



# An update on MODIS DB Acquisition, Processing and Applications in Australia

David L B Jupp

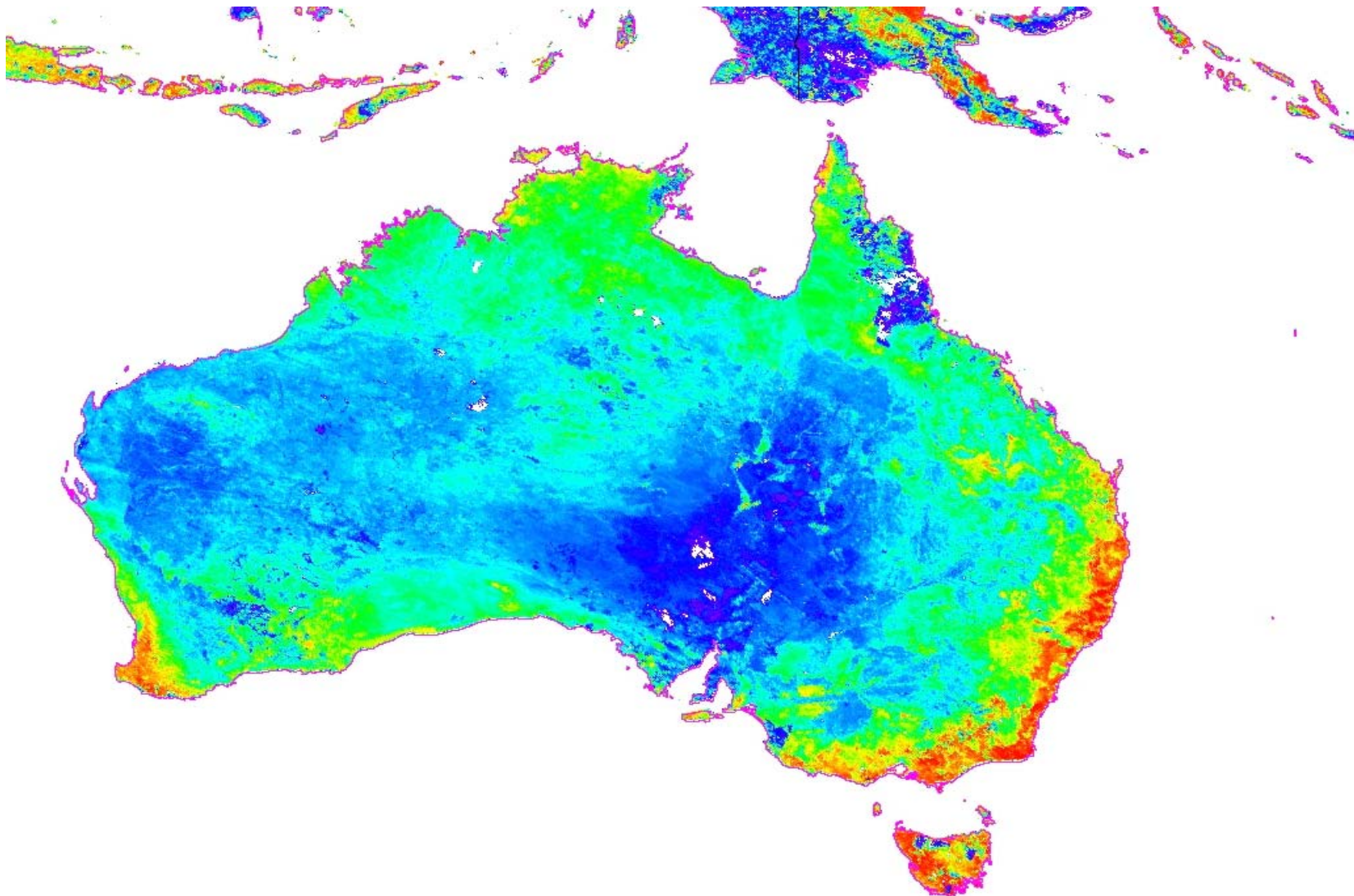
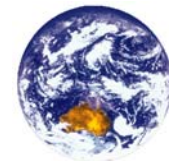


**OFFICE OF SPACE SCIENCE & APPLICATIONS  
EARTH OBSERVATION CENTRE**

**<http://www.eoc.csiro.au>**

Presented at the 2<sup>nd</sup> Meeting of the APEIS Regional Coordination  
Committee; Bangkok, Thailand, March 30-31, 2003

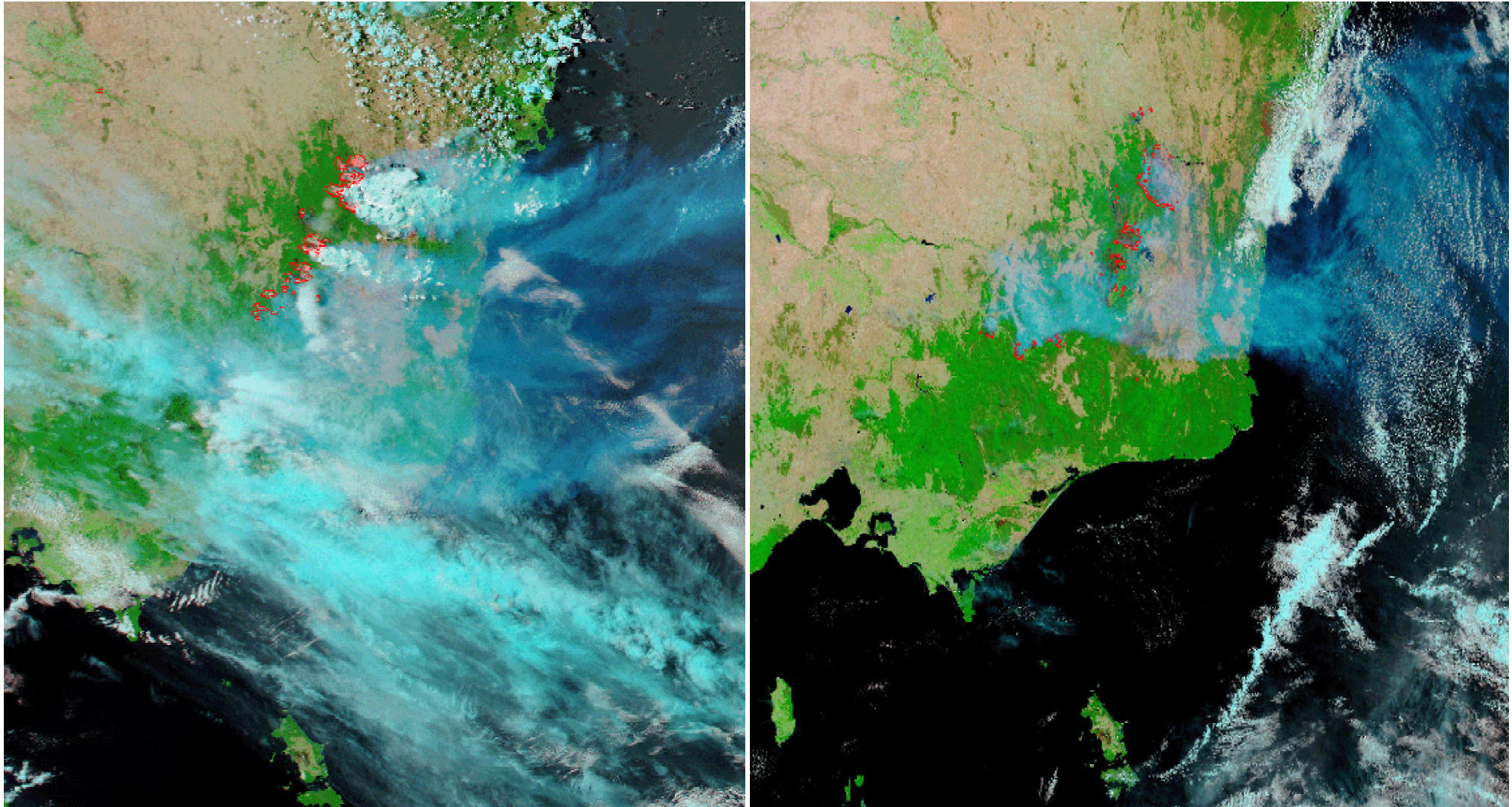
# Australian users still look to Value Added Products





# But users also want information fast!

## January 18 & 19 2003 near Canberra

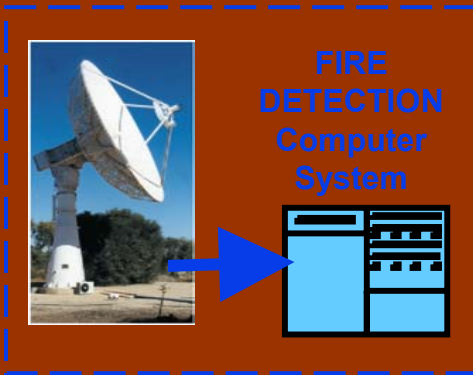


Reported by CSIRO Office of Space Science & Applications  
Earth Observation Centre

# *The Sentinel System*

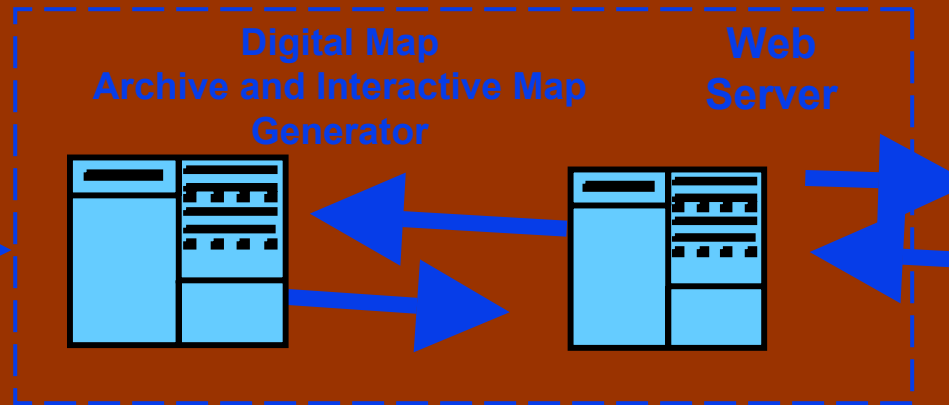
CSIRO

Satellite Receiving  
Station  
Alice Springs



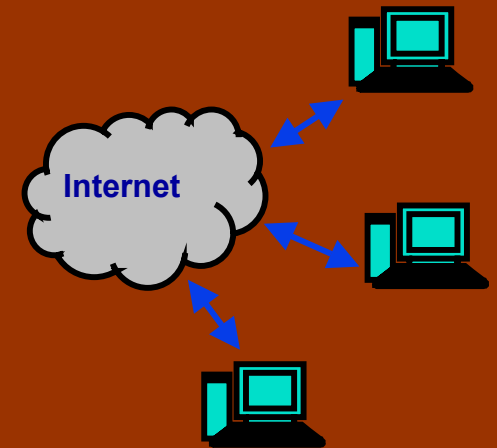
Geoscience  
Australia

Mapping & Web Delivery  
System - Canberra



CSIRO – DIGO - GA

Internet Users with  
Standard Browsers





## SENTINEL Hotspots



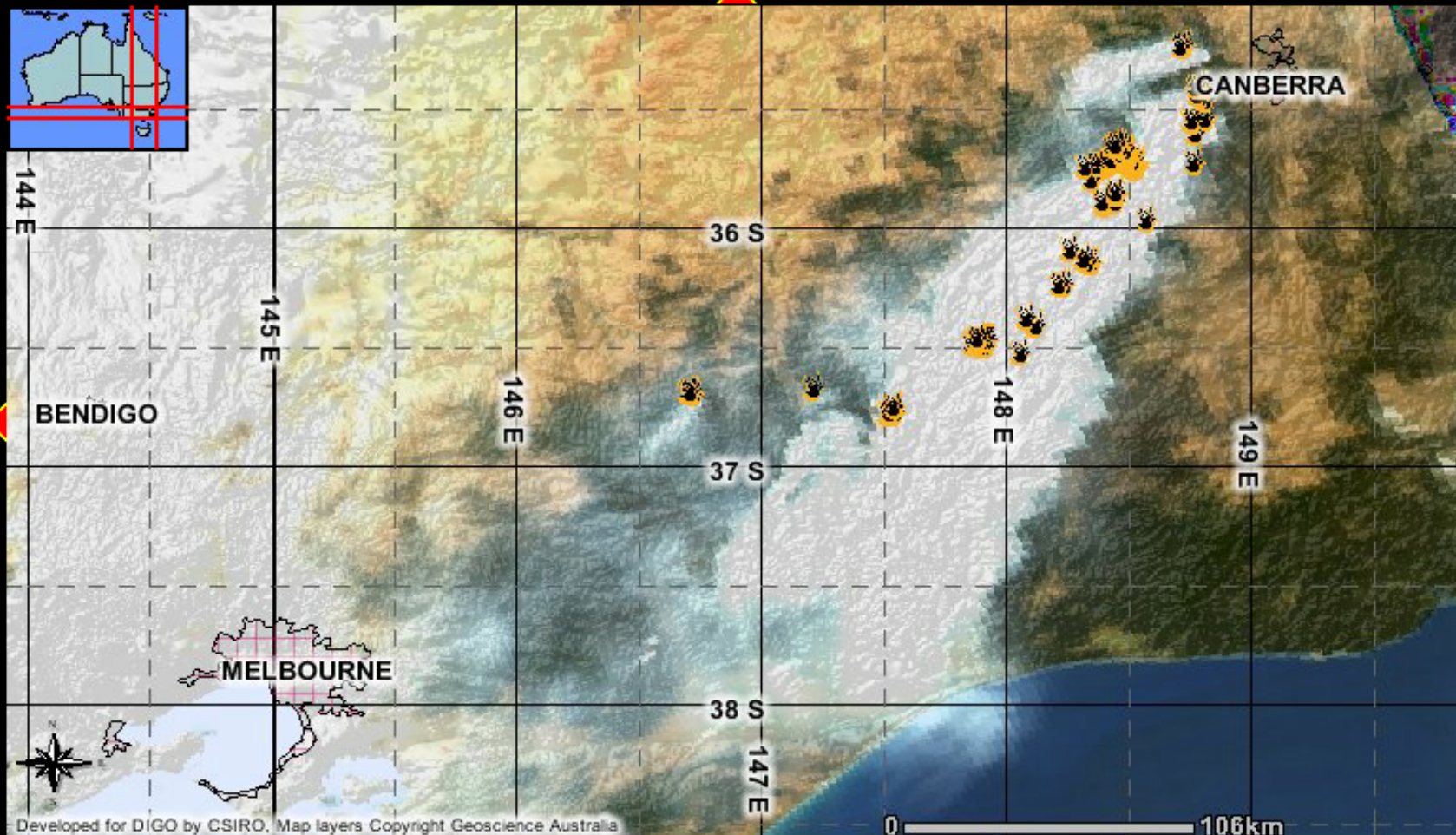
Layers

Legend

### Layers

Visible Active

- |                                     |                                  |                          |
|-------------------------------------|----------------------------------|--------------------------|
| <input type="checkbox"/>            | <input type="radio"/>            | Hotspots By Date         |
| <input checked="" type="checkbox"/> | <input type="radio"/>            | Last Satellite Pass Data |
| <input checked="" type="checkbox"/> | <input checked="" type="radio"/> | Hotspots last 12 Hours   |
| <input type="checkbox"/>            | <input type="radio"/>            | Hotspots 12 to 24 Hours  |
| <input type="checkbox"/>            | <input type="radio"/>            | Hotspots 24 to 48 Hours  |
| <input type="checkbox"/>            | <input type="radio"/>            | Hotspots 48 to 72 Hours  |
| <input type="checkbox"/>            | <input type="radio"/>            | Rail                     |
| <input type="checkbox"/>            | <input type="radio"/>            | Water Courses            |
| <input checked="" type="checkbox"/> | <input type="radio"/>            | Builtup Areas            |
| <input checked="" type="checkbox"/> | <input type="radio"/>            | LatLon Grid              |
| <input checked="" type="checkbox"/> | <input type="radio"/>            | MODIS Imagery            |
| <input type="checkbox"/>            | <input type="radio"/>            | Landsat Mosaic           |
| <input type="checkbox"/>            | <input type="radio"/>            | Base-Map                 |
| <input checked="" type="checkbox"/> | <input type="radio"/>            | Hill Shade               |



# The Sentinel Team



Defence Imagery and  
Geospatial Organisation  
(DIGO)

Owen Moss  
Dan Carmody

CSIRO  
Land & Water

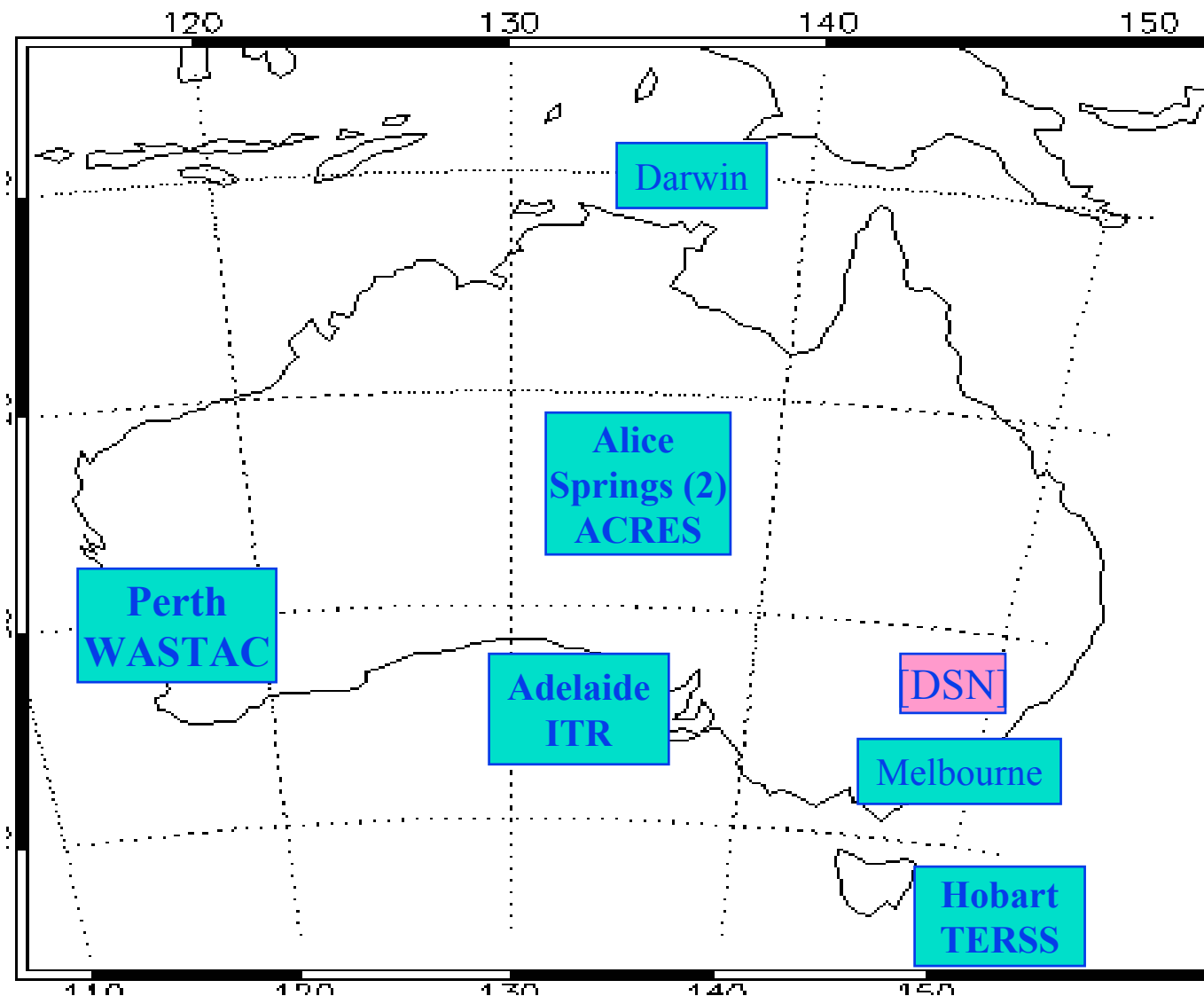
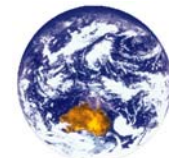
Alex Held  
Peter Dyce  
Alan Marks

Geoscience  
Australia (GA)

Ian Shepherd  
John Woolner  
Stuart Barr

Software and support MOD014:  
NASA: Chris Justice & John Owens  
USGS: John Guthrie

# Current and Potential DB Sites on the mainland (Antarctic to come)



Reported by CSIRO Office of Space Science & Applications  
Earth Observation Centre



- ❖ Three stations operating – two in Alice Springs one (TERSS) in Hobart
- ❖ IMAPP Level 1B data from DB reception now held on the web for 1 week
- ❖ Major activity during Australian fires this summer
- ❖ General Operational Processing sequence
  - ◆ Passes acquired at ASP/HBT
  - ◆ Processed to Level 1b - IMAPP
  - ◆ Catalogue generated
  - ◆ Frame relay link to DPF overnight
  - ◆ MS2GT processing





# TERRA-1 Orbit 10203

Date: 2001-11-18

Time: 01:54:05 (utc)



Granule 1	Latitude	Longitude
Window UL :	00:46:09 N	117:25:33 E
Window UR :	00:08:15 N	139:25:34 E
Window LL :	11:40:09 S	140:09:31 E
Window LR :	10:55:21 S	115:59:56 E



Granule 2	Latitude	Longitude
Window UL :	07:19:31 S	114:45:49 E
Window UR :	08:21:09 S	138:14:59 E
Window LL :	21:34:37 S	138:58:01 E
Window LR :	20:22:38 S	112:48:40 E



Granule 3	Latitude	Longitude
Window UL :	16:55:47 S	111:27:11 E
Window UR :	18:27:22 S	136:52:35 E
Window LL :	31:34:46 S	137:28:16 E
Window LR :	29:51:13 S	108:59:52 E



Granule 4	Latitude	Longitude
Window UL :	26:37:29 S	106:43:32 E
Window UR :	28:52:50 S	134:23:33 E
Window LL :	42:41:35 S	134:44:23 E
Window LR :	40:12:24 S	103:10:27 E

Bands 1-2 at 250m		Download	
Band 1 (620-670 nm)	(65.33 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 2 (841-876 nm)	(70.80 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Metadata		<a href="#">uncomp</a>	<a href="#">gzip</a>
All 250m bands (tar of gzip data + meta)		( ~ 136.12 MB )	<a href="#">.tar</a>

Bands 1-7 at 500m		Download	
Band 1 (620-670 nm)	(16.63 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 2 (841-876 nm)	(17.98 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 3 (459-479 nm)	(17.20 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 4 (545-565 nm)	(17.40 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 5 (1230-1250 nm)	(18.32 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 6 (1628-1652 nm)	(18.09 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 7 (2105-2155 nm)	(18.00 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Metadata		<a href="#">uncomp</a>	<a href="#">gzip</a>
All 500m bands (tar of gzip data + meta)		( ~ 123.63 MB )	<a href="#">.tar</a>

Bands 1-36 at 1000m		Download	
Band 1 (620-670 nm)	(2.97 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 2 (841-876 nm)	(2.93 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 3 (459-479 nm)	(2.82 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 4 (545-565 nm)	(2.84 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 5 (1230-1250 nm)	(2.95 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 6 (1628-1652 nm)	(2.94 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 7 (2105-2155 nm)	(2.92 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 8 (405-420 nm)	(2.98 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 9 (438-448 nm)	(2.81 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 10 (483-493 nm)	(2.54 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 11 (526-536 nm)	(2.47 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>
Band 12 (546-556 nm)	(1.95 MB compressed)	<a href="#">uncomp</a>	<a href="#">gzip</a>

# WASTAC-X Band Station, Perth WA



WASTAC-X Band Station - Perth

Bureau of Meteorology

Department of Land  
Administration, W.A.

Curtin University of Technology

Murdoch University

C.S.I.R.O.

Geoscience Australia

# WASTAC Consortium Develops



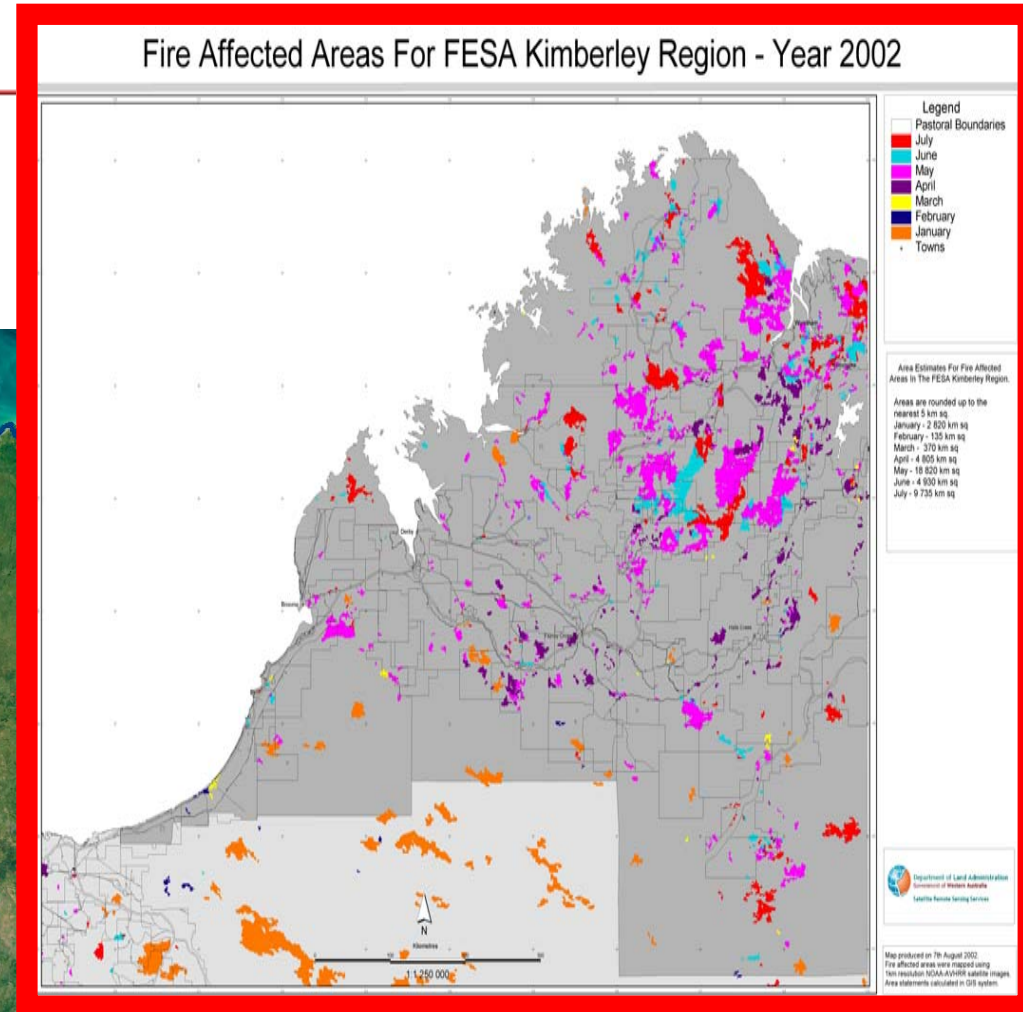
- ❖ The new X-Band station is operational
- ❖ Agreements between major agencies exist to ensure network operation
- ❖ Liam Gumley ran a course in MODIS processing based on IMAPP Level 1A products in November 2002
- ❖ Extensive interest in Australia in DB following the fires and all DB stations are combining to meet the needs



# Fire Mapping is a Major Activity in North Australia



Department of Land Administration  
Government of Western Australia

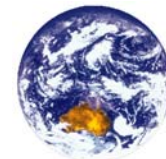


# WASTAC proposal for X-Band DB products

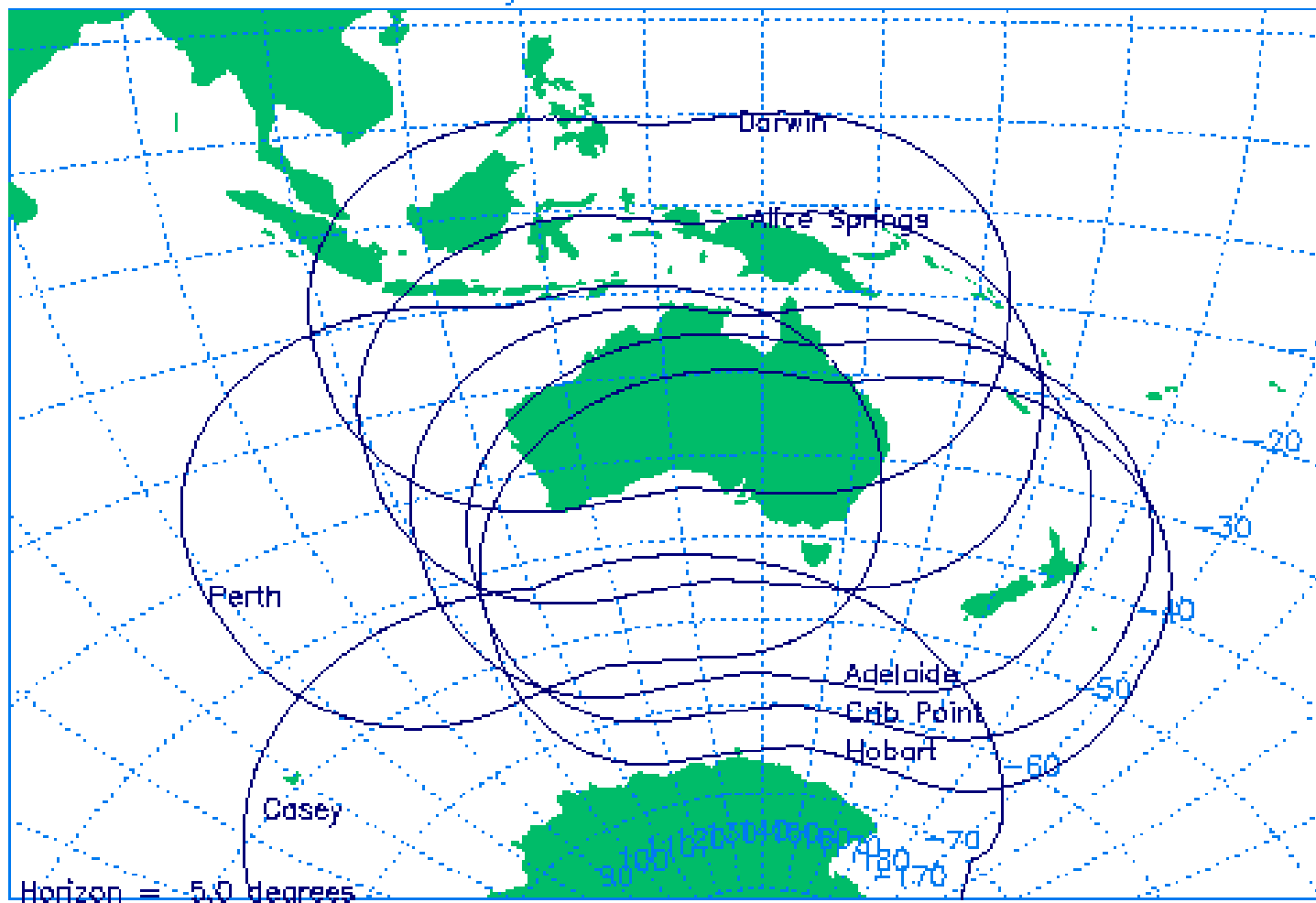


- ❖ Products aim to serve user needs
- ❖ Coordination needed to define Level 2 base data
- ❖ > Level 2 are value added products and directly meet user needs
- ❖ Level 2 are “geophysical” products that can have a common standard at all stations
- ❖ Level 2 is achieved by collaboration with US PIs *as much as possible*

# Australian Network Coverage within 3 years



Modis viewing area from Australian stations



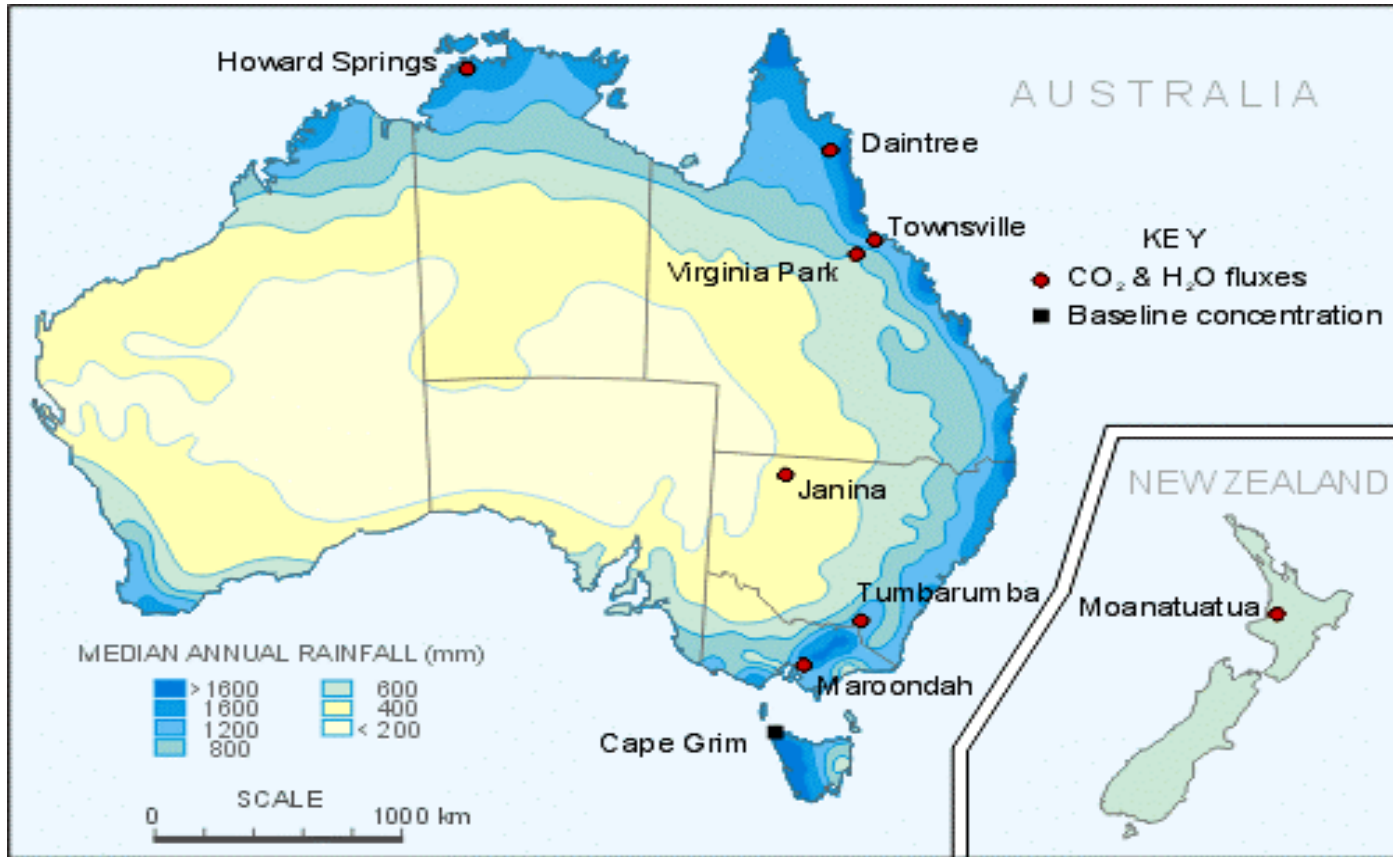
Provided by CSIRO, Marine

Reported by CSIRO Office of Space Science & Applications  
Earth Observation Centre





<http://www.clw.csiro.au/research/waterway/interactions/ozflux/>



Location	Description
<a href="#">Howard Springs</a>	Wet/dry savanna
<a href="#">Daintree</a>	Rainforest
<a href="#">Townsville</a>	Sugar cane
<a href="#">Virginia Park</a>	Wet/dry savanna
Janina	Semi arid savanna
<a href="#">Tumbarumba</a>	Wet sclerophyll eucalyptus forest
<a href="#">Maroondah</a>	Wet sclerophyll eucalyptus forest
<a href="#">Moanatuatua</a>	Peatland
<a href="#">Cape Grim</a>	Atmospheric baseline air pollution station

# TUMBARUMBA Flux Site

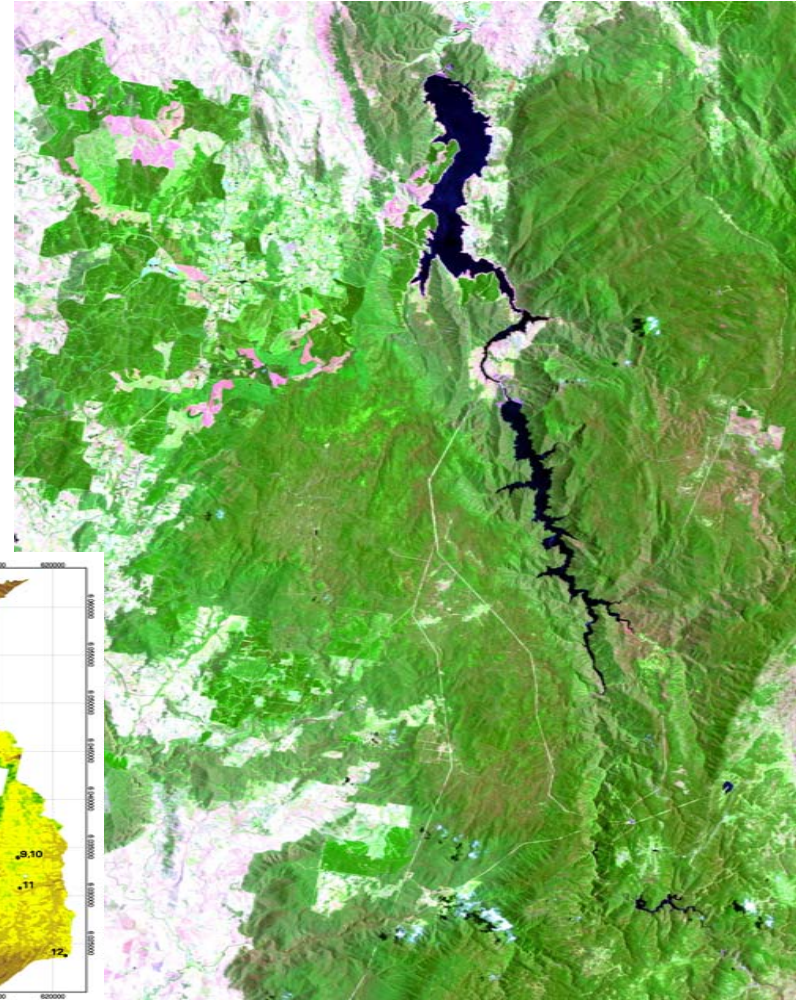
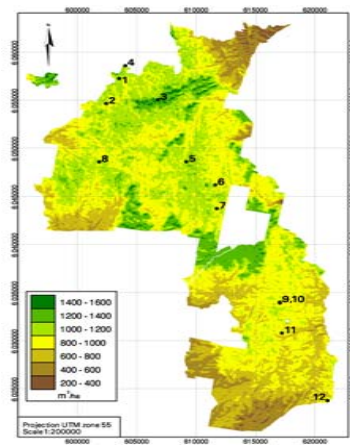


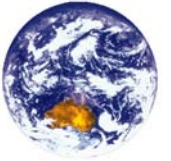
**Site of long term forest sustainability studies.**

**Eddy Flux Correlation tower (CSIRO L&W).**

**Large database of additional climate, soil and productivity data:**

Photo:CSIRO LW





## MODIS Coordination Group :

Ocean colour: Arnold Dekker

SST: Ian Barton and Paul Tildesley

Atmosphere: Merv Lynch and John Le Marshall

Land: Fred Prata and Ian Grant

Coordination: Ian Shepherd David Griersmith & David Jupp

❖ **Next Meeting is May 1**

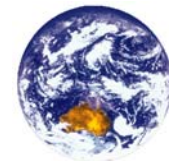


## Coordination Group Activities

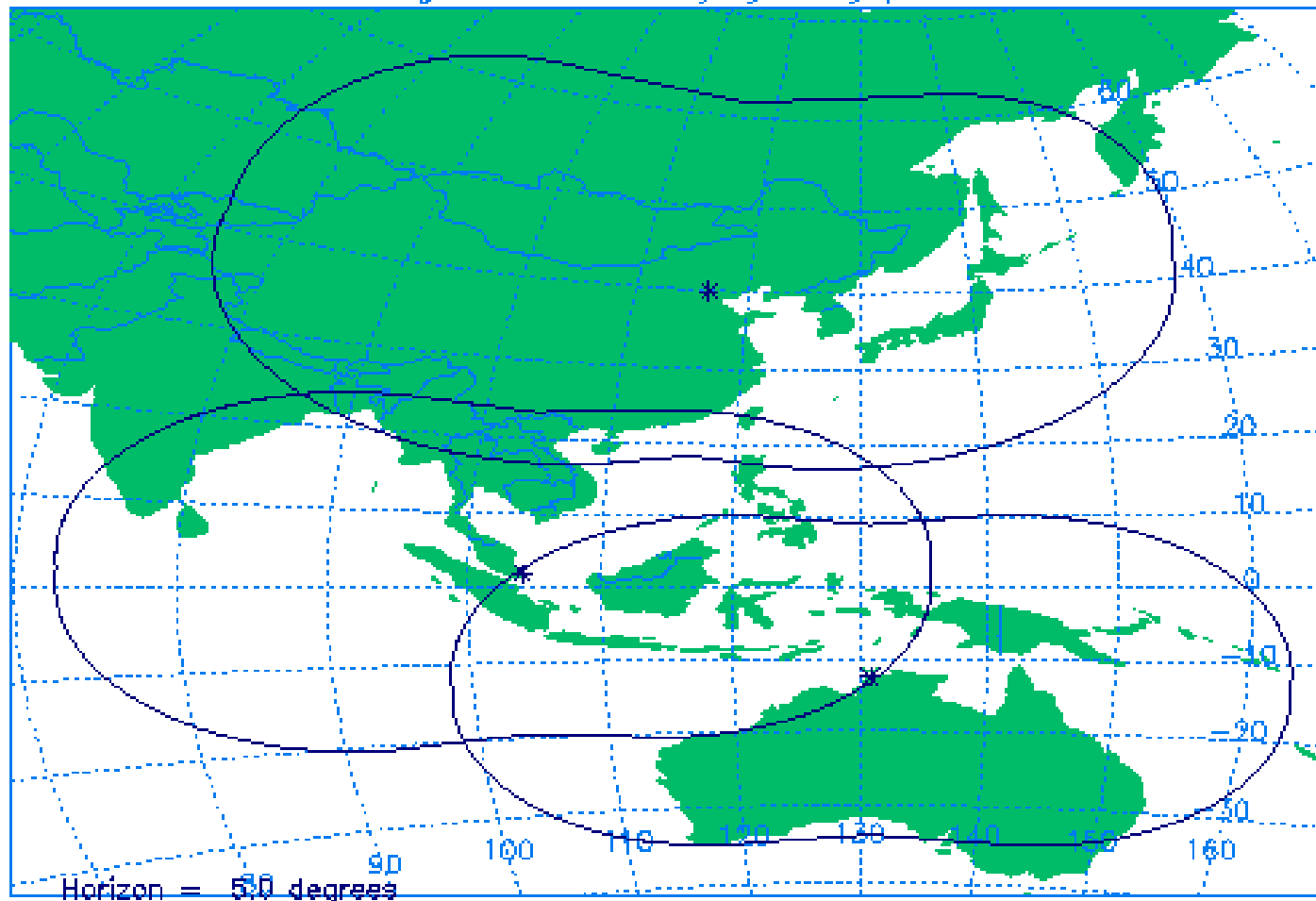


- ❖ Promoting validation of MODIS products for the Australian region
- ❖ Evaluating parameters to calibrate base products (in company with developers)
- ❖ Assessing base level software and data standards to Level 1B to encourage standardisation and exchange
- ❖ Coordinating data and product standardisation post-Level 1B to Level “2” – defining Level 2.

# The Possible DB Network in South Asia? Are there others?



Modis viewing area from Beijing, Singapore & Darwin



Provided by CSIRO, Marine

Reported by CSIRO Office of Space Science & Applications  
Earth Observation Centre

## Regional Opportunities – Progress is being made



- ❖ Exchange visits – NUS attendance at Perth Workshop
- ❖ Network advantages can spread beyond national borders
- ❖ Interactions with NASA and US PIs – eg Boston University, University of Maryland and others
- ❖ Coordination between stations and users has many benefits
- ❖ Common areas of study and application: Fires an immediate opportunity also volcanic ash, pollution, global/regional change and emergency management