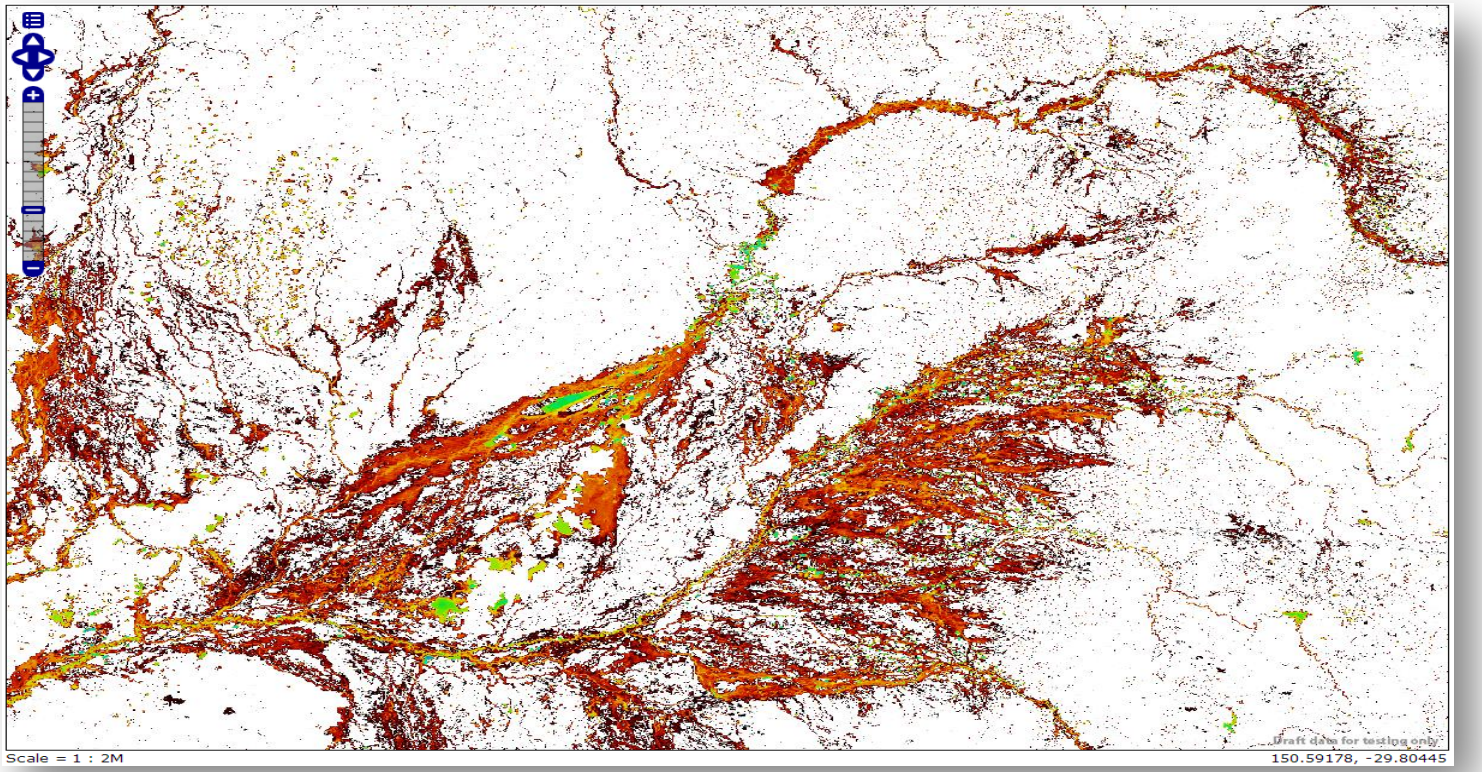
Normalised 15-year surface water count (25m)



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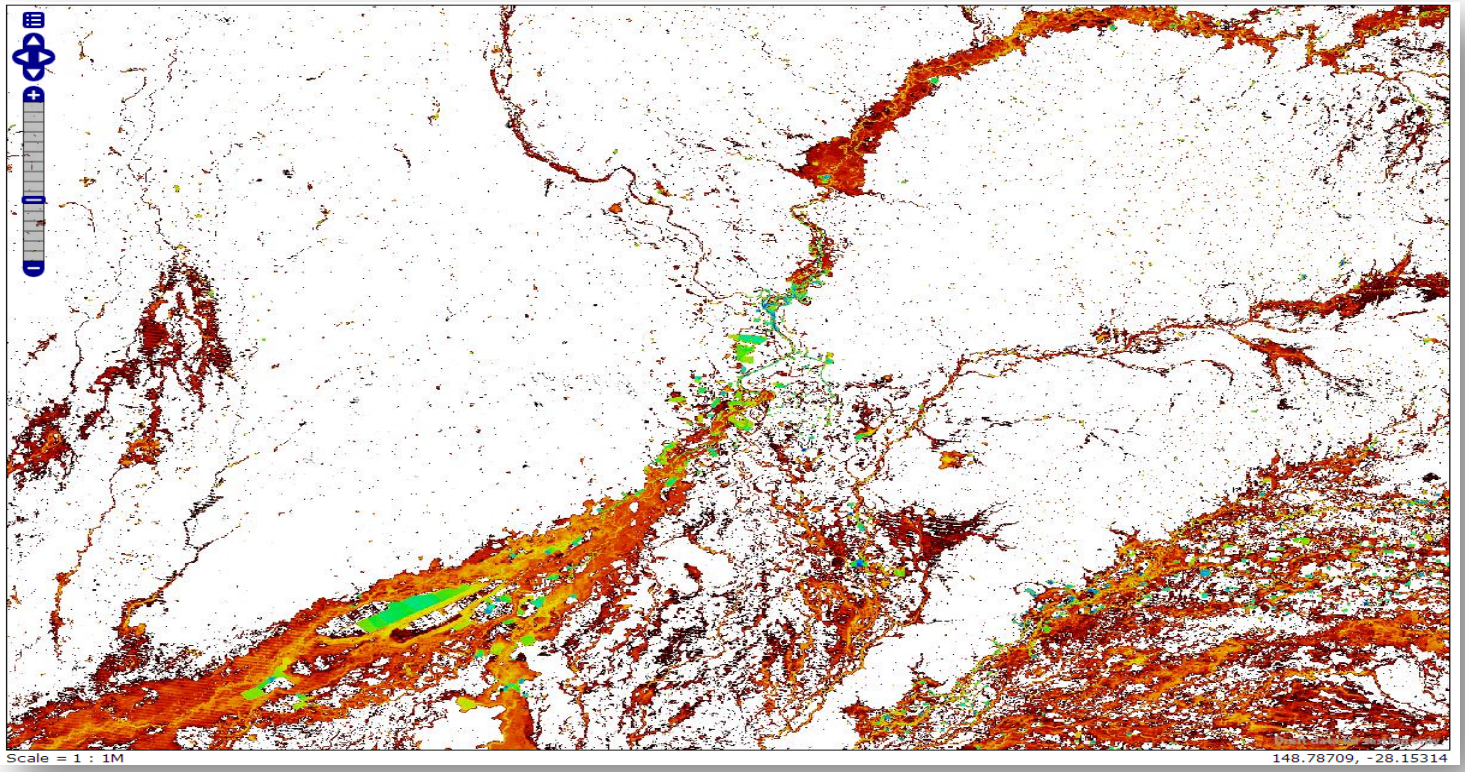
Normalised 15-year surface water count (25m)



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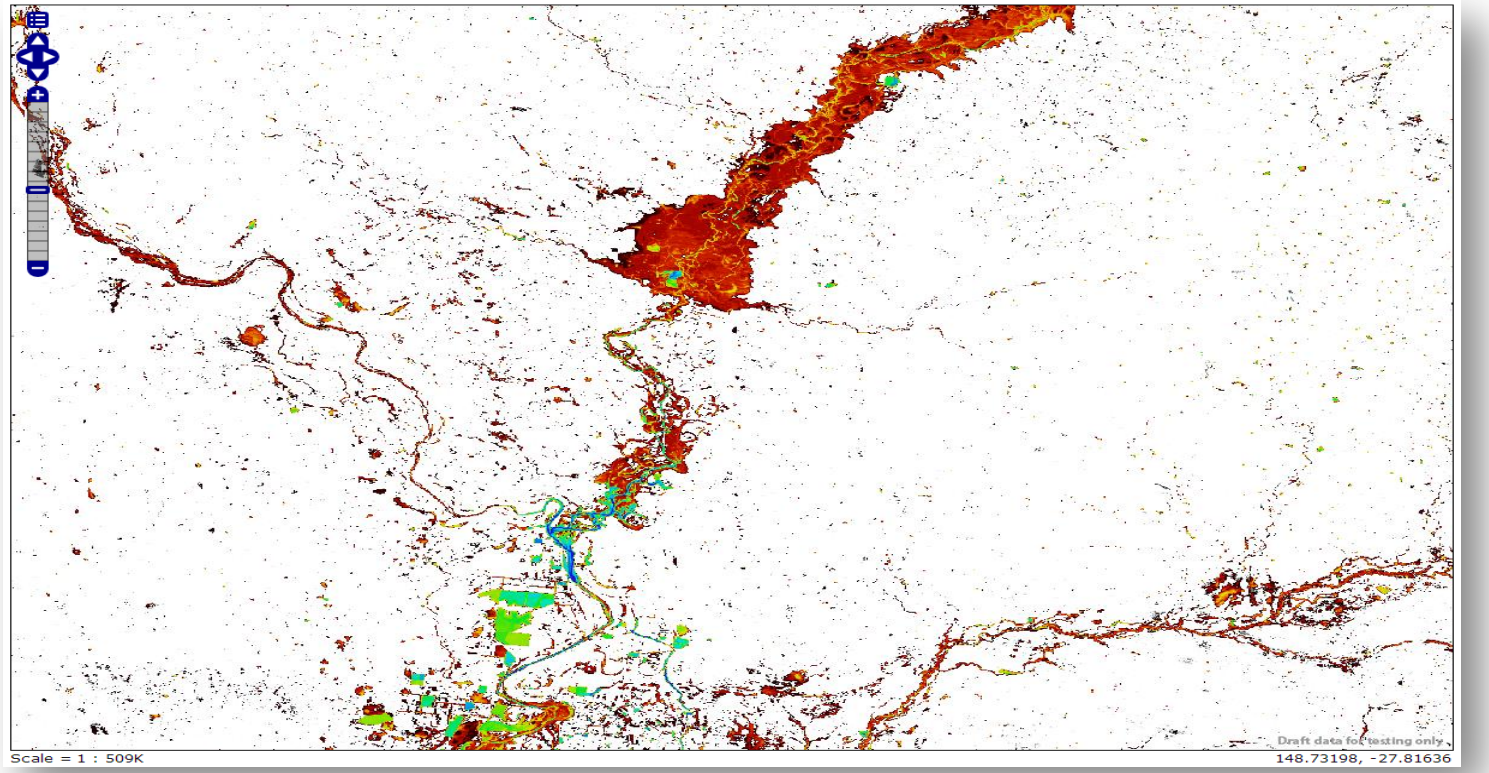
Normalised 15-year surface water count (25m)



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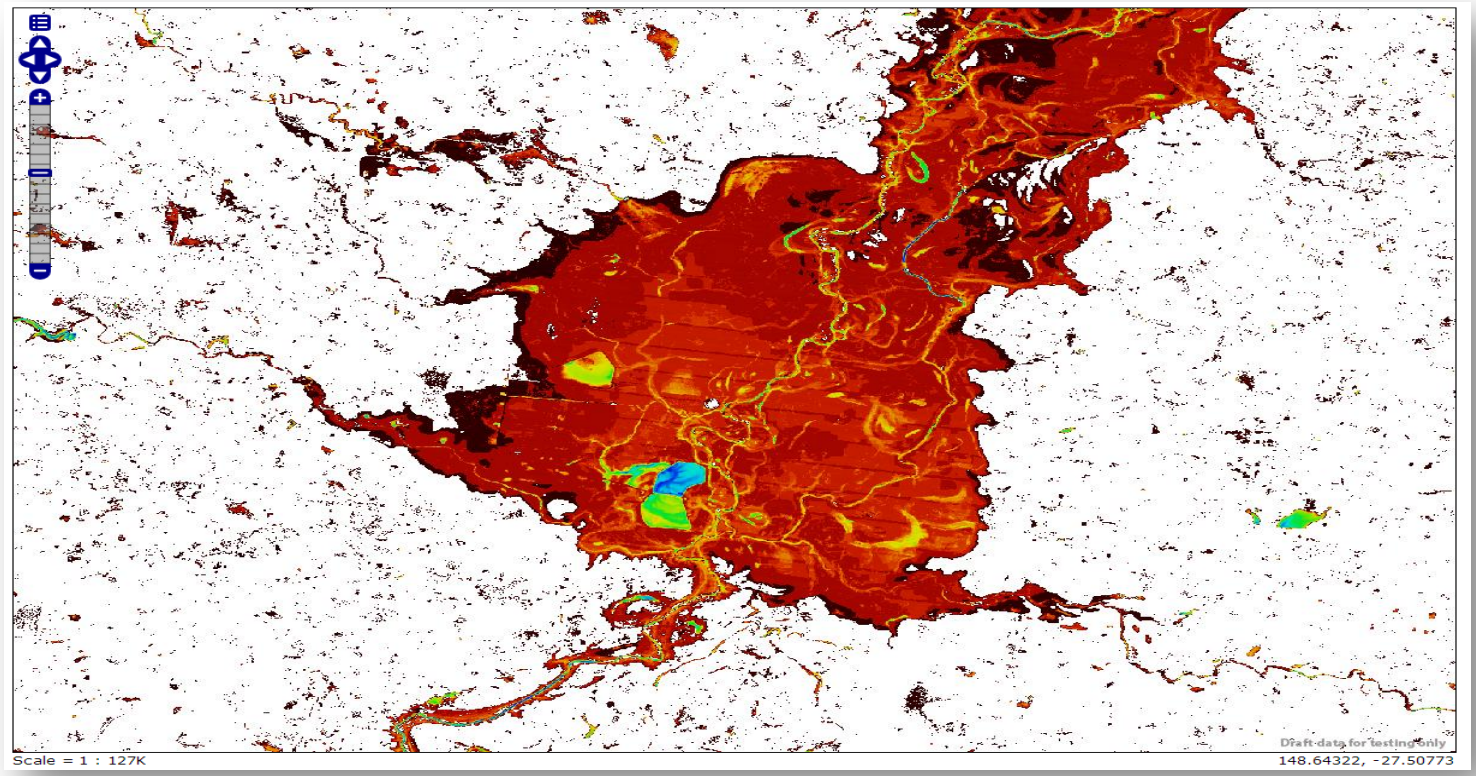
Normalised 15-year surface water count (25m)



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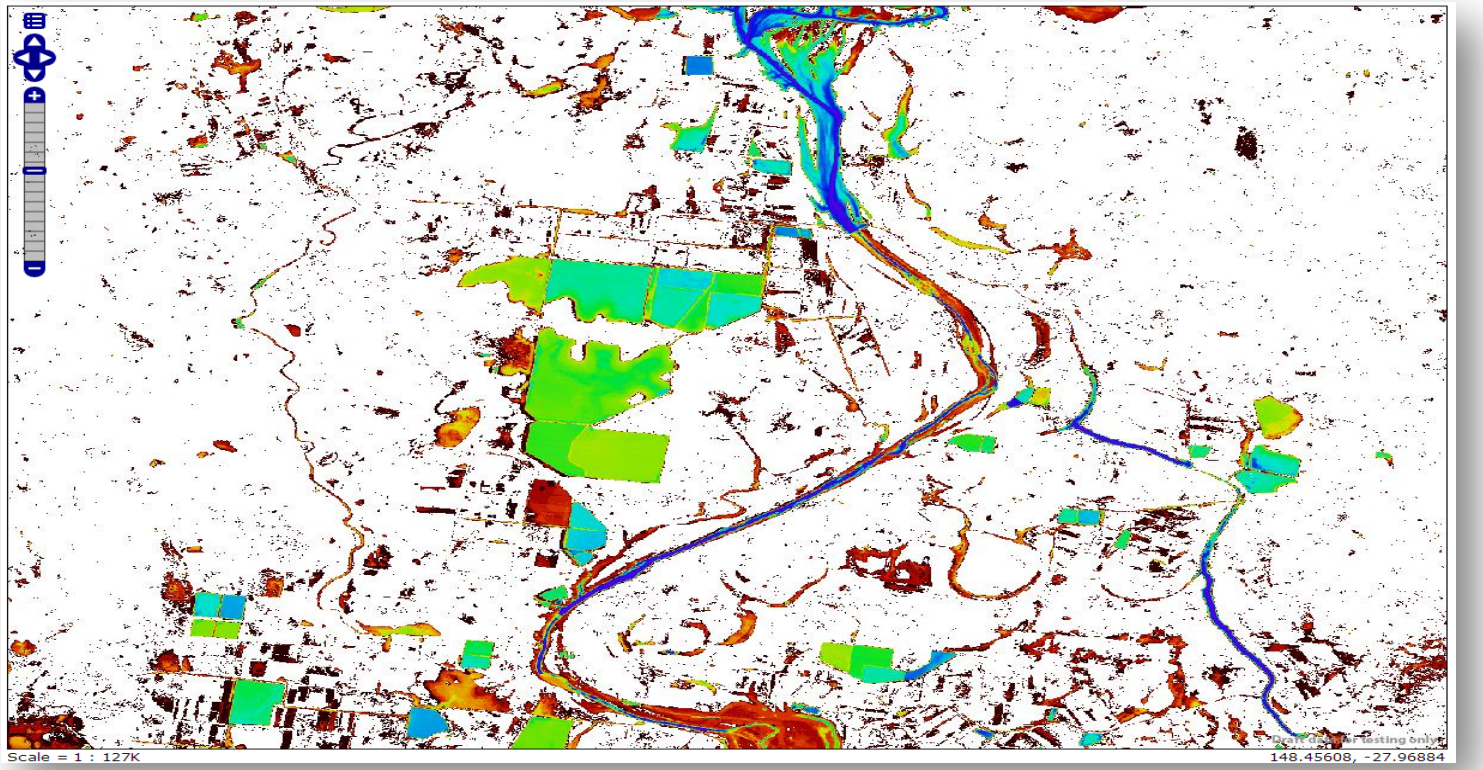
Normalised 15-year surface water count (25m)



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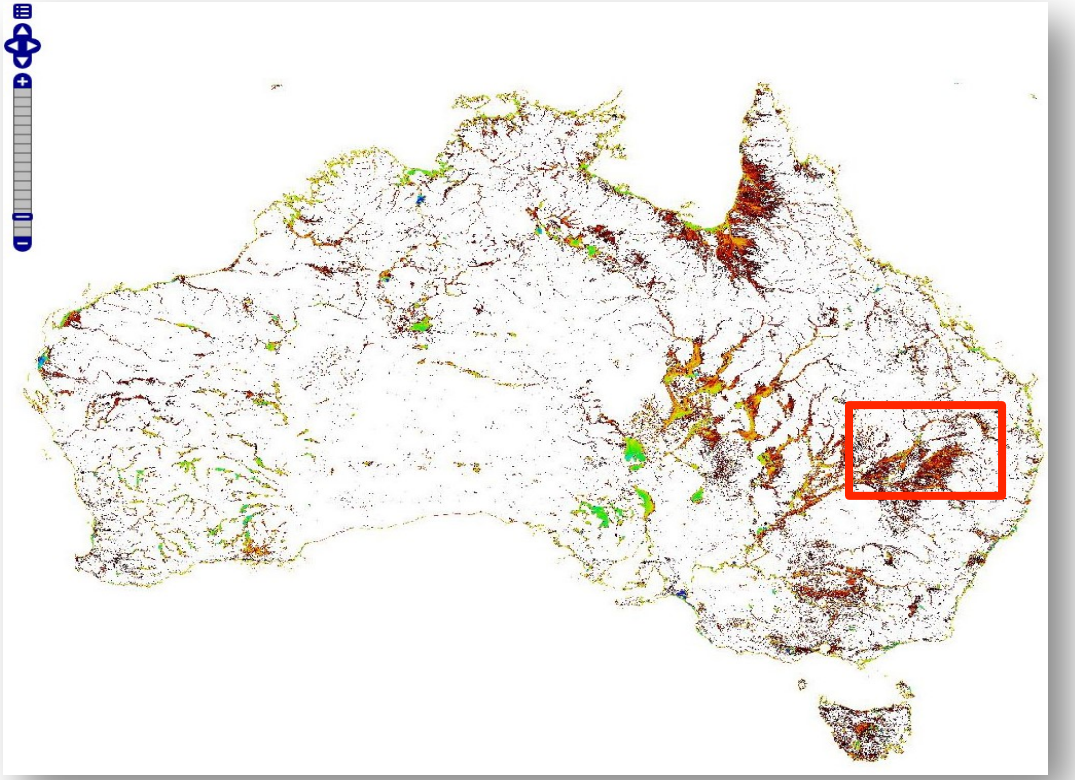
Normalised 15-year surface water count (25m)



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Visualising time-series

Land Management – Keytah Station. “Fractional cover”

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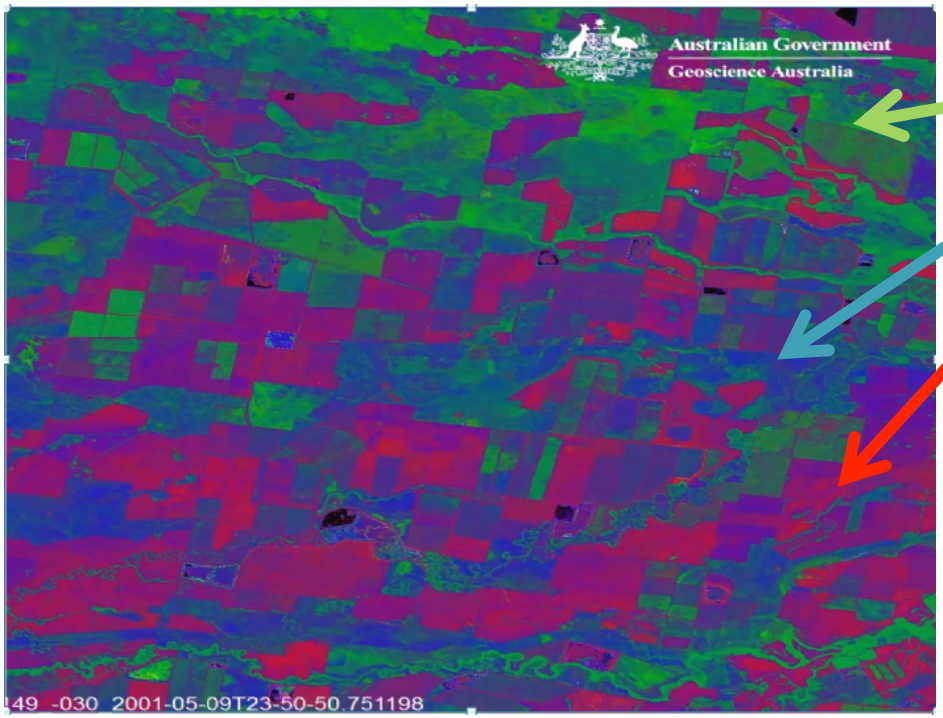
Visualising time-series

Land Management – Keytah Station. “Fractional cover”



Photosynthetic vegetation (PSV)

Non-Photosynthetic vegetation (NPSV)

Bare Soil

yyyy-mm-dd

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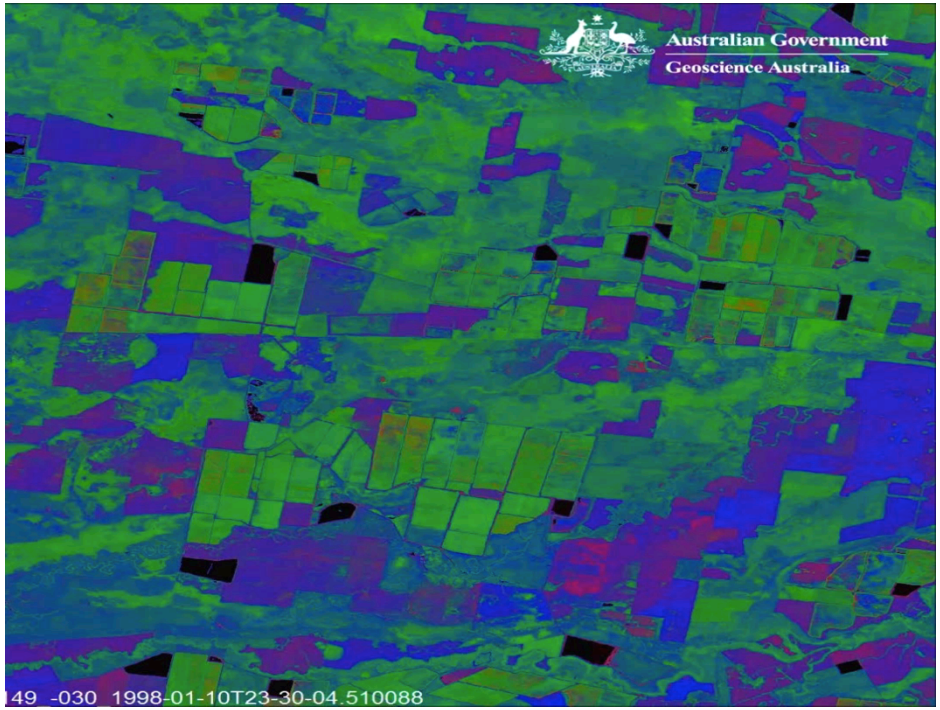
Visualising time-series

Land Management – Keytah Station. “Fractional cover”



yyyy-mm-dd

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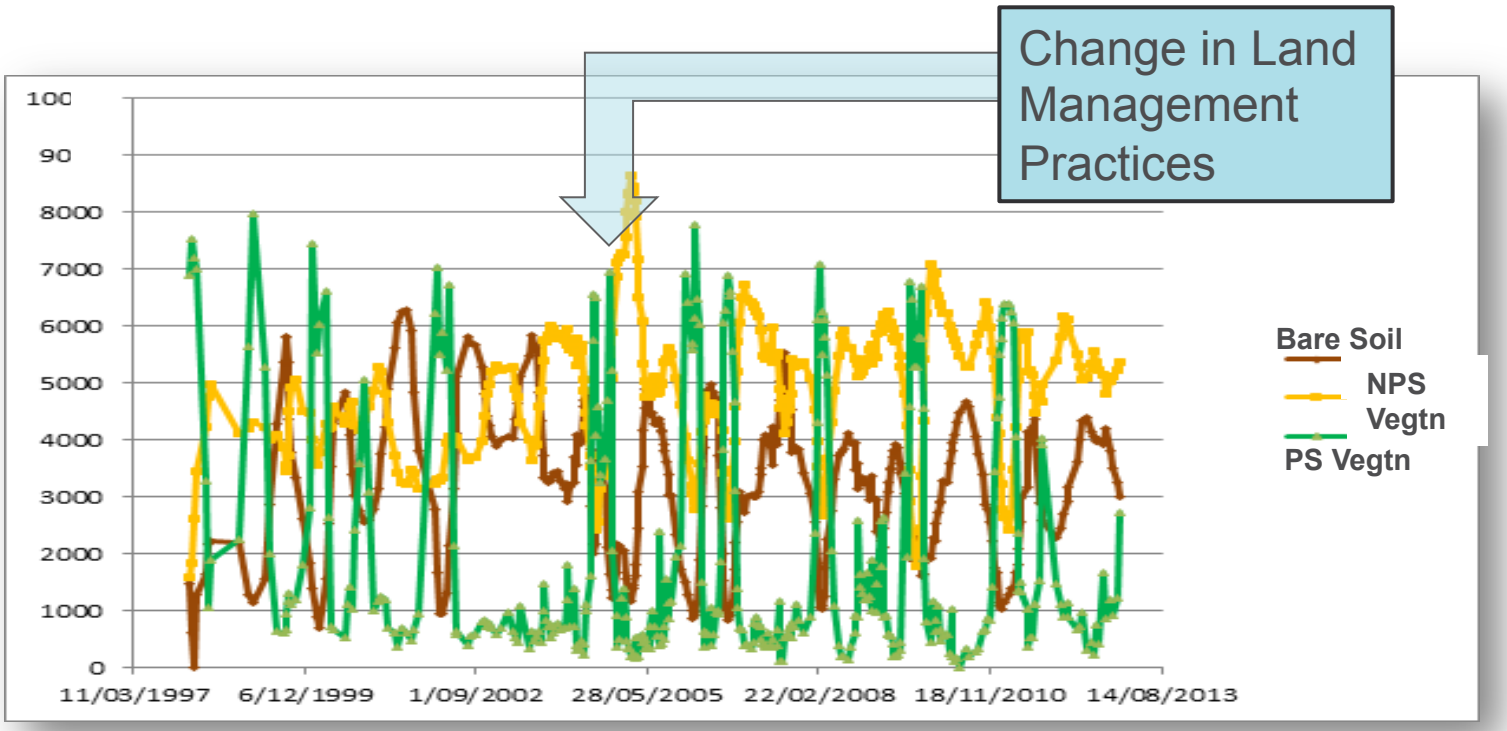
Observations can feed into models (Keytah)



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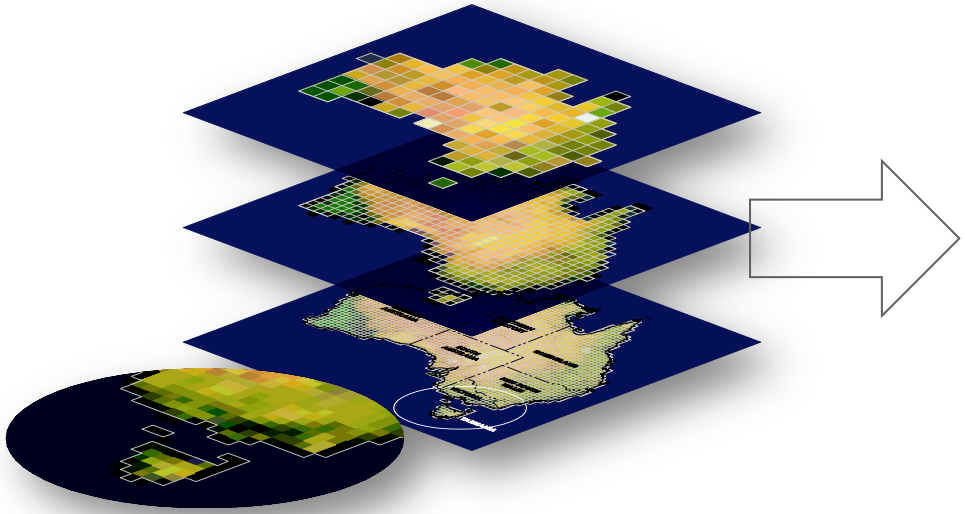
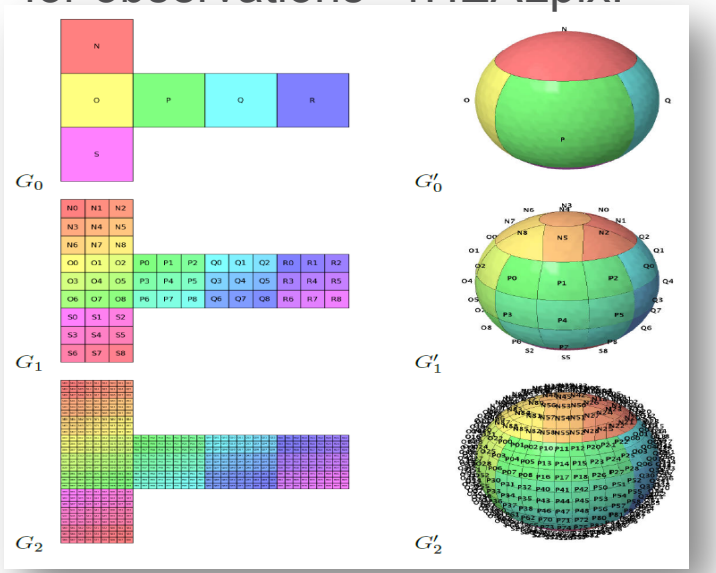
Next step? A multi-scale, observational framework

An Australian nested grid system for observations:



A discrete global grid system for observations - rHEALpix:



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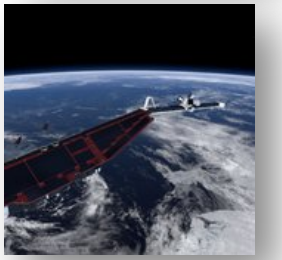
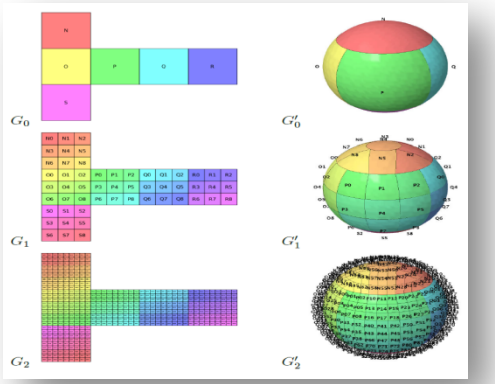
Extracting information from EOS – ultimate vision

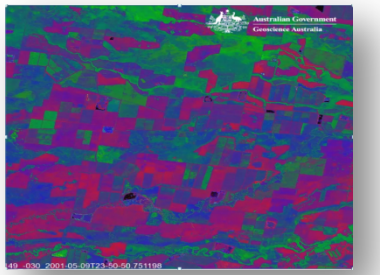
Numerous EOS data sources

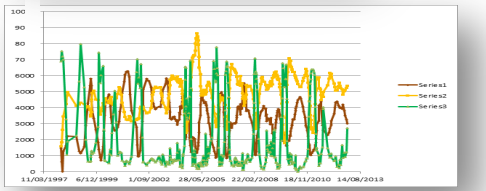


Calibrated land surface measurements in a Global observing grid



Information for multiple uses in land, water, hazards, & etc.





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Conclusions

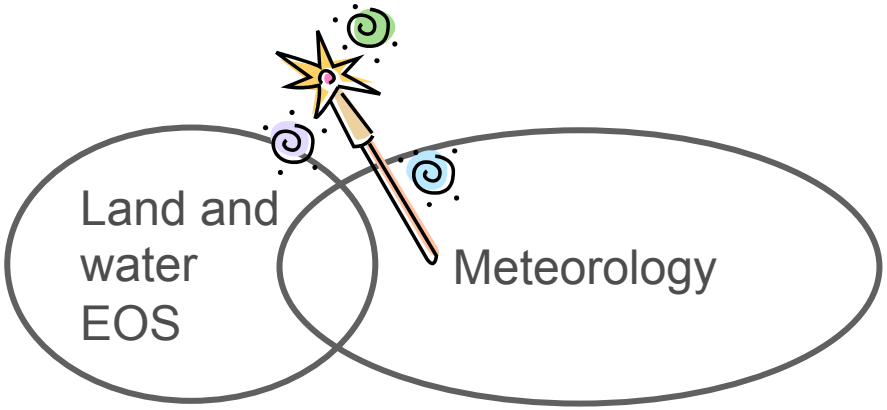
A clear policy and planning framework

Coordination

Defined priorities

Exciting progress

Increasing opportunities in the overlap between land and atmosphere communities of EOS



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Thank you.

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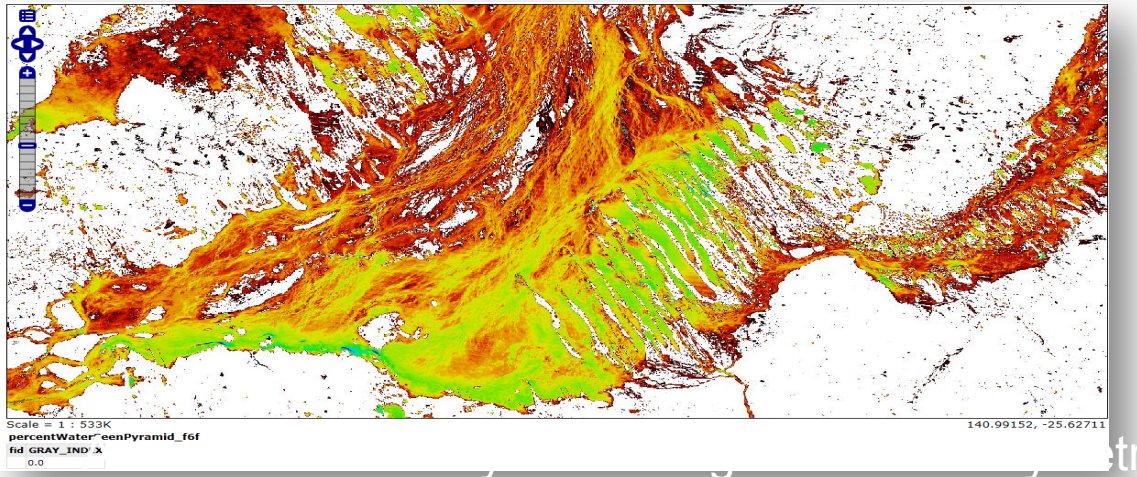
medhavy.thankappan@ga.gov.au



With thanks to :
Matt Purss
Alex Ip
Leo Lymburner
Kath Hagan
Stephen Ring
… and others who have contributed materials used in this presentation

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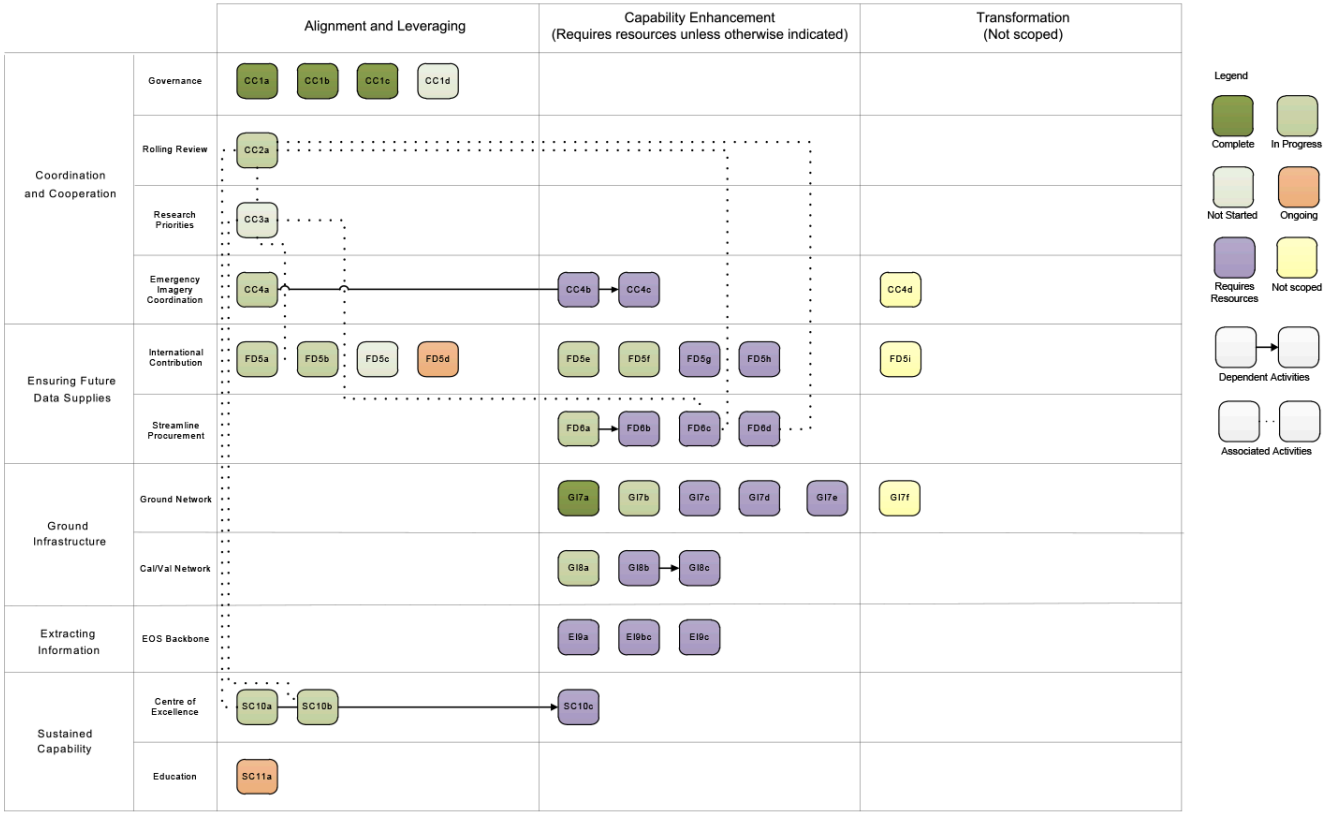
National Earth Observations from Space – Infrastructure Plan (Phases)



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Future Missions – Copernicus Sentinels

Sentinel-1 : C-band radar; land deformation, ocean monitoring

Sentinel-2 : multispectral, systematic, imaging of the land

Sentinel-3 : Ocean colour, altimetry, SST

Sentinel-4 : Geostationary atmosphere monitoring – Eumetsat

Sentinel-5 : Atmosphere, polar orbit

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Geoscience Australia

National geoscience agency

~750 Staff

Industry portfolio

- Environmental Geoscience
- Minerals and Natural Hazards
- Energy

Earth observation for land, water, minerals, resources, geohazards.

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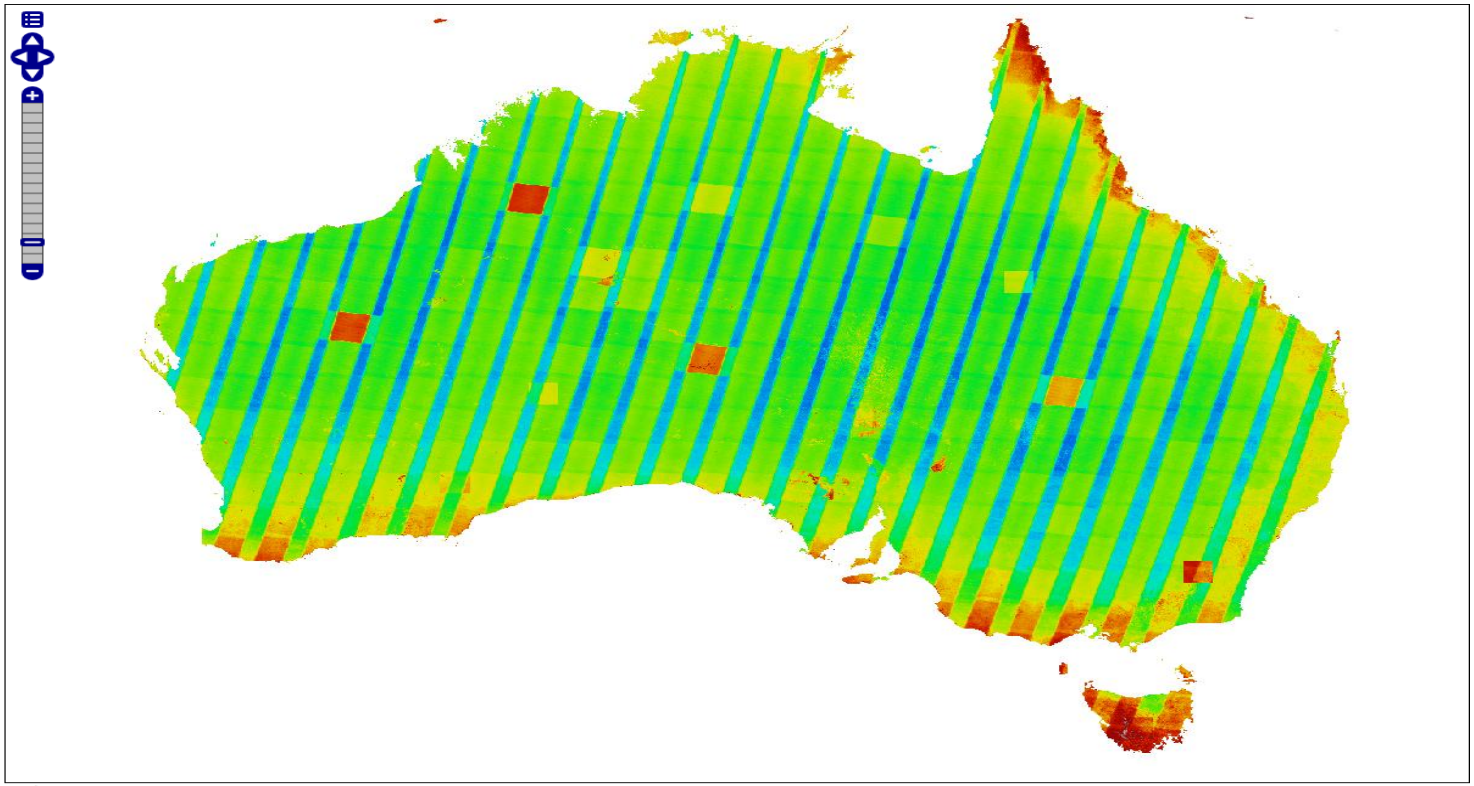
Density of quality-assured observations (15 years)



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