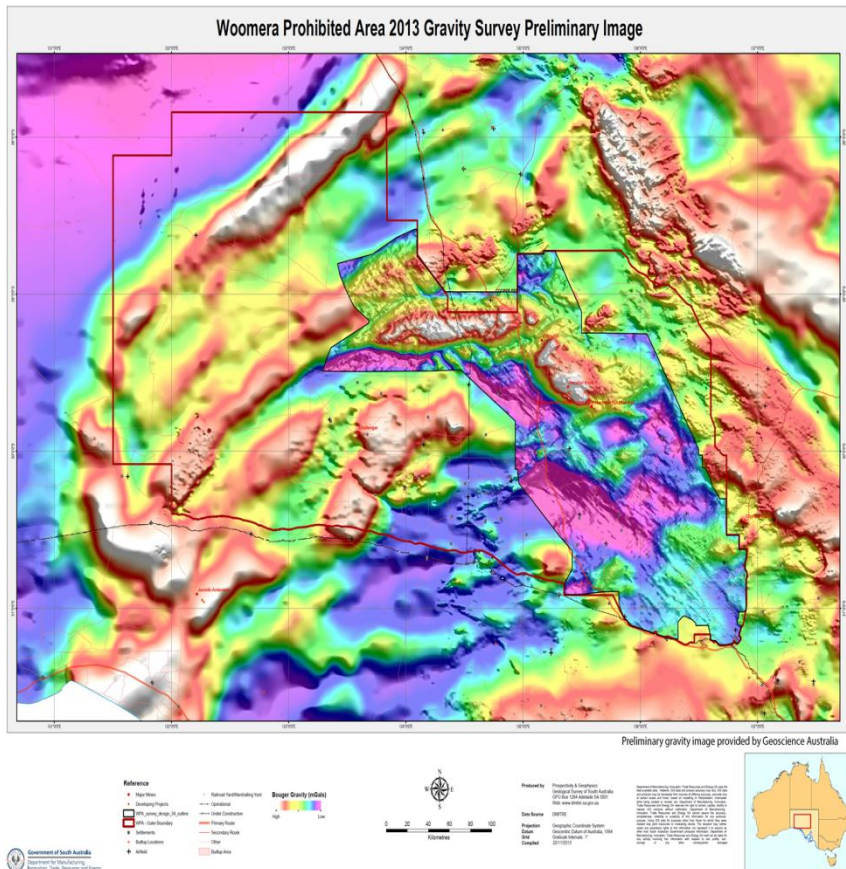


What is the future for Government Geoscience Initiatives in Australia?



Paul Heithersay

SEG International Exchange
Lecturer 2014

**SMEDG Meeting
Sydney 2014**

A global game needs a national approach



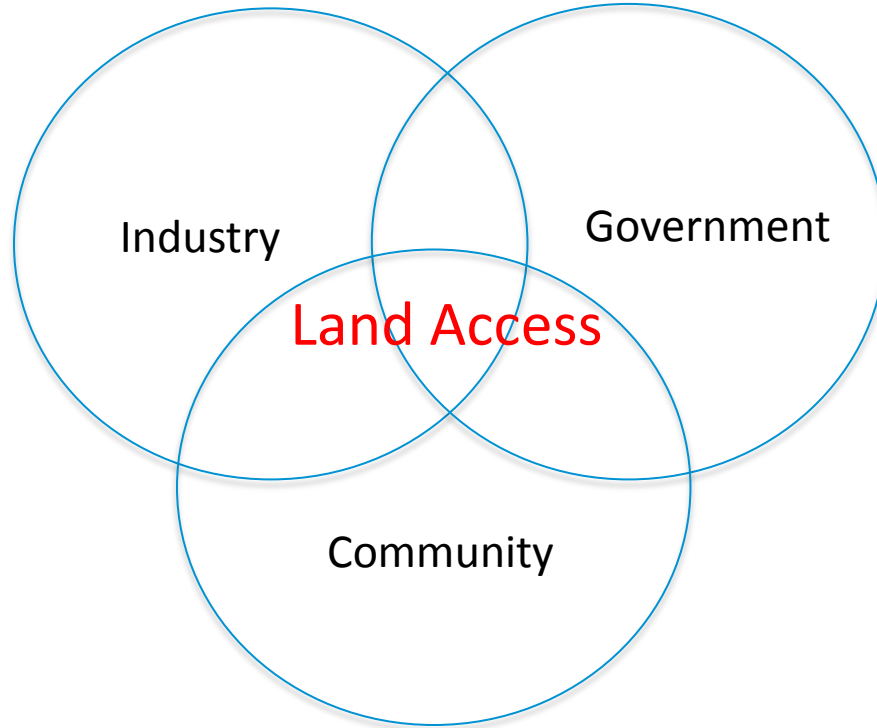
- National Depth and cover map
- National map of deep crust and upper mantle
- National distal footprints
- National 4 D Metallogenic Map
- National research network
- Technology transfer process

It's a three legged race now

Access to capital

Costs escalating

**Market driven
timeframes**



Royalties

Local industry

**Regional
communities**

Facebook

Ok if it is somewhere else

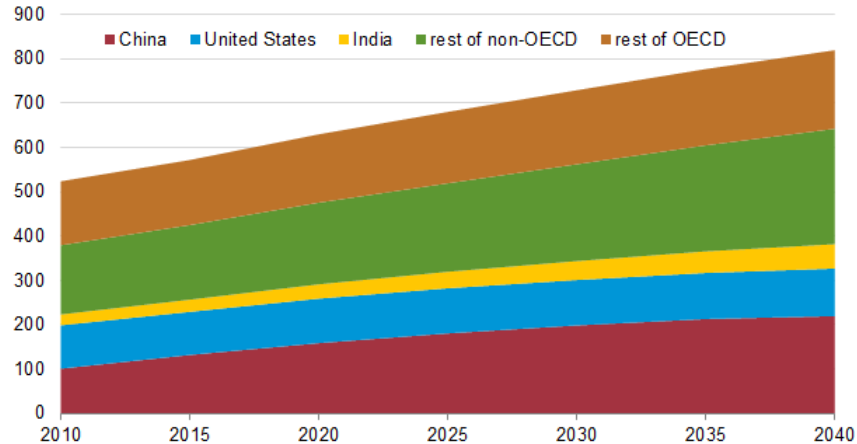
Compliance

Overall Community Benefit

The Grand Challenge for the Resources Sector

Global primary energy consumption

quadrillion british thermal

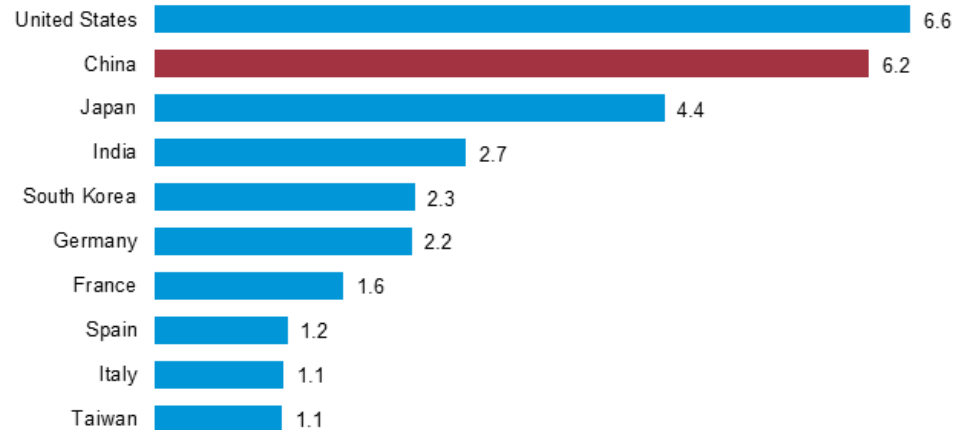


Source: U.S. Energy Information Administration, *International Energy Outlook*, 2013.

By 2040 China will consume almost 20% of global energy supplies

Top ten annual net oil importers, 2013

millions barrels per day

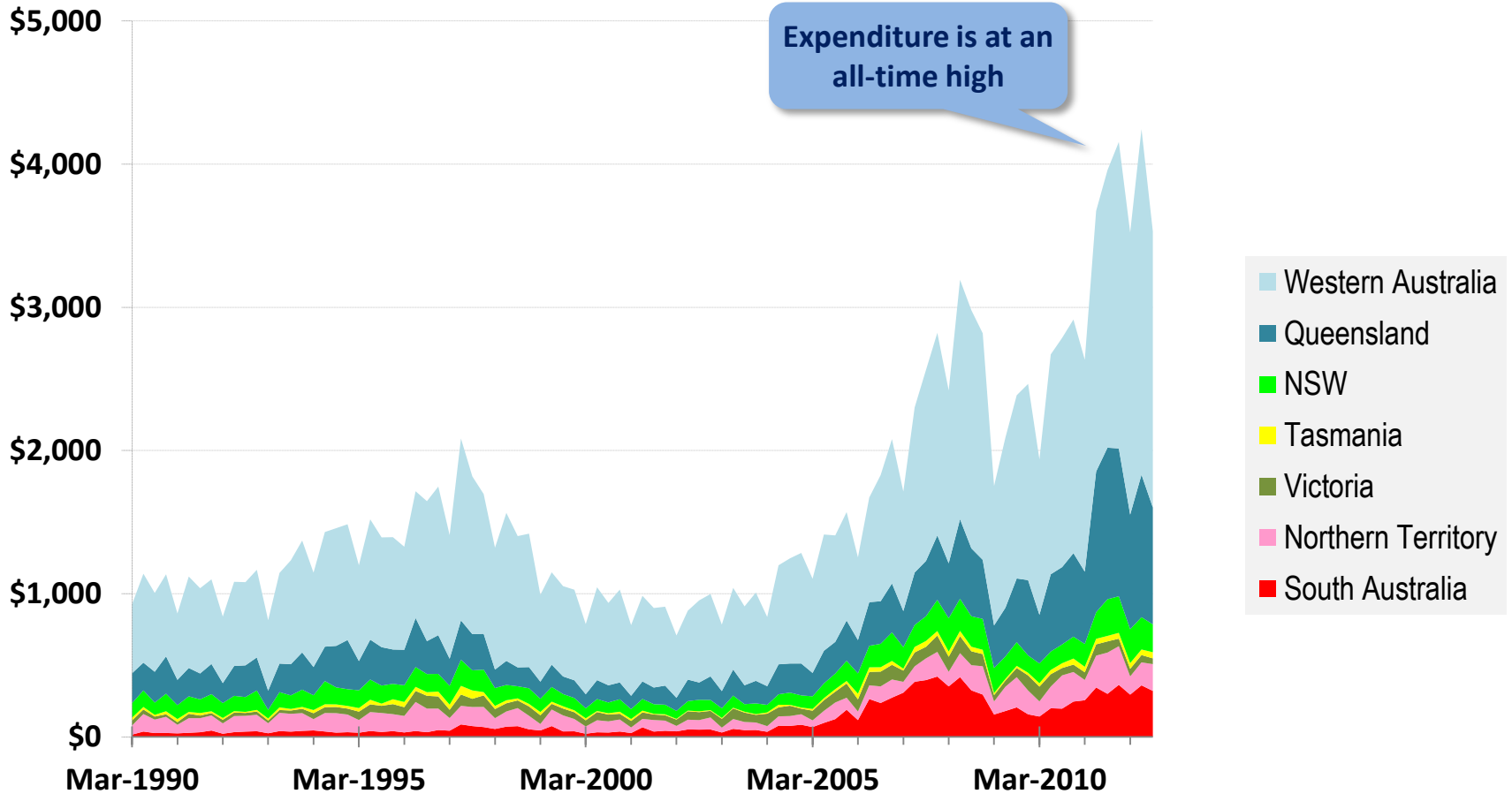


Note: Estimates of total production less consumption. Does not account for stockbuild.
Source: U.S. Energy Information Administration, *Short Term Energy Outlook*, January 2014.

Total exploration spend in Australia by State

Total Spend (June 2012 A\$m)

March 1990- September 2012



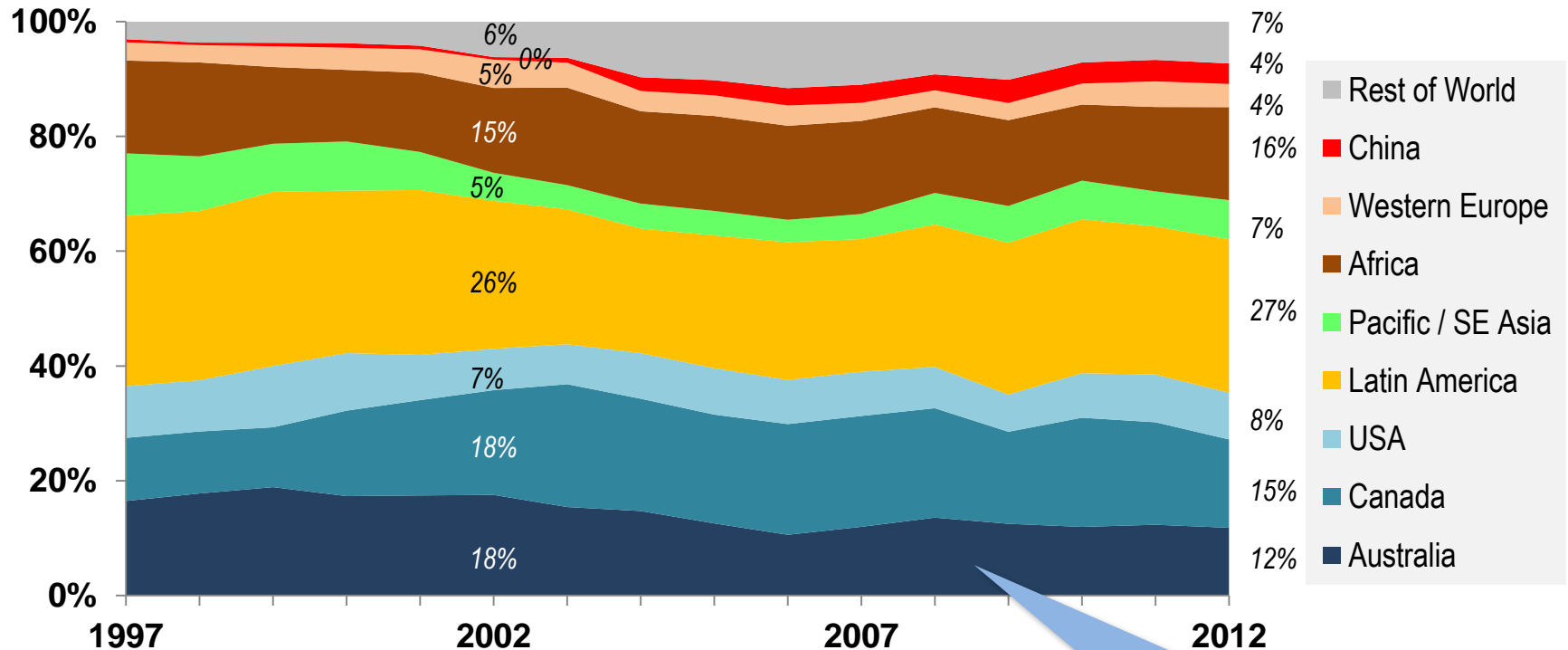
Note: Quarterly spend data is reported on an annualised basis

Source: ABS 8412

Exploration Expenditures: World by Region – : 1997-2012

excluding Bulks and Uranium

Percentage of total spend



Australia losing market share in traditional metal exploration

Note: "Rest of World" refers to Russia, Eastern Europe, Central Asian Republics, Mongolia, Middle East and South West Asia (including India and Pakistan)

Sources: MinEx Consulting estimates, based on data from ABS, NRCAN, OECD and MEG

Government / Private Drivers of Discovery

Geoscience Australia; CSIRO, U of A; SACOME; Gov Agencies

GOVERNMENT

**Tenure
Land Access**

Human & Intellectual Capital

Education and training
R&D – new exploration and
processing technologies

**Precompetitive Geoscientific
Data and Information**

Capture and Delivery
Value-add Research
Underexplored / Covered Regions
Targeted Programs

PRIVATE

Availability of Finance

**Quality of
Exploration**

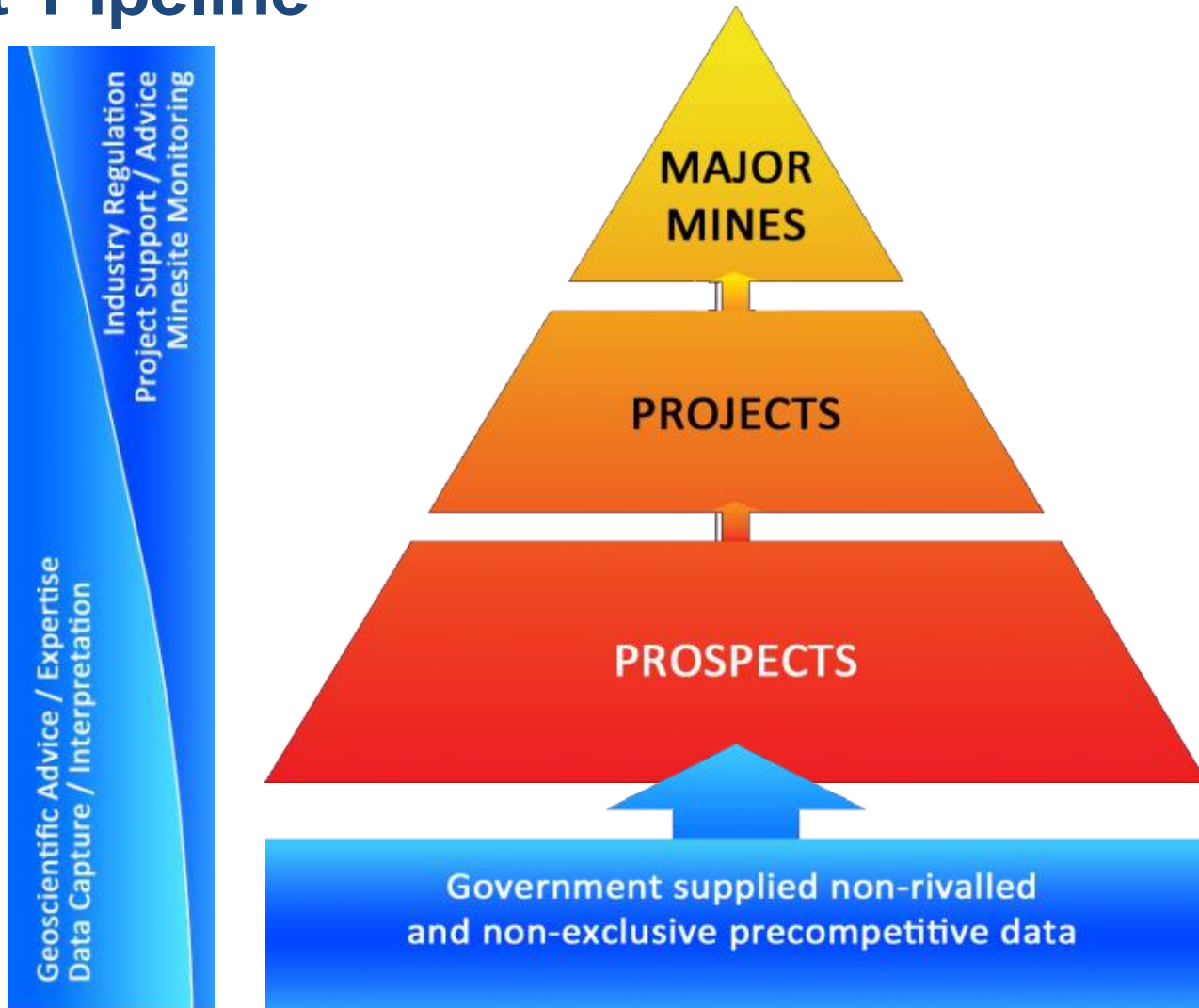
**Quantity of
Exploration**

Discovery

GREENFIELDS

Adapted from Derek Carter

Project Pipeline



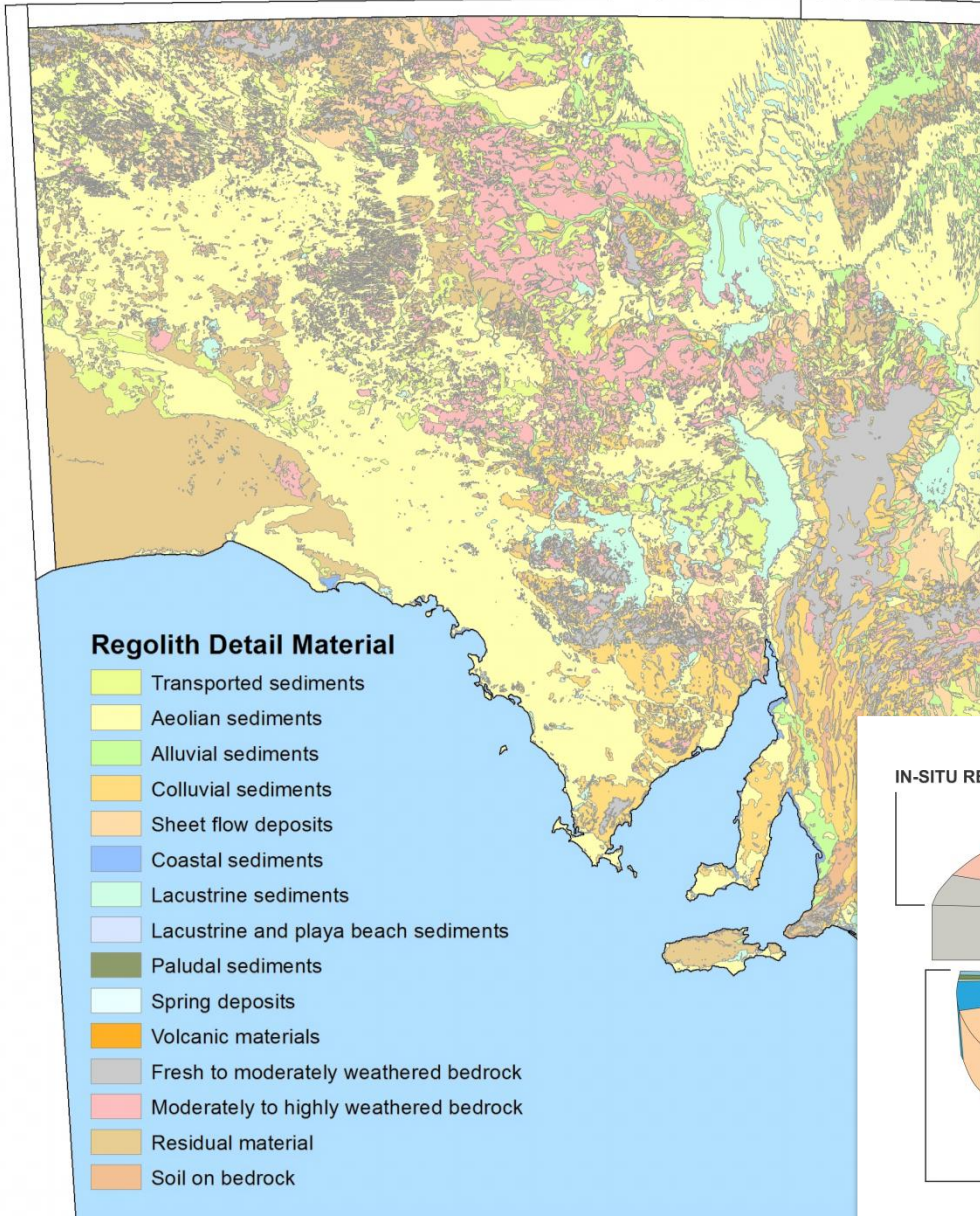
Deep Cover Exploration Impediment...



Moon Plain, Stuart Shelf, SA (Photo S.Hill)

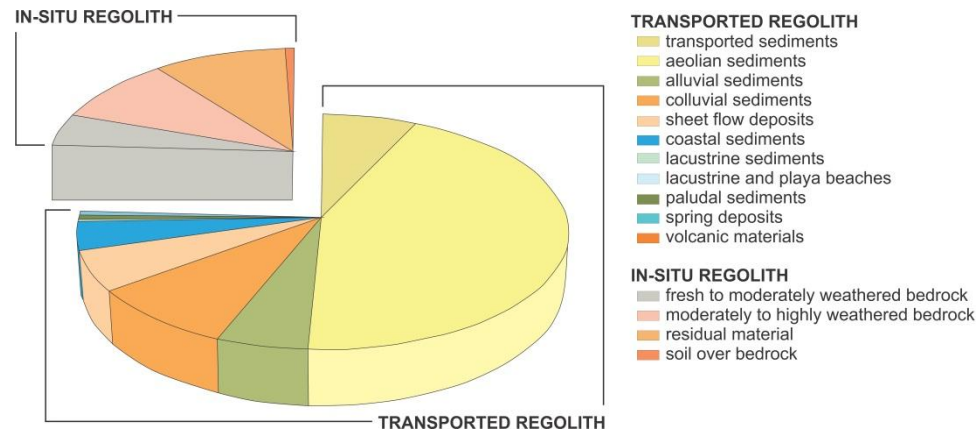
South Australia – the state is covered! (from Carmen Krapf, GSSA)

75% is transported regolith!



Regolith Material TRANSPORTED	AREA in sqkm	AREA in %
transported sediments	69304.44	7.05
aeolian sediments	429955.94	43.76
alluvial sediments	52894.60	5.38
colluvial sediments	85602.62	8.71
sheet flow deposits	53286.47	5.42
lacustrine sediments	39114.82	3.98
lacustrine and playa beach sediments	954.26	0.10
paludal sediments	8036.47	0.82
coastal sediments	4282.08	0.44
spring deposits	279.50	0.03
volcanic materials	78.28	0.01
SUM TRANSPORTED	743789.47	75.70

Regolith Material IN-SITU	AREA in sqkm	AREA in %
fresh to moderately weathered bedrock	43481.04	4.43
moderately to highly weathered bedrock	90126.05	9.17
residual material	98452.61	10.02
soil on bedrock	6709.09	0.68
SUM IN-SITU	238768.79	24.30



Exploration Challenges...



Covered areas are “under-explored”

Provides unrealised potential / opportunity / new search space

Covered, green-fields, exploration frontiers need help

Need for an effective deep cover exploration method and framework

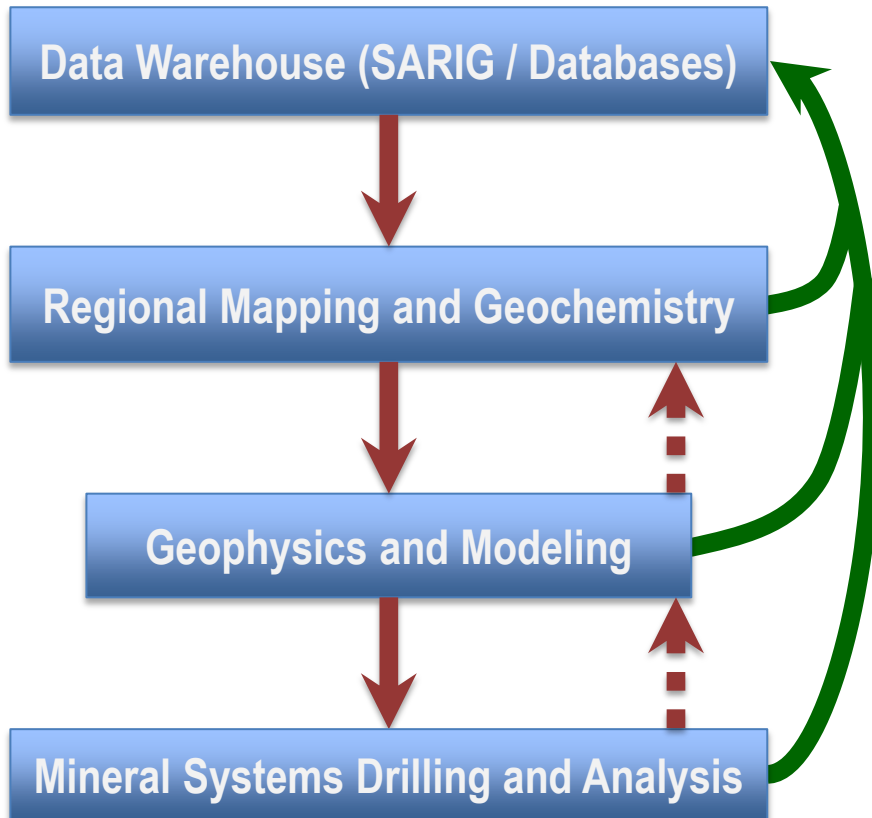


Precompetitive Geoscience Workflow



Key components resulting in a transformational change in exploration in covered / greenfield regions?

- *Characterising cover*
- *Lithospheric architecture*
- *4D geodynamic and metallogenic evolution for ore deposit origins*
- *Characterising and detecting distal footprints of covered mineral systems*
- Cheaper, faster drilling
- Effective data delivery and interpretation
- Develop new and innovative exploration techniques and methodologies



New Data Releases for Pre-Competitive Exploration Workflow...



New Data Releases for Pre-competitive Exploration Workflow

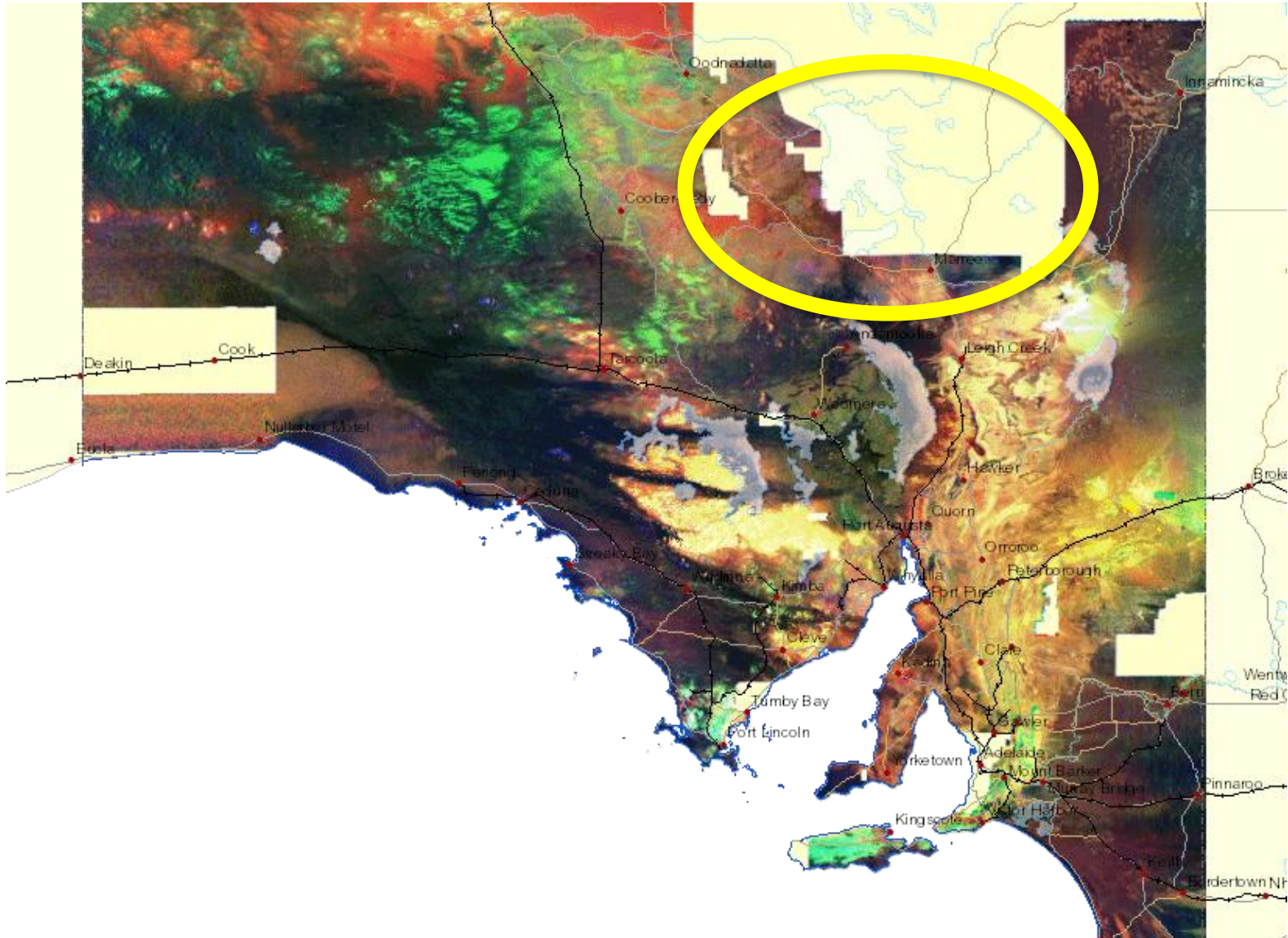
Marree Region

- New edition 1:250k Geology Sheet (White, Sheard & Reid, 2012)
- Prospective for wide range of commodities, especially uranium and base metals
- Most of region has Mesozoic to Recent transported cover (esp. aeolian dunes)
- DMITRE / Geoscience Australia: Frome Airborne Electro-Magnetic (AEM) survey

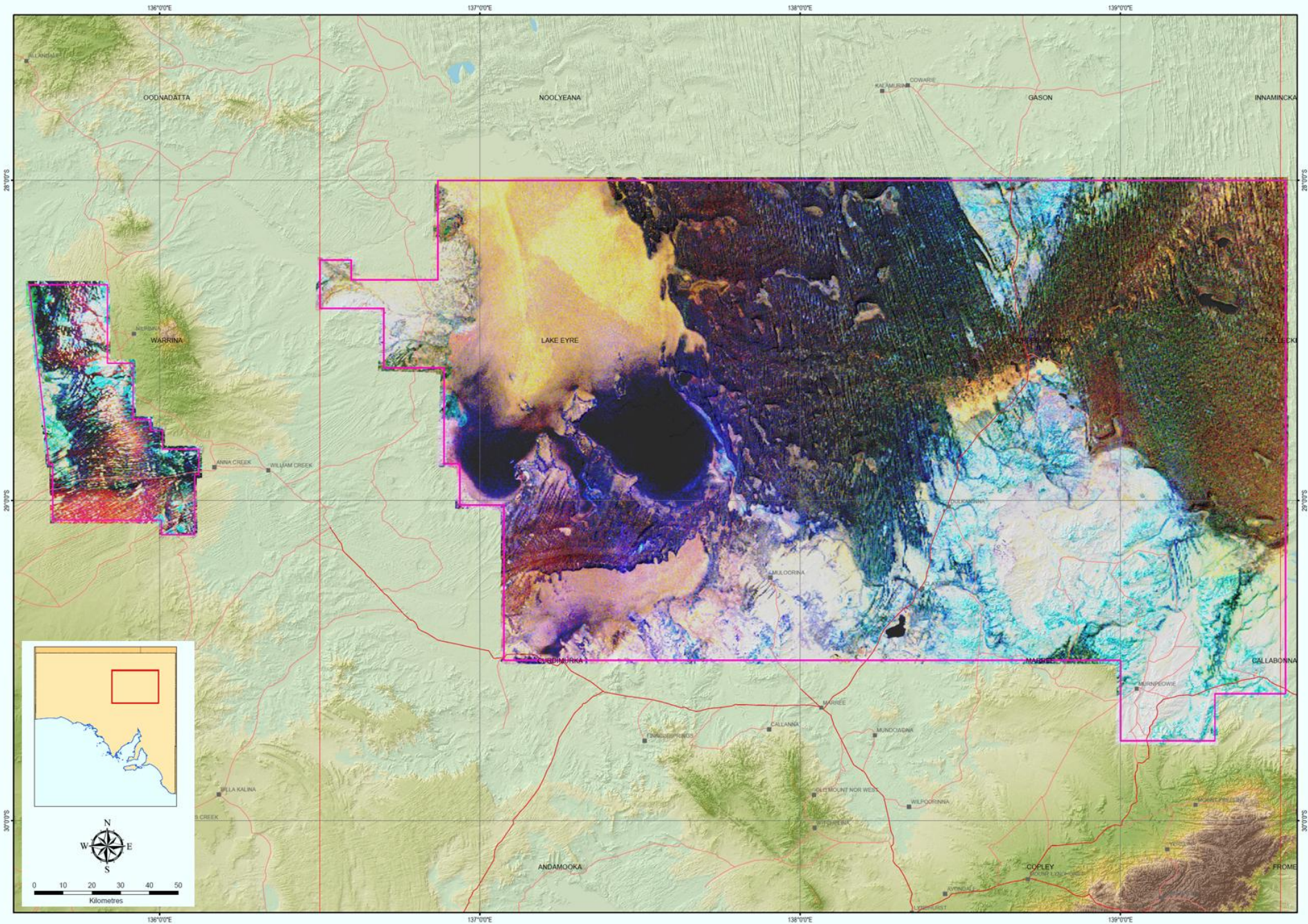
New Marree Airborne Data Release

- Commenced September 2012
- Cost \$810,000 (from 2011/12 PACE Budget)
- 131,437 line km data within 45,000 km²
- 400 m line spacing / 80 m fixed wing flight elevation
- Geoscience Australia conducted tender process and QA/QC
- Public release via SARIG
- Radiometric data
- Magnetic data

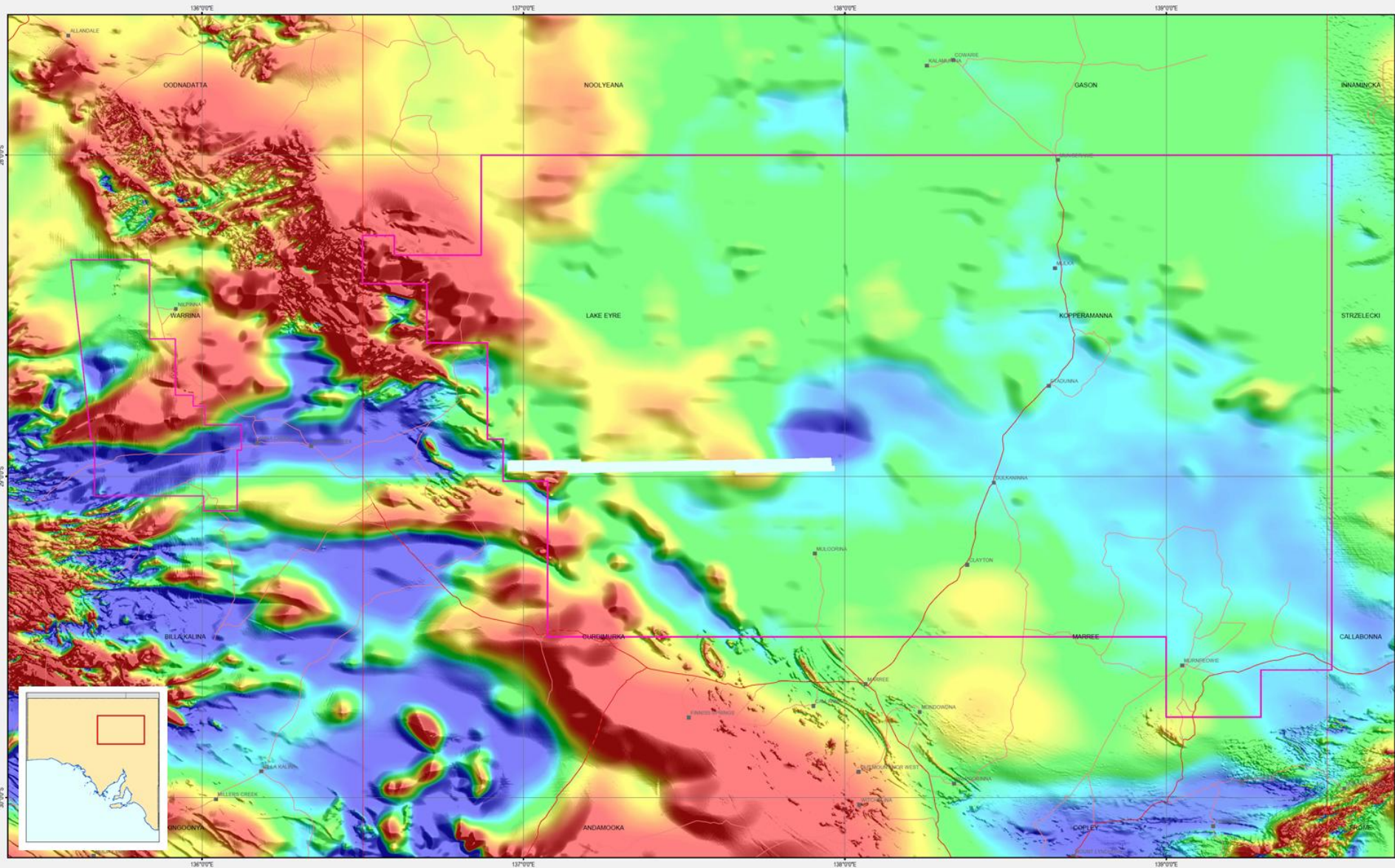
SA Radiometrics Coverage...



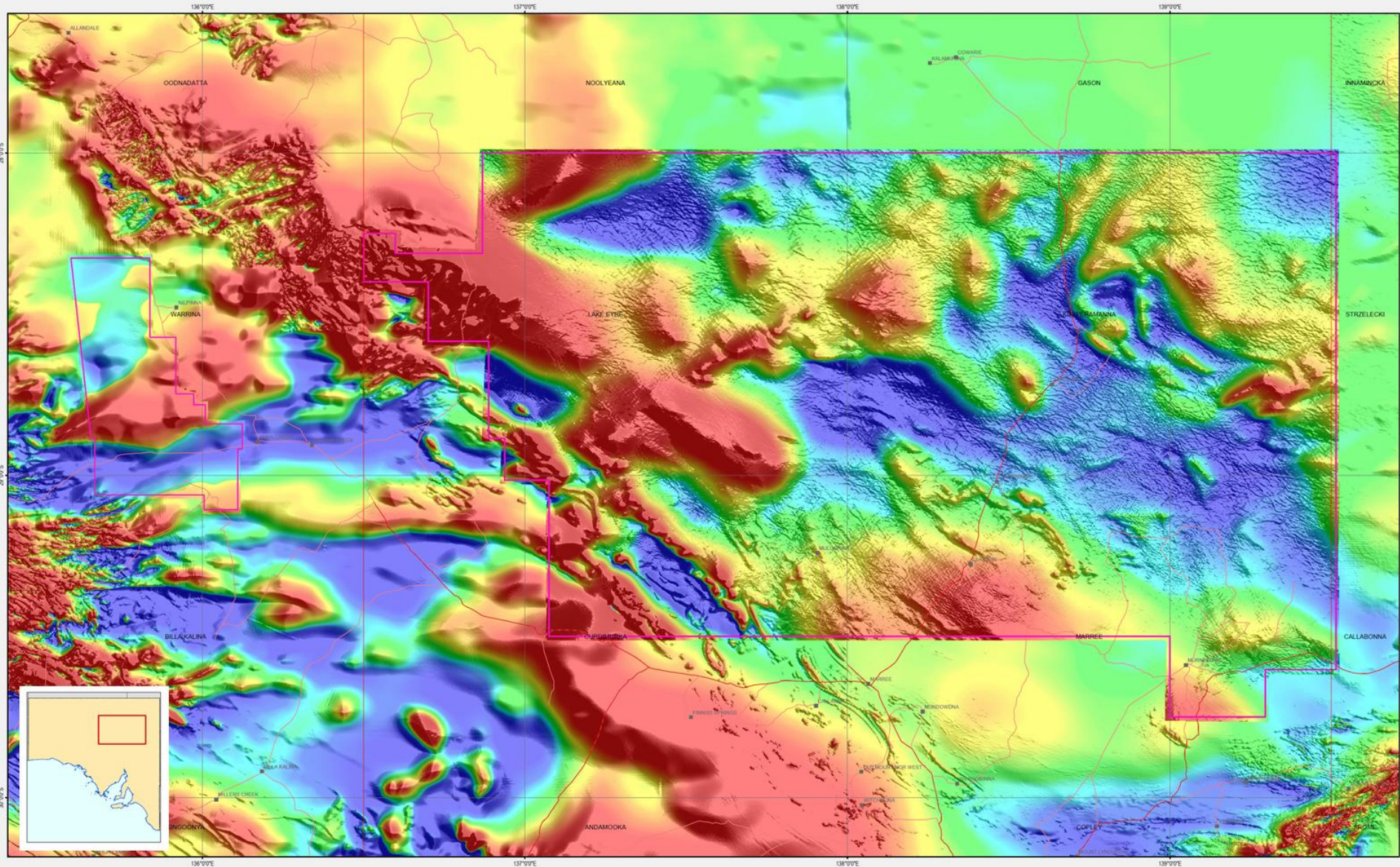
Marree - Ternary Radiometric Image



Marree Region - Total Magnetic Intensity - Pre 2013 Survey



Marree Region - Total Magnetic Intensity - Post 2013 Survey (Preliminary)

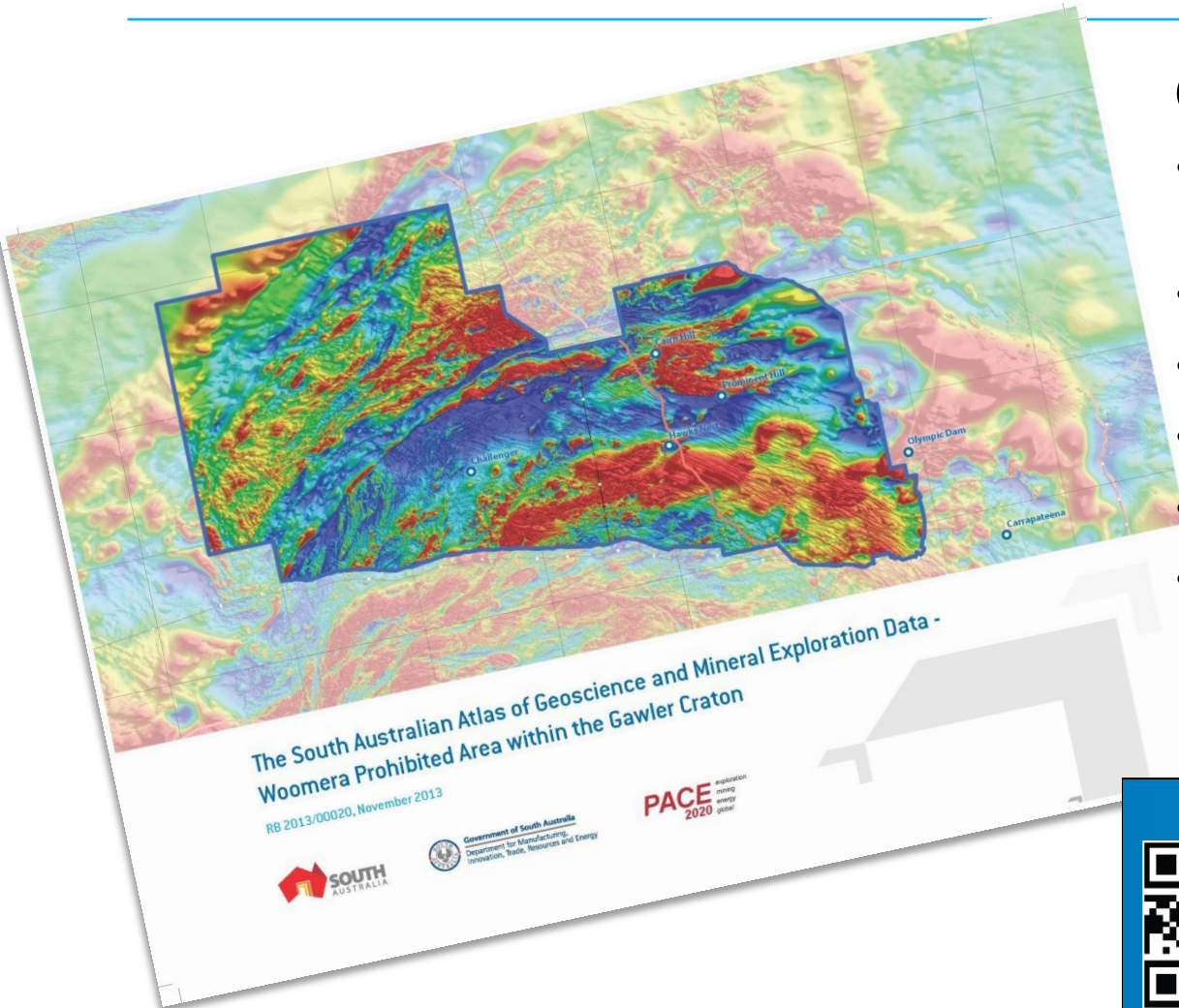


New Data Releases for Pre-competitive Exploration Workflow

Woomera Prohibited Area (WPA)

- **South Australia Atlas of Geoscience and Mineral Exploration Data – Woomera Prohibited Area within the Gawler Craton**
 - Visual display of current open file exploration data
- **Gawler Craton (WPA) Gravity Survey**
 - Partnership between DMITRE / Geoscience Australia / Department of Defence
 - 34,541 new gravity measurements at 1 km x 1 km resolution, except in the continual use zone of the WPA where resolution is 2 km x 2 km
 - 3,458 repeat stations (QA/QC)
 - ~\$2 M from 2012/13 PACE Budget
- **Gawler Craton (WPA) Reprocessed and Recompiled Magnetics Data**
 - Addition of 2000-2007 open file data
 - GSSA reprocessing
 - Compliments Gravity Survey Data
 - Valuable mineral system targeting data, especially for IOCG systems

South Australia Atlas of Geoscience and Mineral Exploration Data – Woomera Prohibited Area within the Gawler Craton



63 key maps and images!

- Land Access & Administration
- Geology
- Geophysics
- Drillholes & Rock Samples
- Remote Sensing
- Historic Exploration

Now available on SARIG!!!



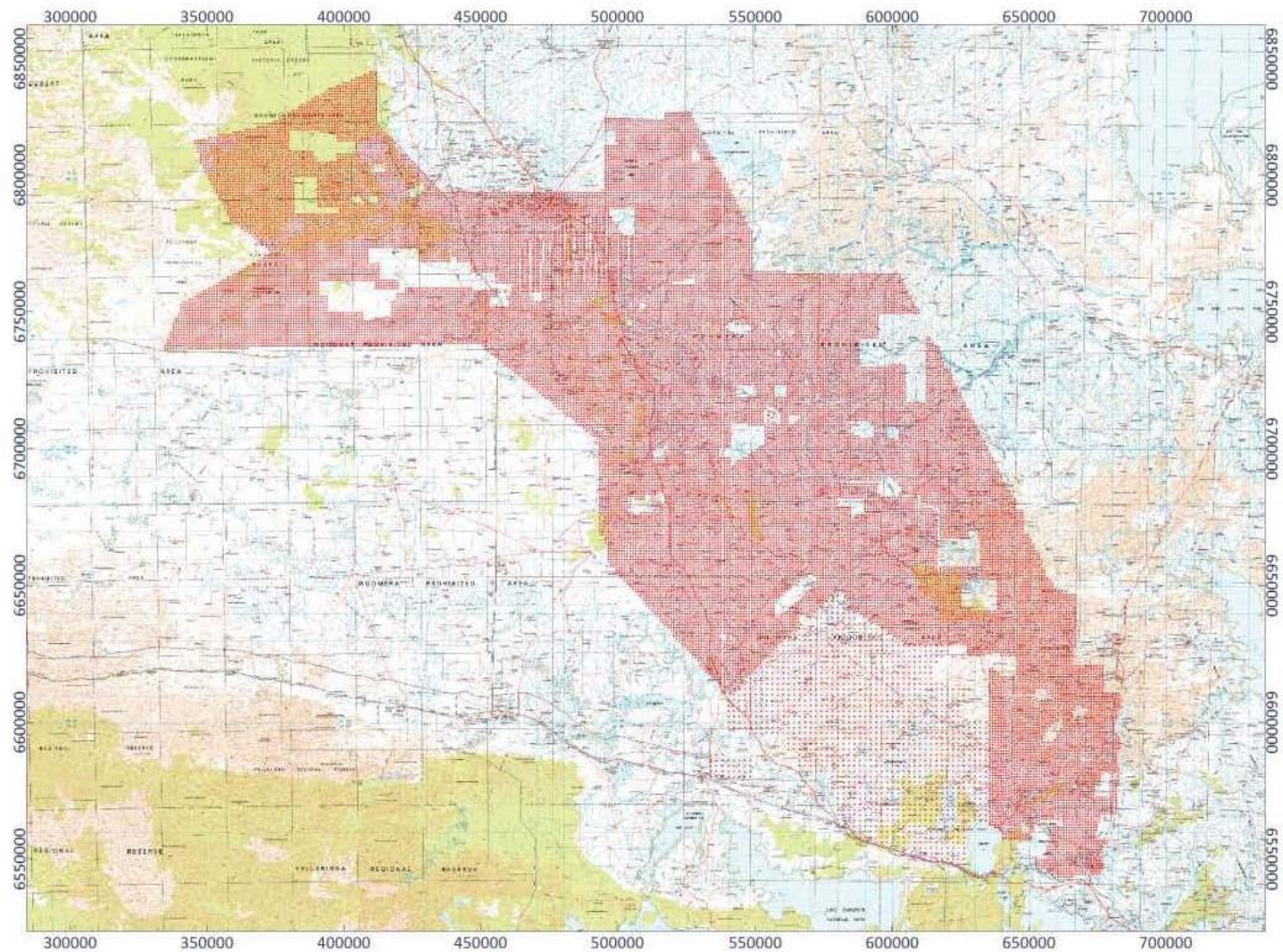
The South Australian Atlas of
Geoscience and Mineral Exploration Data -
Woomera Prohibited Area within the Gawler Craton

RB 2013/00020, November 2013

The Atlas document, and all constituent data,
are freely available through the South Australian
government's online geoserver

SARIG

sarig.dmitre.sa.gov.au



1km x 1km / 2km x 2km Regional Grid
Daishsat Project #13005
May - October 2013
Created By: G.A. Coopes

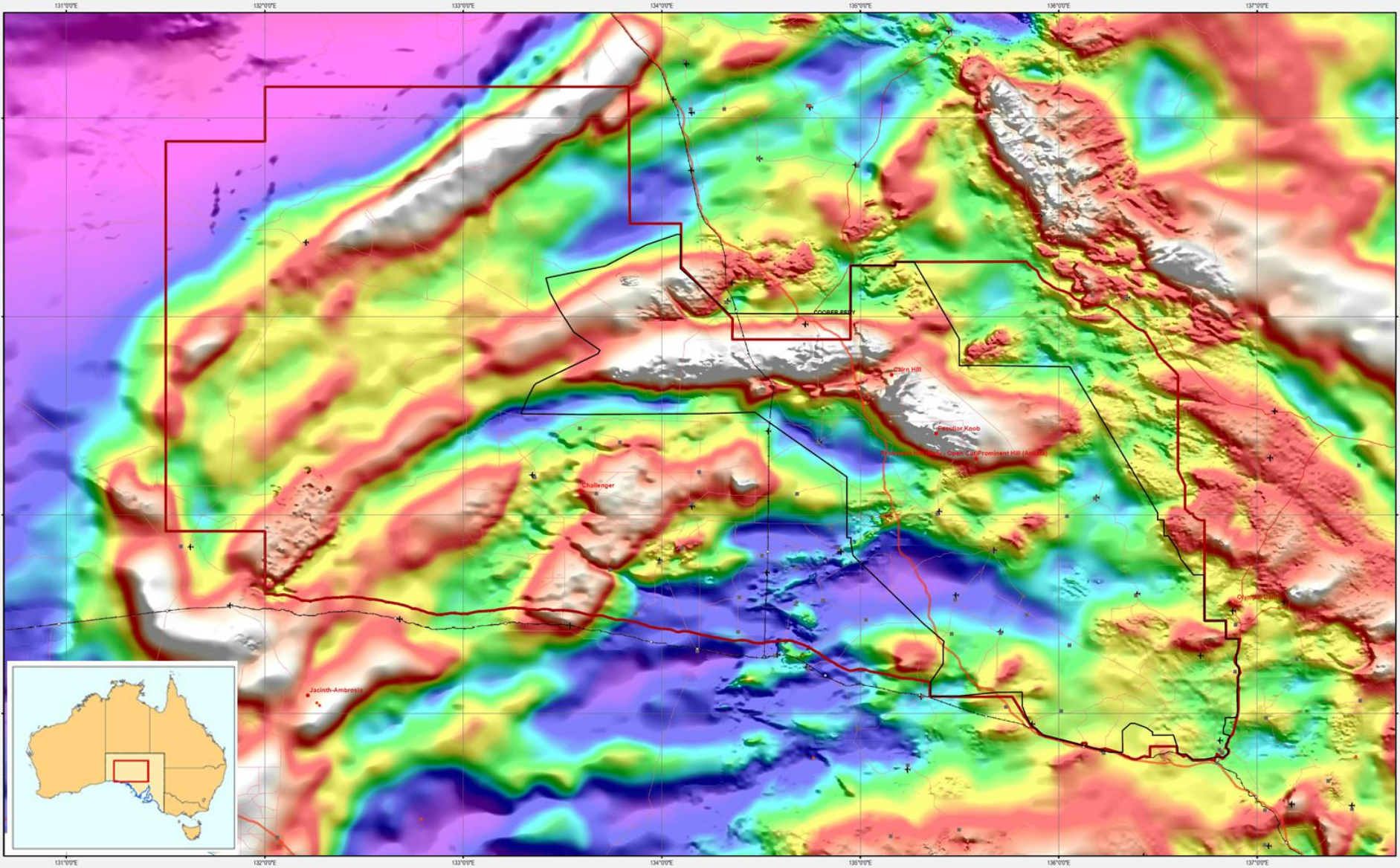


GEOSCIENCE AUSTRALIA - PROJECT 201350

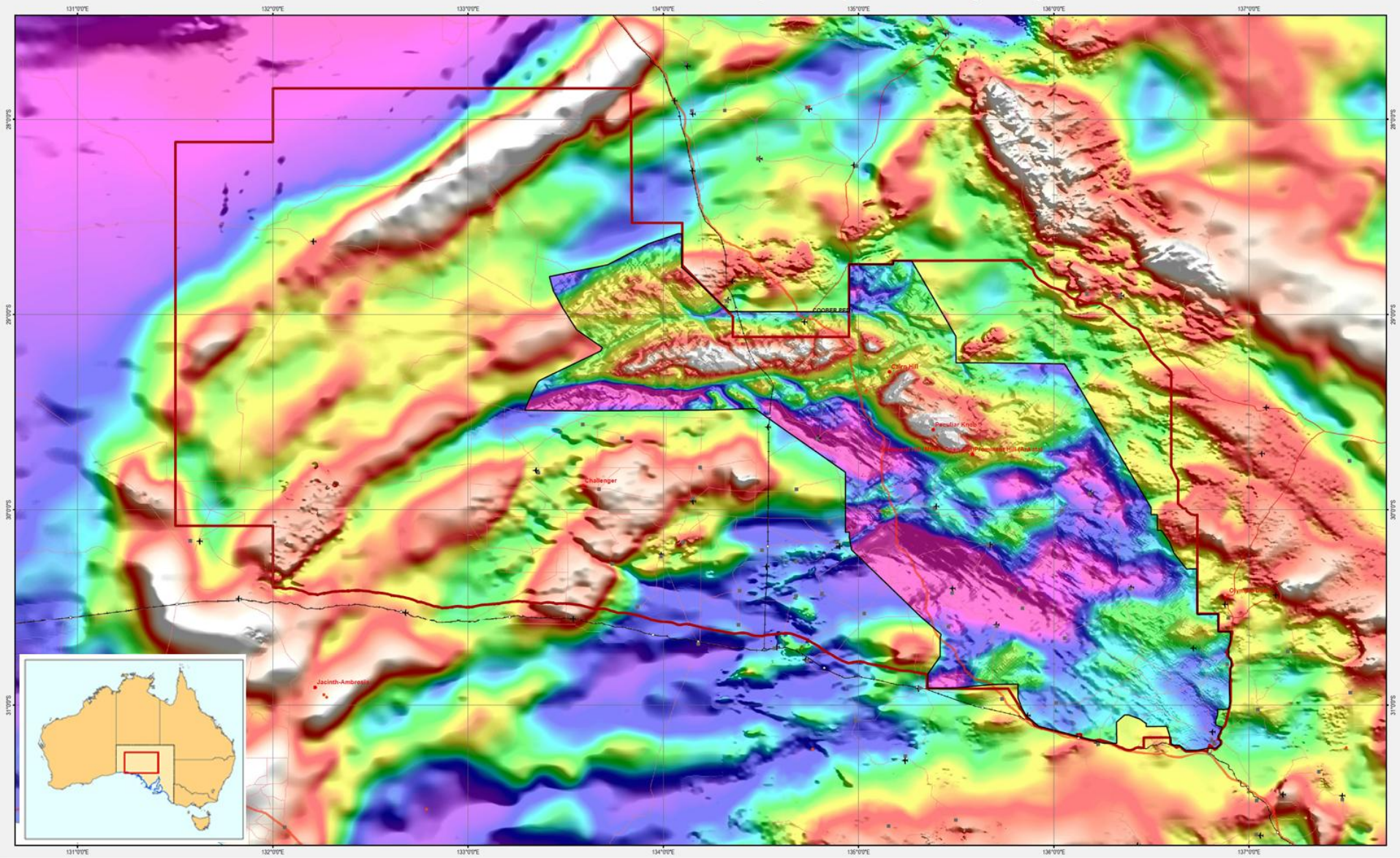
Woomera Prohibited Zone Regional Gravity Survey
Gravity Station Locations
34,697 Stations Acquired

Survey By: Daishsat Geodetic Surveyors

Woomera Prohibited Area Gravity 2011



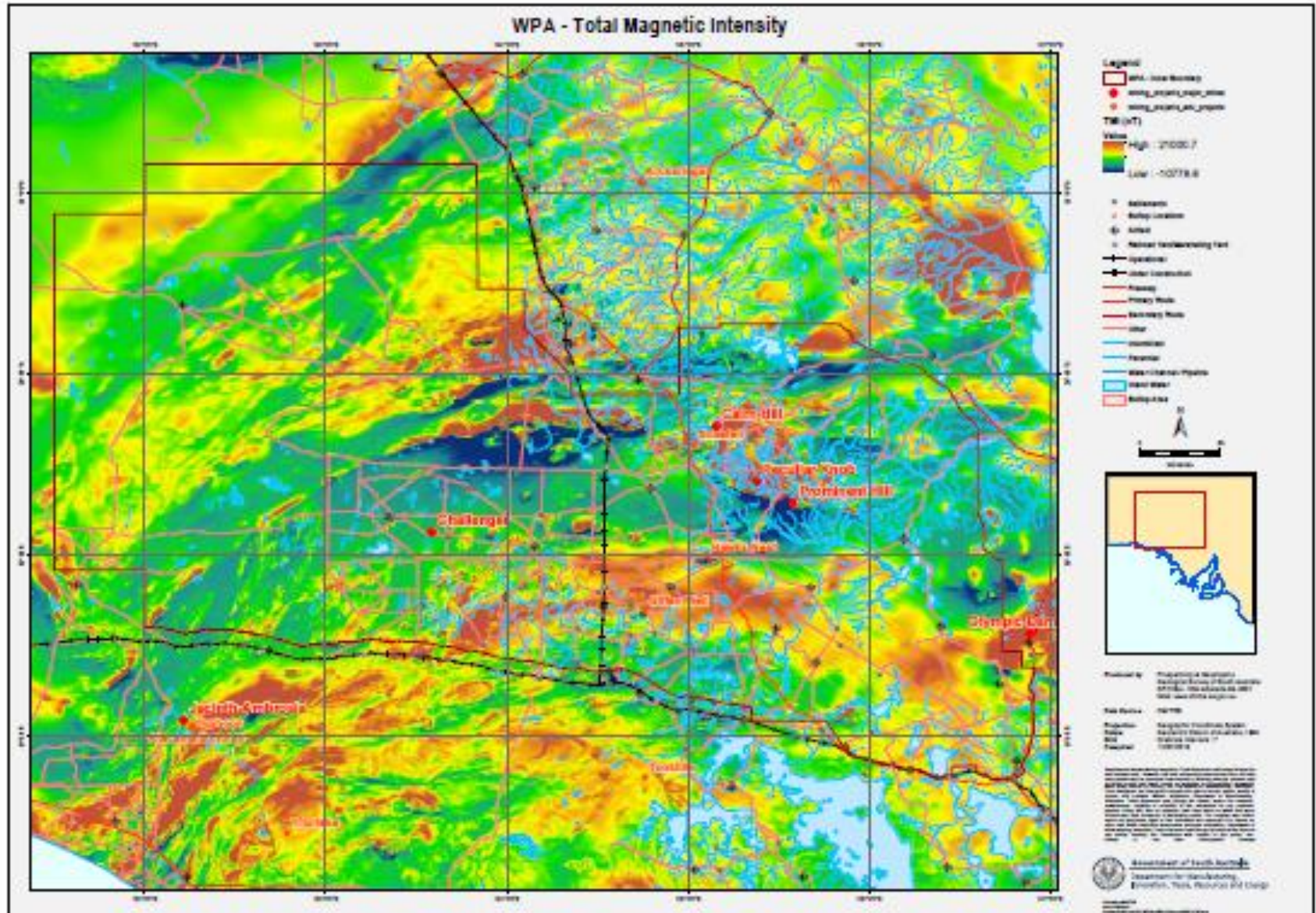
Woomera Prohibited Area 2013 Gravity Survey Preliminary Image



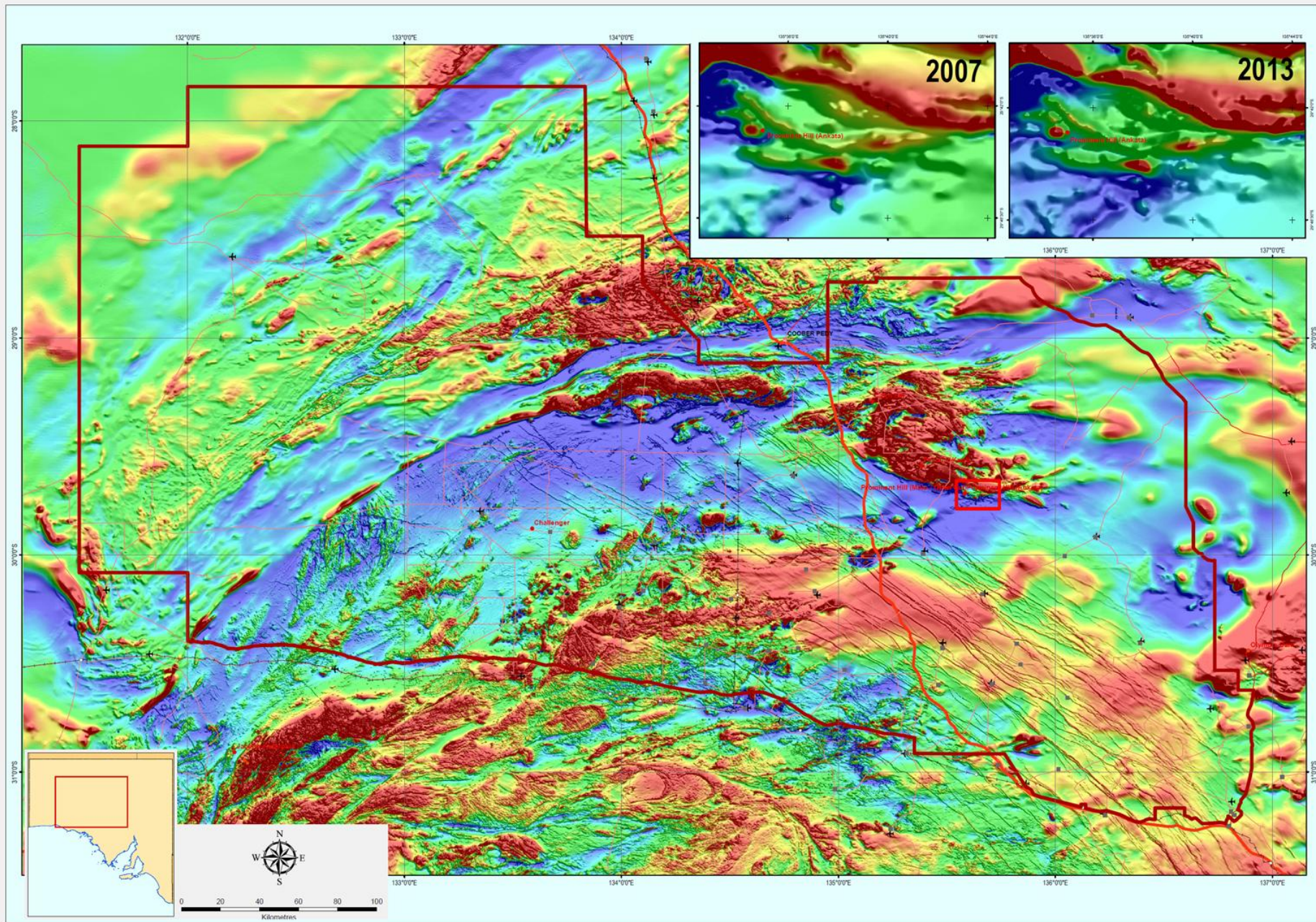
Preliminary gravity image provided by Geoscience Australia



WPA – Total Magnetic Intensity Image (2007)



WPA - Total Magnetic Intensity Image - Reprocessed 2013 (Preliminary)



Regional Mineral System Drilling...



Gibber plain (Photo S.Hill)

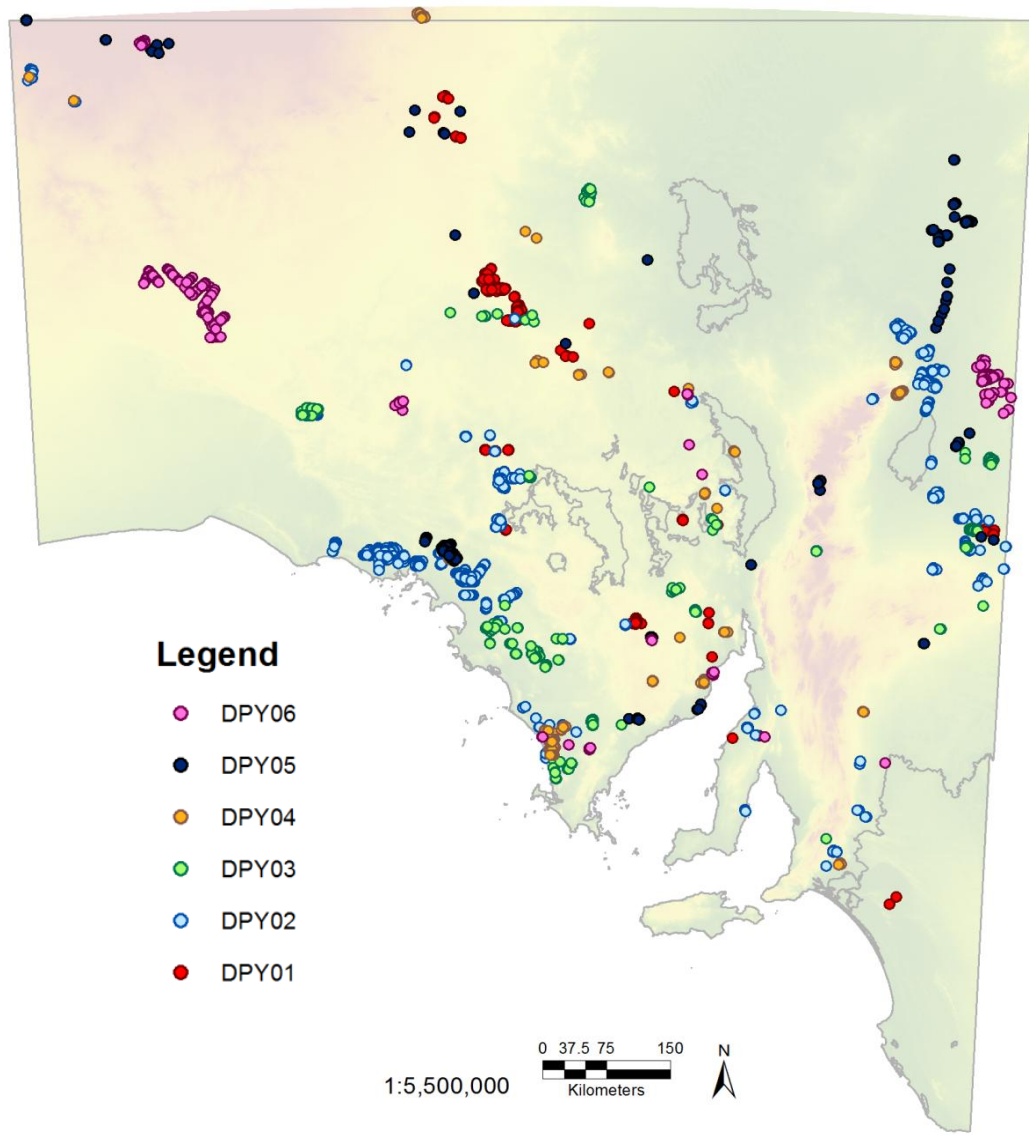
PACE Collaborative Drilling

8.8M Government spend leveraged over \$24M from industry

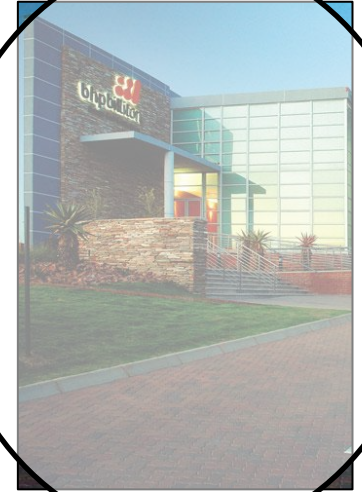
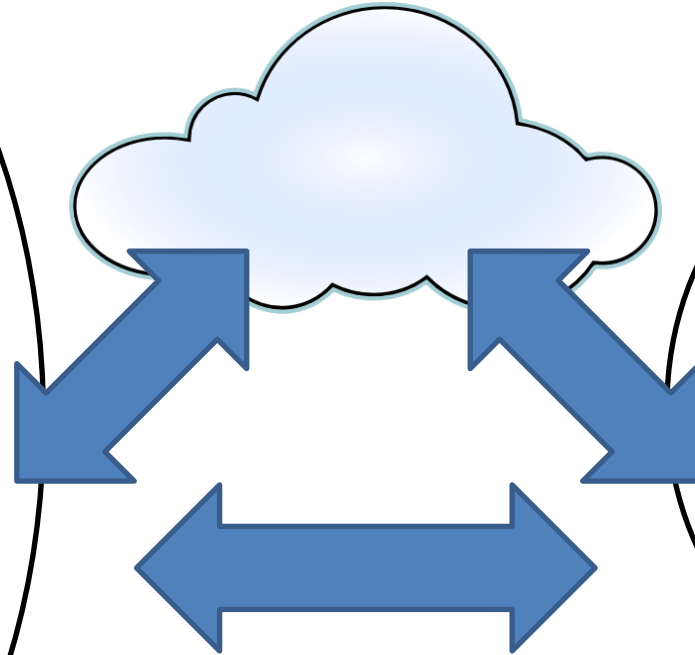
New assay results; downhole logs; petrophysics; geophysics;

PLUS follow-up programs and further investment

Round	Holes	m	DDH Core
1	353	21,469	4,016
2	1291	96,036	20,044
3	566	54,377	5,576
4	590	35,049	9,959
5	369	50,031	11,055
6	447	38,848	5,916
TOTAL	3616	295.8km	56.6km
plus			
OPAL	1183	19,181	
GOMA	4	1,084	160.6m



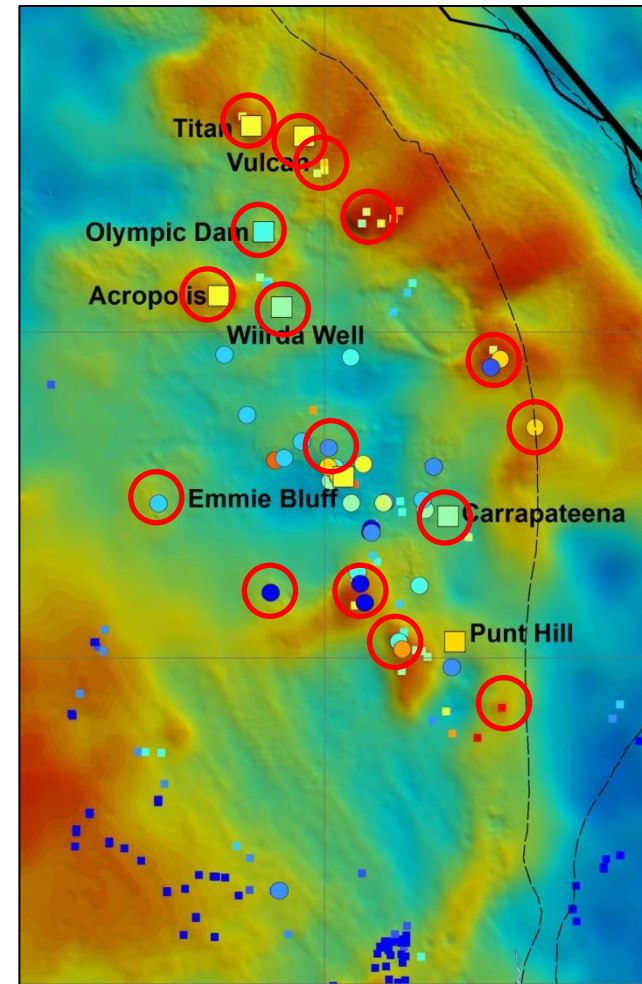
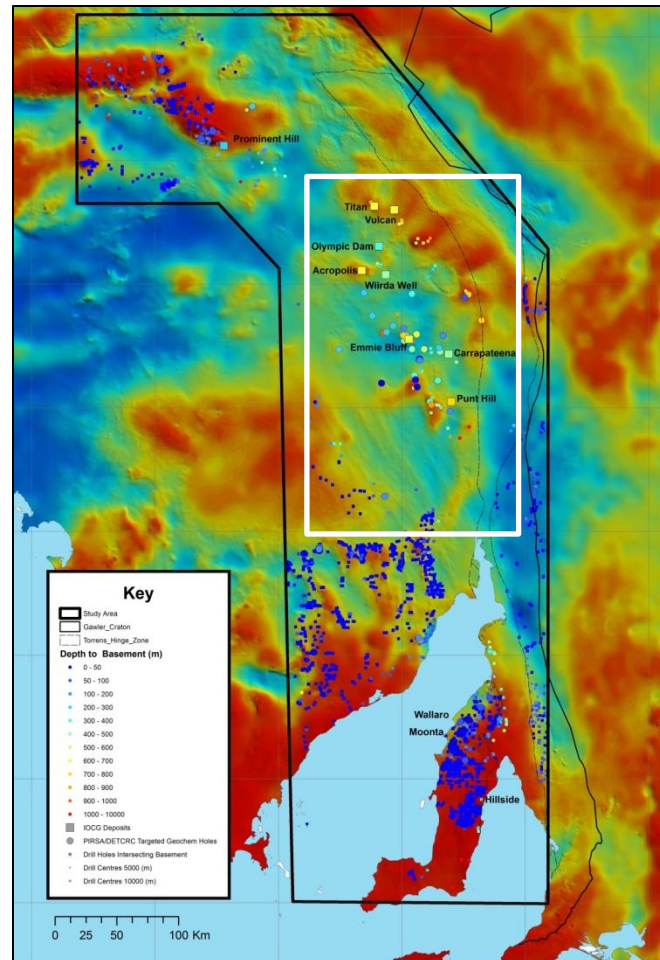
Deep Exploration Technologies
Cooperative Research Centre (DET CRC)



Technologies will enable
'Prospecting Drilling'

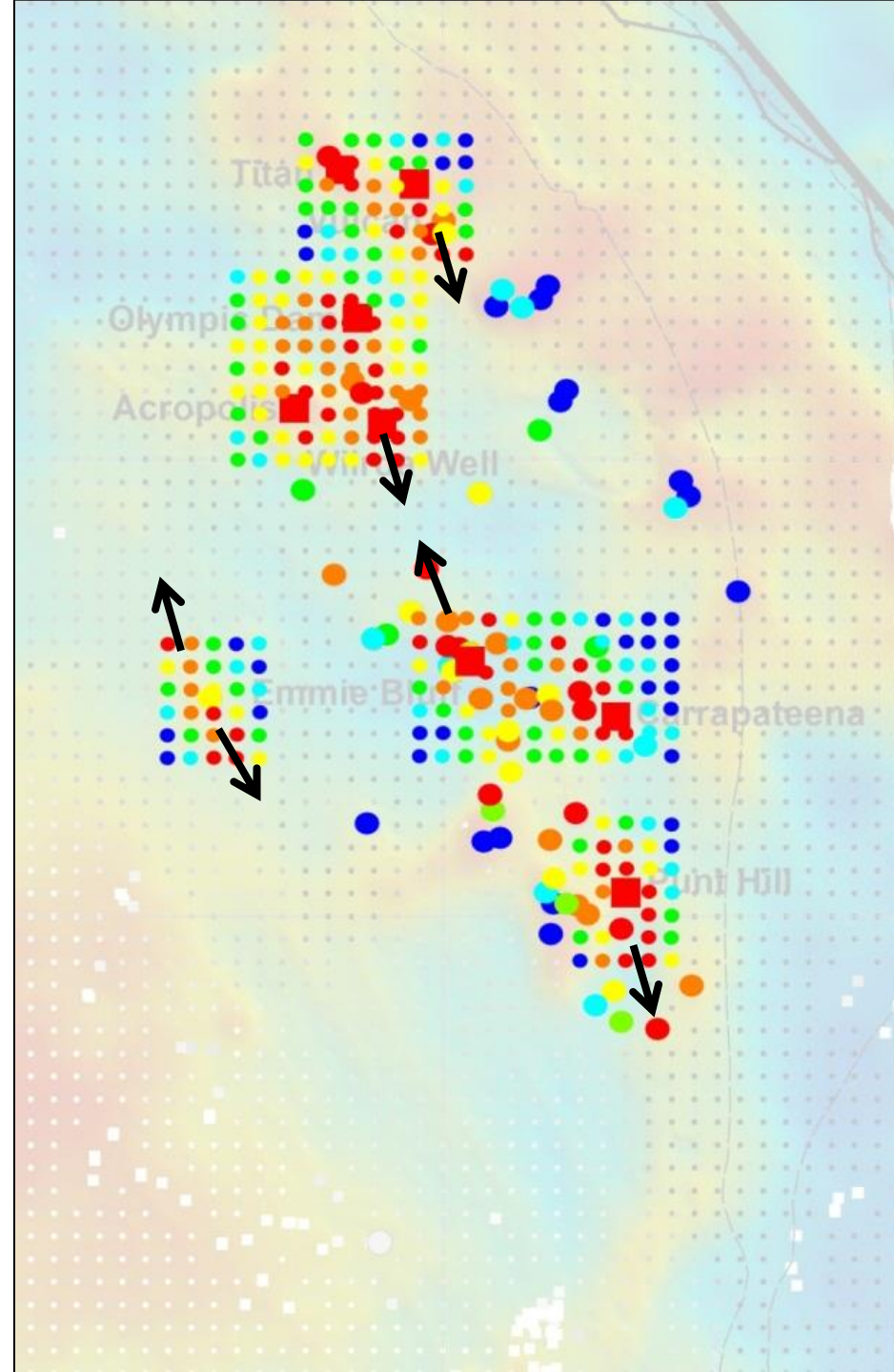
Deep Exploration: Current Practice

- IOCGs, Gawler Craton, SA
- Drill through deep cover based on grav & mag anomalies alone
- Many false +ves
- Many anomalies tested by one hole
- Sparse data collected with little knowledge to inform follow-up drilling



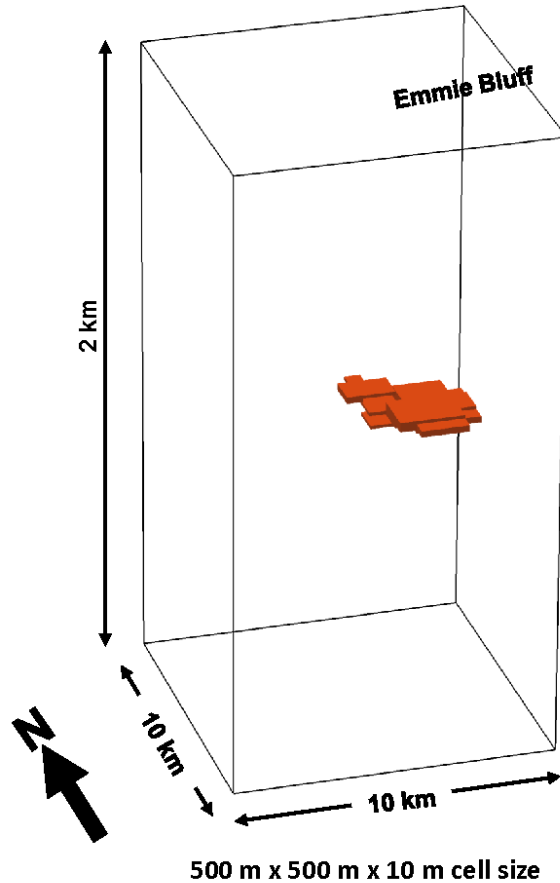
Deep Exploration: Prospecting Drilling

- Build out from initial targets using 5-10 km coiled tubing drilling array and resampling prior holes for consistent geochemical data
- Downhole & lab-at-rig tools define petrophysics and geochemical halos real-time
- Anomalies re-modelled and followed up during same campaign
- Targets based on broad bandwidth of geophysical and geochemical data reduces false +ves and allows recognition of new deposit types
- Start to map entire mineralising system with regional scale vector potential



Mapping buried mineral systems: enlarging buried target and provides framework for next drillhole

Emmie Bluff 3D Model Copper Shell (0.8%)



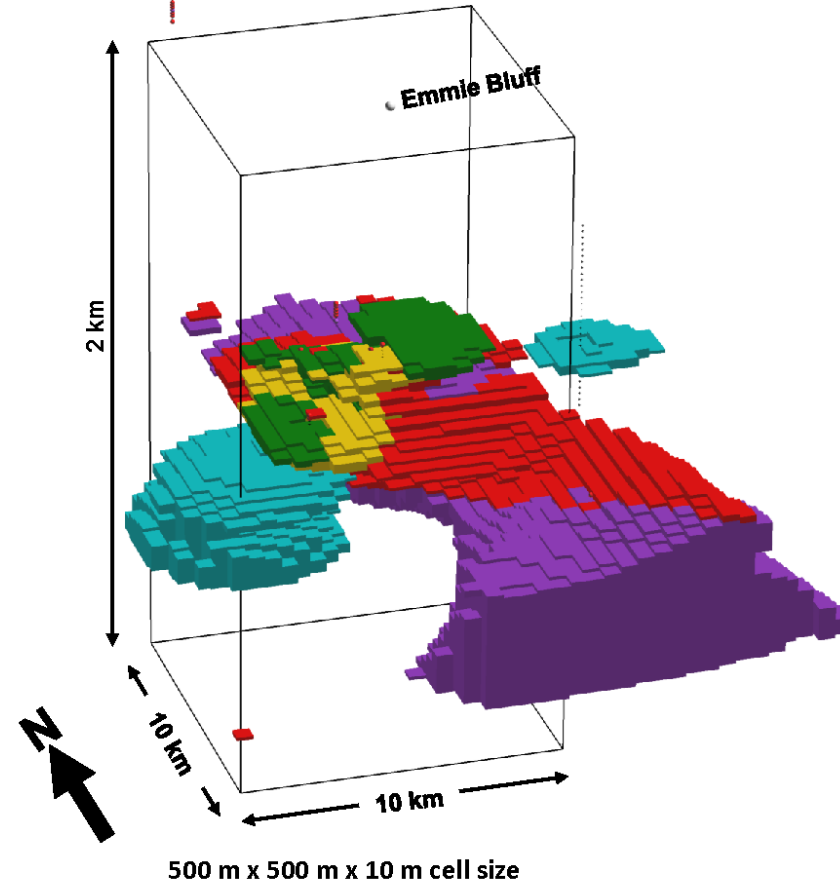
500 m x 500 m x 10 m cell size

10x vertical exaggeration

Key

- Hematite
- Magnetite
- Hematite – Magnetite
- Albite
- K-Feldspar
- Sericite
- Sericite – Chlorite
- Chlorite
- Copper Shell

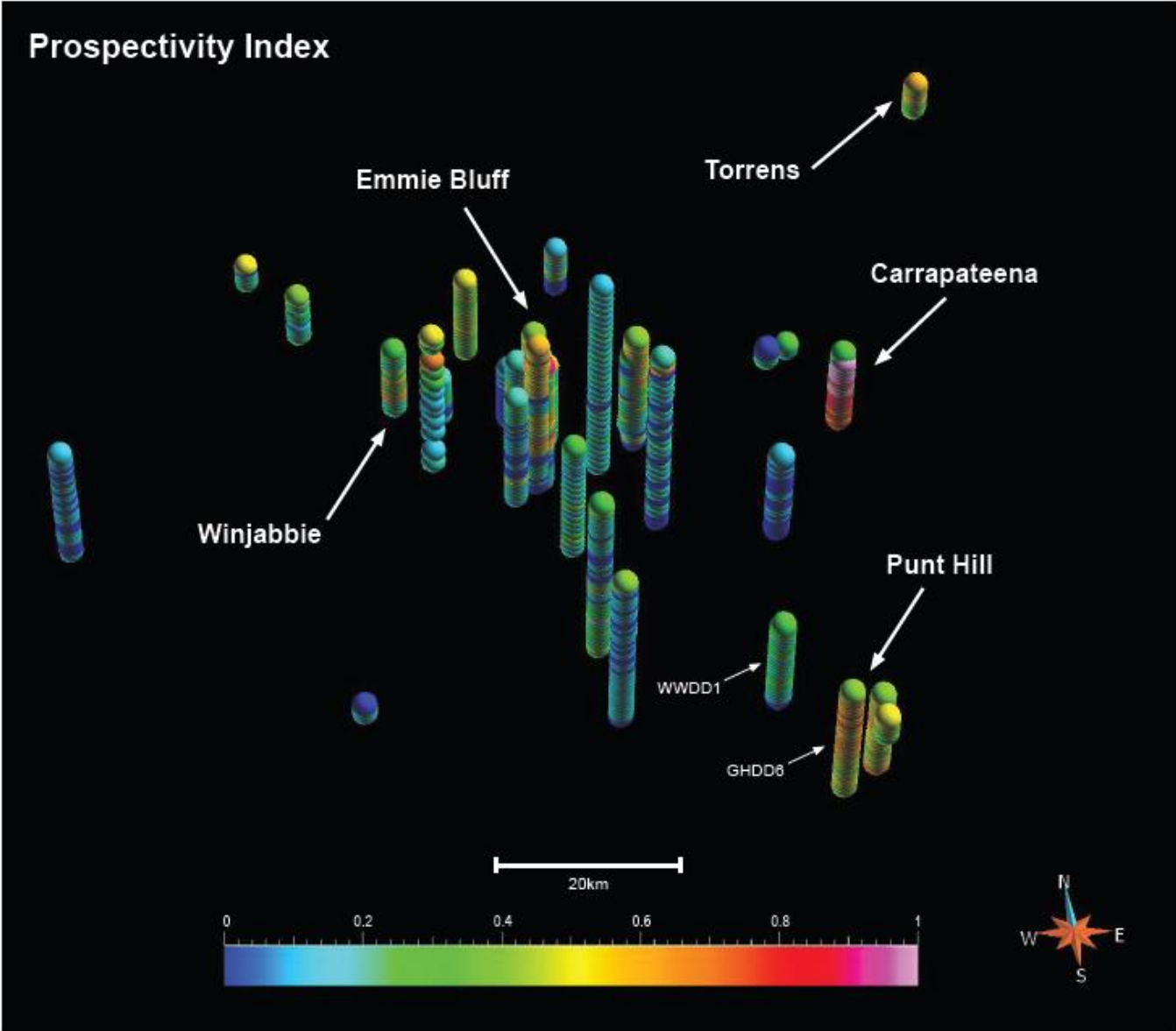
Emmie Bluff 3D Model Alteration Voxet



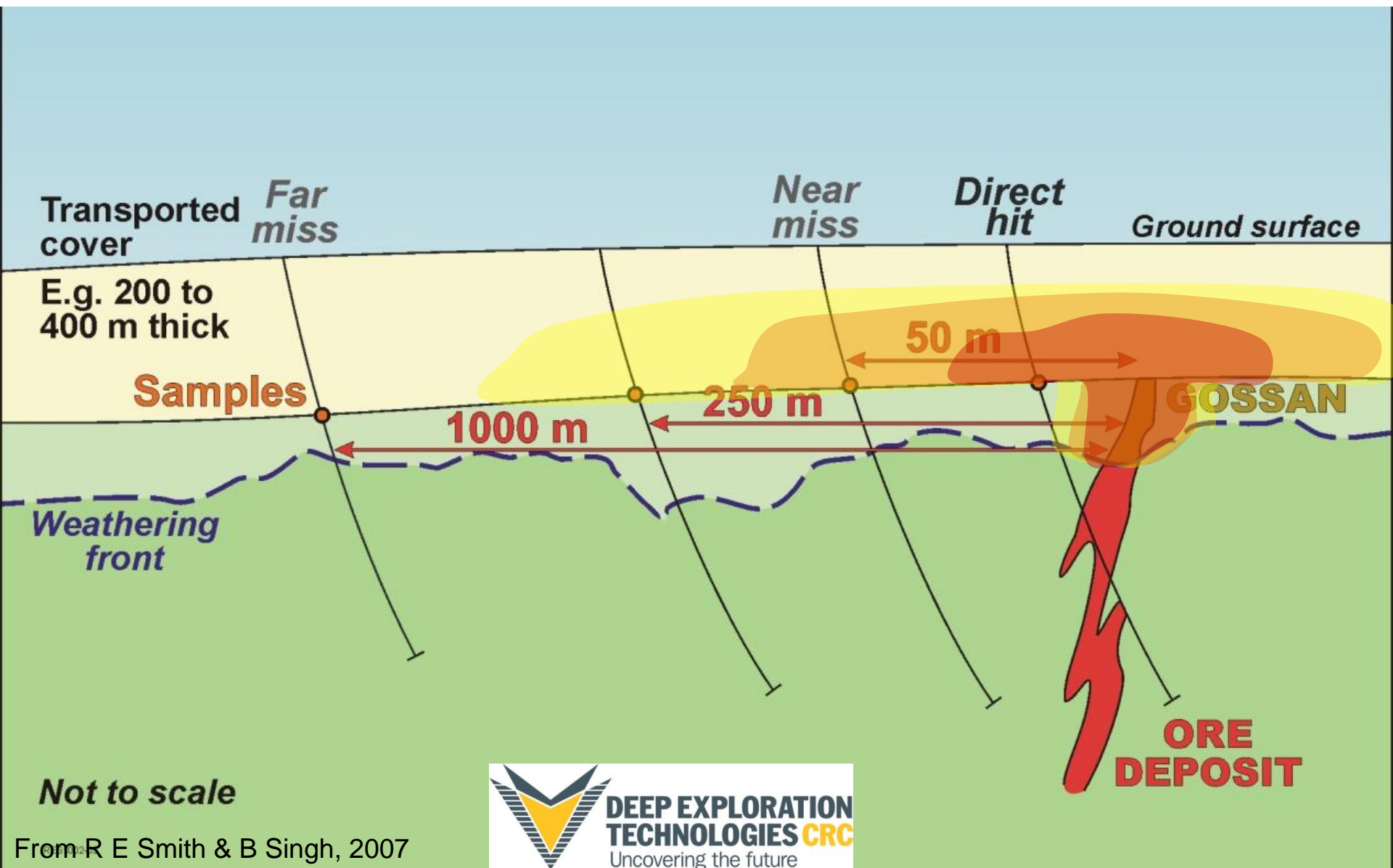
500 m x 500 m x 10 m cell size

10x vertical exaggeration

Geochemically rank samples – in “real time” using Lab-at-Rig



Regolith Geochemical Challenge from Drilling: Proximity to Minerals Systems from results within the cover



Mineral System Drilling

Mineral System Drilling Vision

PACE-type Contract to drill 130,000m on a 10km x 10km array through cover for basement and/or unconformity sample

\$50/m = \$6.5M

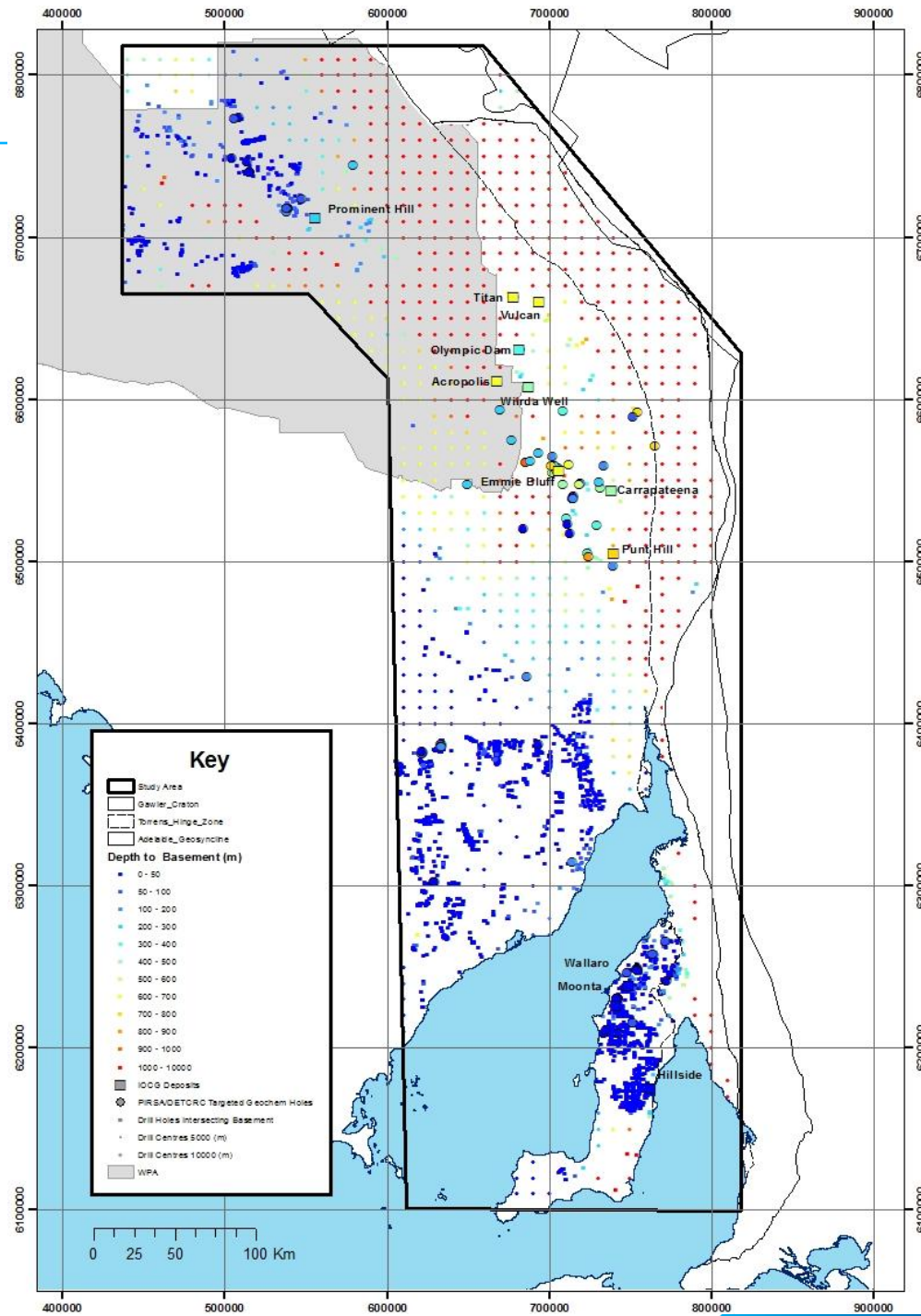
(excluding where basement > 1km)

**PACE Frontiers: \$2.0M
(2014-15 FY)**

\$200/m = 10,000m drilling

average hole ~ 500m = ~20 holes

+ plus industry co-investment opportunities



Regional Deep Cover Workflows – Eastern Gawler Craton

- Atlas of Open File Resources
- Enhanced Gravity and Magnetics Data
- Hardrock Seismic Pilot Study (HiSeis)
- Ongoing Magnetotelluric surveys (University of Adelaide)
- Alteration Characterisation (GSSA Geochemistry and HyLogger)
- Geochemistry / Biogeochemistry Pilot Study (GSSA)
- Regional Exploration Virtual Laboratory (REVL) (CSIRO)
- **Regional Mineral System Drilling (2015 – DET CRC and collaborators)**
- Extension and Application to northern Curnamona Province...

Western Gawler Craton – Eucla Basin....



Western Gawler / Eucla Basin Continental Seismic Transect



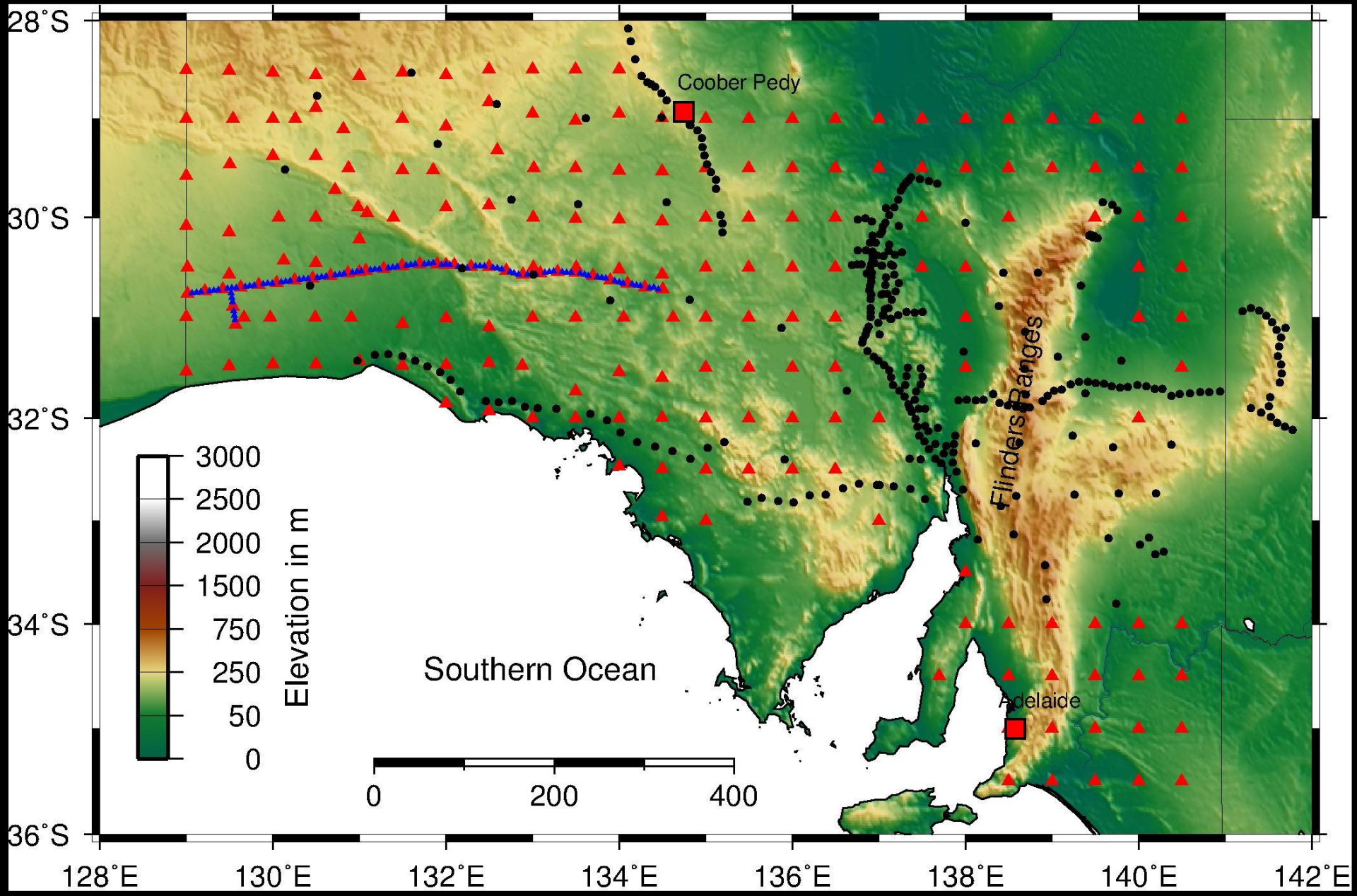
- **WA SA border eastwards to Tarcoola**
- **Completed !**
- **Funding**
 - \$1.75M PACE
 - \$0.5M GA
 - \$1.0M AusScope
 - GSWA paying for mobilisation / de-mobilisation
- **Across a major continental geological frontier....**



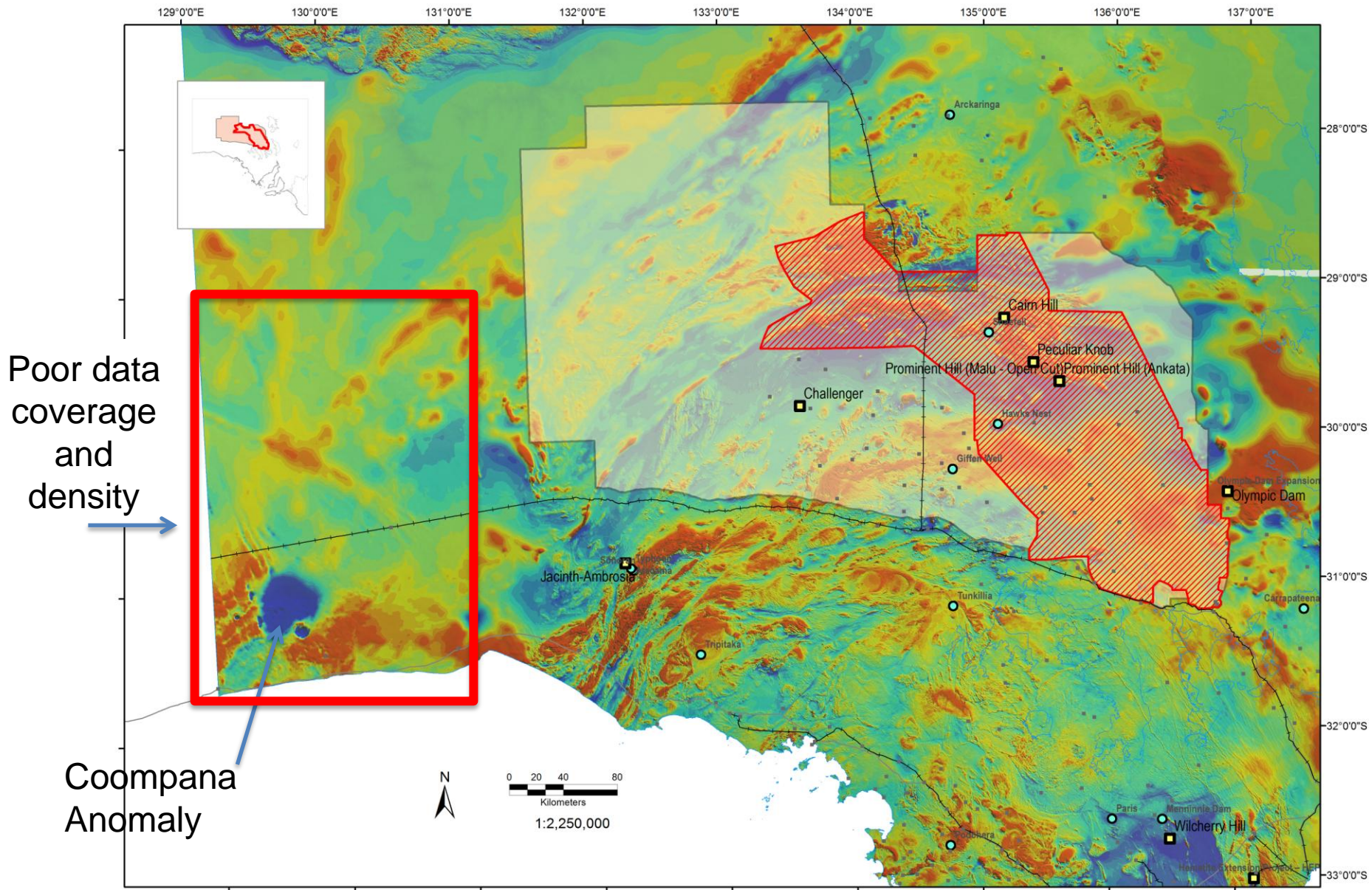
Western Gawler Craton / Eucla Basin Magnetotellurics

- **Collaboration with University of Adelaide (Graham Heinson)**
- **SA currently has greatest number of MT station data points in Australia**
- **This will maintain SA's leading edge in MT data coverage and interpretation of conductivity / resistivity of crustal profiles**
- **PACE funded. 2014-15 data acquisition**



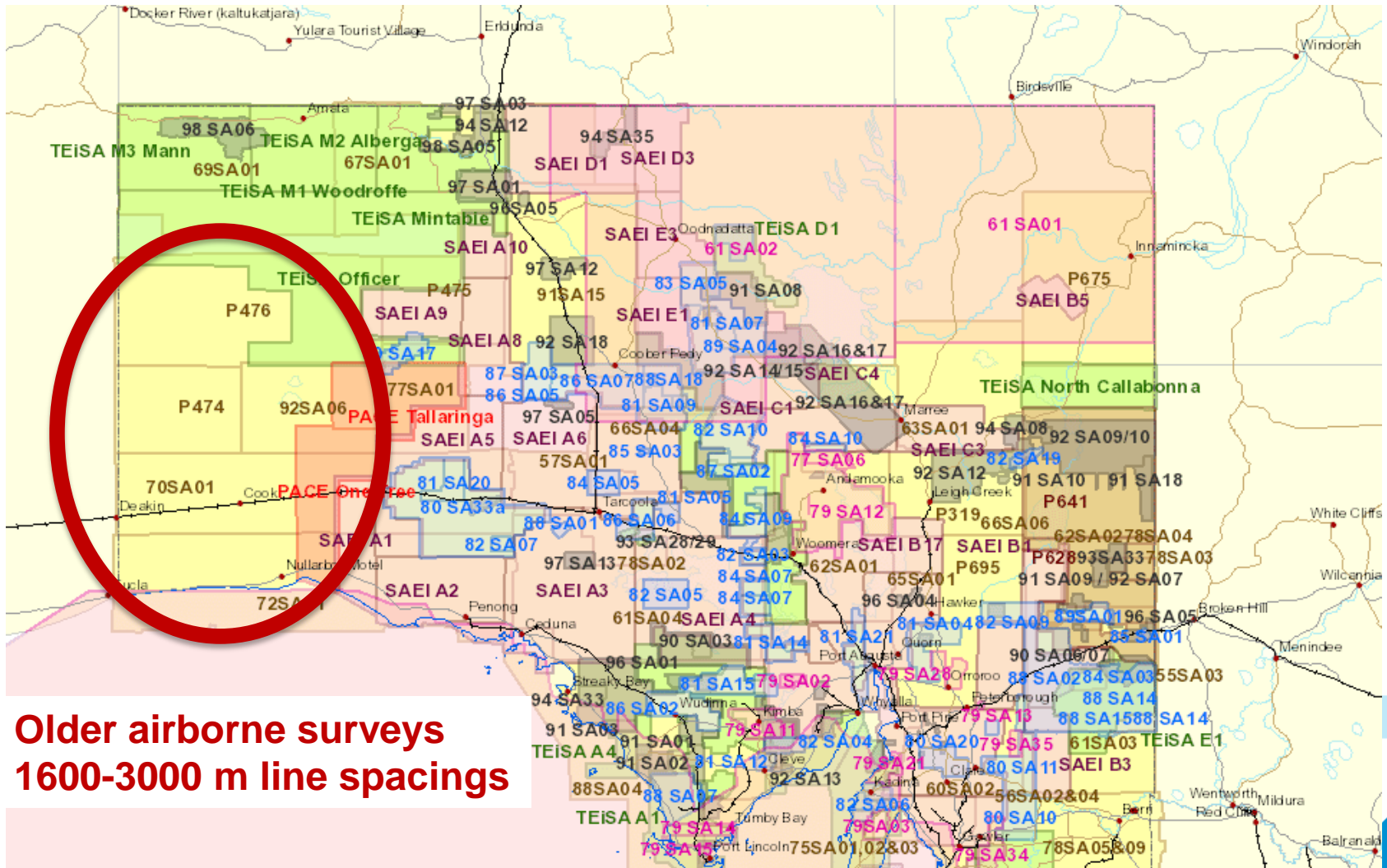


Western Gawler / Eucla Basin Airborne Survey (TMI backdrop)



2. Western Gawler / Eucla Basin Regional Geophysics

SA airborne geophysical surveys (from SARIG)



**Older airborne surveys
1600-3000 m line spacings**

Emerging Integrated Pre-competitive Geoscience workflow in Western Gawler – Eucla Basin

Regional Seismic Line
(2013-14)

Regional MT
(2014)

Airborne Geophysics
(2014)

Regional Geochemistry
(2013 – 15)

Regional Drilling

**Regional Geology
Data and Information**

**Data and Information
Delivery**

Free SmartPhone App for South Australia Mining Investors...

SOUTH AUSTRALIA MINING

“The South Australia Mining App will become your go-to guide for resources investment. With real-time data at your fingertips, investing in South Australia has never been so easy.”

Hon. Tom Koutsantonis MP
Minister for Mineral Resources and Energy

www.southaustraliamining.sa.gov.au



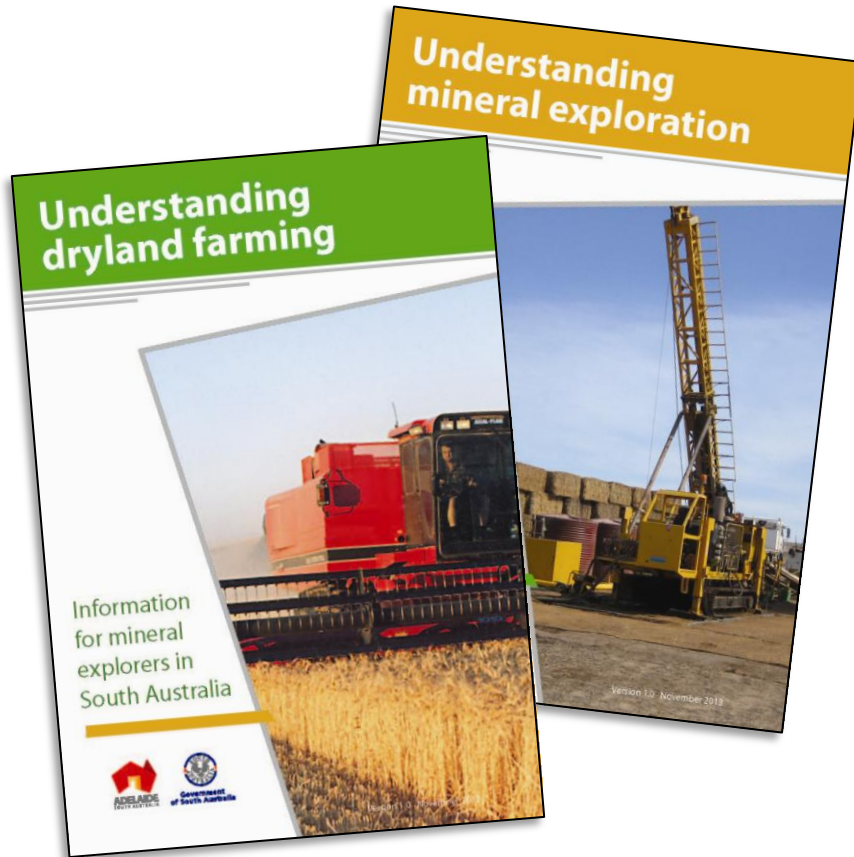
Government of South Australia
Department for Manufacturing,
Innovation, Trade, Resources and Energy

PACE 2020 exploration
mining
energy
global

www.minerals.dmitre.sa.gov.au

Community Engagement Strategy

Informed stakeholders



Eyre Peninsula Land use Support Program

Eyre Peninsula Land Use Support Program

HOME LIBRARY SUPPORT NEWS EVENTS FAQ CONTACT

About EPLUS

Eyre Peninsula Land Use Support (EPLUS) Program has been created to assist landholders to interact effectively and confidently with the exploration and mining industry.

The Program will provide access to information, education and support and links to services that will assist landholders and explorers and miners manage the impacts on farmland, farm businesses and farming families arising from exploration and mining developments.

As a landholder, the easier it is to source relevant information on the exploration and mining industry, its business processes and government laws and regulation, the better placed you will be to obtain the best possible outcomes for your business and personal wellbeing.

A major goal is to provide an opportunity for both landholders and the exploration and mining industry to be made aware of the processes and legislation involved in each other's business so where an explorer or miner seeks to access land both parties are able to plan and make informed decisions.

NEWS

EPLUS INFO SESSIONS PLANNED FOR NEW YEAR
28 November 2013
Information sessions will be held early next year to introduce farmers to the recently announced Eyre Peninsula Land Use Support (EPLUS) Program.
...[Read more](#)

NEW GUIDES TO FOSTER BETTER UNDERSTANDING BETWEEN FARMERS, EXPLORERS
26 November 2013
Two companion booklets are now available to help foster better mutual understanding between South Australian farmers and mineral explorers.
...[Read more](#)

NEW SMART PHONE APP TO POWER RESOURCE INVESTMENT IN SOUTH AUSTRALIA
28 October 2013
South Australia Mining - a new smart phone application providing a real-time guide for resources investors has been launched.
...[Read more](#)

HELPING EYRE PENINSULA REALISE BENEFITS FROM MINING
25 September 2013
A new support program to help landholders adapt to the recent influx of explorers and resource companies.
...[Read more](#)

Landowner frequently asked questions about mineral exploration in South Australia
(PDF 5.6 MB)

Code of Conduct for mineral and energy explorers - A framework for access to rural land
(PDF 1.7 MB)

Guidelines: Landowner rights and access arrangements in relation to mineral exploration and mining in SA
(PDF 5.1 MB)

Understanding dryland farming

Understanding mineral exploration: Information for farm businesses and the community in South Australia
(PDF 16.8 MB)

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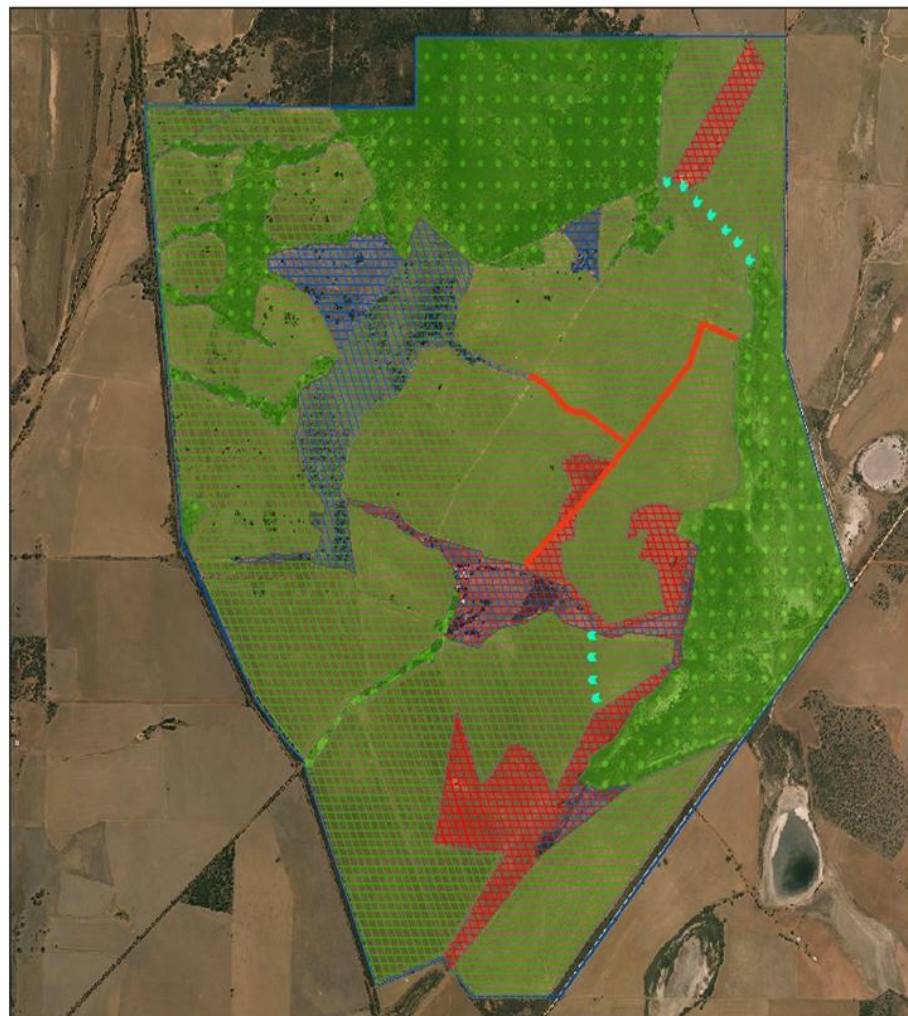
This is a collaborative project between DMITRE and PIRSA, delivered by Rural Solutions SA

SOUTH AUSTRALIA Government of South Australia

The objectives of the program include:

- Demonstrating the values and benefits of a shared commitment to multiple land use by modelling the program on the proposed National Multiple Land Use Framework
- Build capacity of Eyre Peninsula communities, farming businesses and local industries to enable them to respond to changes brought on by exploration programs in the region and potential mining developments.
- Provide local agribusinesses with the tools and support needed to fully understand and realise the opportunities for their businesses by working collaboratively with the explorers and potential mine developers.
- Equip landowners with the knowledge and understanding required to effectively participate in the land access negotiation process.
 - <http://www.pir.sa.gov.au/eplus>

Future Farm Landscape Workshops



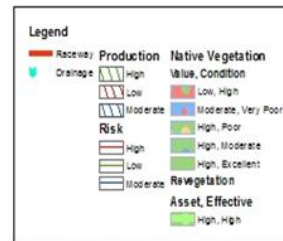
Future Farm Landscapes
Future Farming Focus Farm

Landholder:
Siviour
Location: Wangary

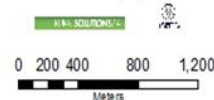


1:28,047

Map Datum: GDA94 MGA ZONE 53
Data Source: DENR
Date: 10/07/2012



Map created by: Brett Masters
Rural Solutions SA
brett.masters@sa.gov.au



- Targeted workshops for landholders
- Identify profitability (H/L/M) across the farm landscape and risk areas.
- This is then overlaid with potential impacts from exploration, mining or associated infrastructure to determine priority actions required to ensure long-term viability of the farming enterprise.

Policy Potential Index - Global



		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010 UPDATE	2010/11	2011/12	2012/13	
RANKING TOP 25	Nr jurisdictions	53	64	64	65	68	71	72	51	79	93	96	
	1	Nevada	Nevada	Nevada	Manitoba	Quebec	Quebec	Quebec	Quebec	Alberta	Alberta	New Brunswick	Finland
	2	Chile	Ireland	Alberta	Alberta	Nevada	Nevada	Wyoming	New Brunswick	Finland	Nevada	Finland	Sweden
	3	South Australia	Manitoba	Manitoba	Nevada	Finland	Nevada	Nevada	Finland	Quebec	Saskatchewan	Alberta	Alberta
	4	Tasmania	Utah	Chile	Utah	Alberta	Alberta	Alberta	Alberta	Yukon	Quebec	Wyoming	New Brunswick
	5	New South Wales	Saskatchewan	Quebec	South Australia	Manitoba	Manitoba	Newfoundland and Labrador	Nevada	Saskatchewan	Finland	Quebec	Wyoming
	6	Manitoba	Spain	Mexico	New Brunswick	Chile	Chile	New Brunswick	Saskatchewan	Chile	Utah	Saskatchewan	Ireland
	7	Alberta	Quebec	Saskatchewan	Quebec	Utah	Utah	Manitoba	Chile	Newfoundland and Labrador	Sweden	Sweden	Nevada
	8	Quebec	Ontario	Arizona	Queensland	Wyoming	Wyoming	Chile	Newfoundland and Labrador	Botswana	Chile	Nevada	Yukon
	9	Queensland	Alberta	Ontario	Tasmania	Ireland	Ireland	Saskatchewan	Manitoba	Alaska	Manitoba	Ireland	Utah
	10	Saskatchewan	Tasmania	Utah	Saskatchewan	Sweden	Sweden	Ontario	South Australia	Nevada	Wyoming	Yukon	Norway
	11	Brazil	Arizona	Western Australia	Yukon	Botswana	Botswana	Utah	Yukon	Manitoba	South Australia	Northern Territory	Quebec
	12	Northern Territory	Western Australia	New South Wales	Victoria	Saskatchewan	Saskatchewan	Nova Scotia	Sweden	Wyoming	Greenland	Western Australia	Nova Scotia
	13	Victoria	Idaho	Alaska	New Mexico	New Brunswick	New Brunswick	Sweden	Wyoming	Utah	Newfoundland and Labrador	Ontario	Saskatchewan
	14	New Brunswick	Chile	South Australia	New South Wales	Arizona	Arizona	Finland	Northern Territory	Mexico	Botswana	Greenland	Greenland
	15	Western Australia	South Australia	Tasmania	Northern Territory	South Australia	South Australia	Yukon	Utah	South Australia	Yukon	Nova Scotia	Western Australia
	16	Ontario	New Brunswick	Ireland	Wyoming	Yukon	Yukon	South Australia	Nova Scotia	Peru	Ireland	Newfoundland and Labrador	Ontario
	17	Ireland	Mexico	Finland	Nova Scotia	Nova Scotia	Nova Scotia	Alaska	Ireland	Arizona	Western Australia	Botswana	Botswana
	18	Nova Scotia	Queensland	New Brunswick	Western Australia	Ontario	Ontario	Botswana	Alaska	Ireland	Colombia	Ontario	Chile
	19	Mexico	New South Wales	Brazil	Ontario	British Columbia	British Columbia	Norway	Western Australia	Brazil	Nova Scotia	South Australia	Newfoundland and Labrador
	20	Peru	India	Northern Territory	Arizona	Tasmania	Tasmania	Northern Territory	New South Wales	Ontario	New South Wales	Manitoba	South Australia
	21	Argentina	Wyoming	Yukon	Spain	Northern Territory	Northern Territory	Western Australia	Botswana	Ghana	Alaska	Utah	Manitoba
	22	Bolivia	Sweden	Wyoming	Newfoundland and Labrador	Newfoundland and Labrador	Newfoundland and Labrador	Spain	Ontario	Nunavut	Norway	Minnesota	Northern Territory
	23	Turkey	Victoria	British Columbia	Idaho	Ghana	Ghana	New South Wales	Tasmania	Tanzania	New Brunswick	Michigan	Chile
	24	Alaska	Finland	Argentina	South Dakota	Mexico	Mexico	British Columbia	Queensland	Namibia	Burkina Faso	Norway	Victoria
25	New Zealand	Northern Territory	Turkey	Alaska	Western Australia	Western Australia	Queensland	Arizona	New Zealand	Arizona	Alaska	Morocco	

British Columbia
Zambia
Western Australia



Mineral Potential Index - Global

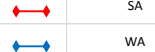


	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Nr jurisdictions	53	64	64	65	68	71	72	79	93	96	
1	Russia	Nevada	Chile	Nevada	Mexico	Chile	Nevada	Chile	Botswana	Greenland	
2	Western Australia	Chile	Nevada	Quebec	Quebec	Quebec	Chile	Quebec	Greenland	Finland	
3	Peru	Quebec	Mongolia	Western Australia	Chile	Finland	Quebec	Saskatchewan	Yukon	Sweden	
4	Chile	Western Australia	Quebec	South Australia	Burkina Faso	Nevada	Burkina Faso	Nevada	Saskatchewan	Nevada	
5	Nevada	Mexico	Mali	Queensland	South Australia	Saskatchewan	Mexico	Greenland	Chile	Saskatchewan	
6	Indonesia	Tasmania	South Australia	Northern Territory	Finland	Sweden	Saskatchewan	Burkina Faso	Alaska	Alaska	
7	Quebec	Finland	Ghana	Ontario	Manitoba	Western Australia	Botswana	Botswana	Nevada	Yukon	
8	Ontario	Northern Territory	Mexico	Chile	Nevada	Utah	Northern Territory	Western Australia	Newfoundland and Labrador	Wyoming	
9	Northwest Territories	Brazil	Ontario	Alberta	Ghana	Mexico	Alaska	Alaska	Quebec	Western Australia	
10	Brazil	Ontario	Western Australia	Alaska	Ireland	South Australia	Mali	Papua New Guinea	Western Australia	Northern Territory	
11	South Africa	Queensland	Saskatchewan	Brazil	Saskatchewan	Peru	Yukon	Yukon	Manitoba	Chile	
12	Alaska	Mali	Botswana	Manitoba	Mali	New South Wales	Peru	Finland	Wyoming	New Brunswick	
13	Mexico	New South Wales	Brazil	Finland	Yukon	Queensland	Brazil	Utah	Burkina Faso	Utah	
14	Northern Territory	Manitoba	Burkina Faso	Yukon	Namibia	Alaska	Finland	Sweden	South Australia	Newfoundland and Labrador	
15	DRC Congo	Mongolia	Manitoba	Newfoundland and Labrador	Ontario	Wyoming	South Australia	Mexico	Utah	Arizona	
16	Nunavut	Tanzania	Argentina	New South Wales	Wyoming	Newfoundland and Labrador	Utah	Colombia	Papua New Guinea	Botswana	
17	British Columbia	Ghana	Tasmania	New Mexico	Peru	Botswana	Newfoundland and Labrador	Manitoba	Ghana	Ontario	
18	China	South Australia	Arizona	Saskatchewan	Newfoundland and Labrador	Turkey	Ghana	Brazil	Alberta	Northwest Territories	
19	Ghana	Peru	Queensland	Ghana	Queensland	Northern Territory	Western Australia	Ontario	Finland	Guyana	
20	Philippines	China	Turkey	Mexico	Zambia	Burkina Faso	Turkey	Wyoming	Sweden	South Australia	
21	Kazakhstan	Nunavut	Alberta	Arizona	Northern Territory	Brazil	Queensland	Mali	Mexico	Norway	
22	Newfoundland and Labrador	Spain	Finland	Tanzania	Brazil	Tanzania	Manitoba	Peru	Northern Territory	Turkey	
23	Queensland	Victoria	New South Wales	Wyoming	Alberta	Zambia	Wyoming	Tanzania	Ontario	Ghana	
24	Argentina	Sweden	Northern Territory	Nunavut	New Brunswick	New Brunswick	Namibia	Ghana	New Mexico	Alberta	
25	New South Wales	Botswana	Utah	Utah	Tanzania	Tasmania	Colombia	Newfoundland and Labrador	Tanzania	Queensland	

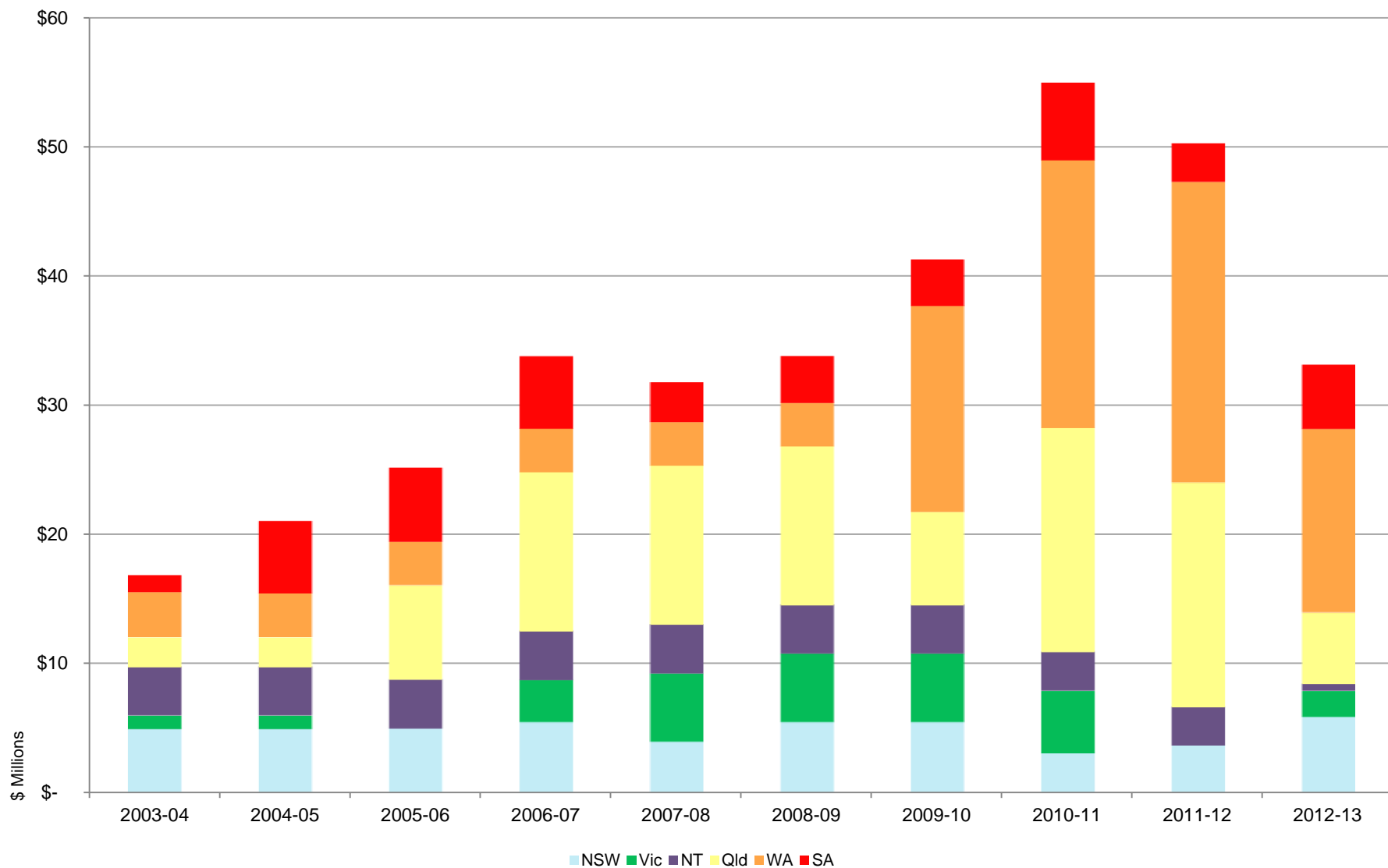
RANKING TOP 25

2004 PACE

2009 WA EIS Scheme



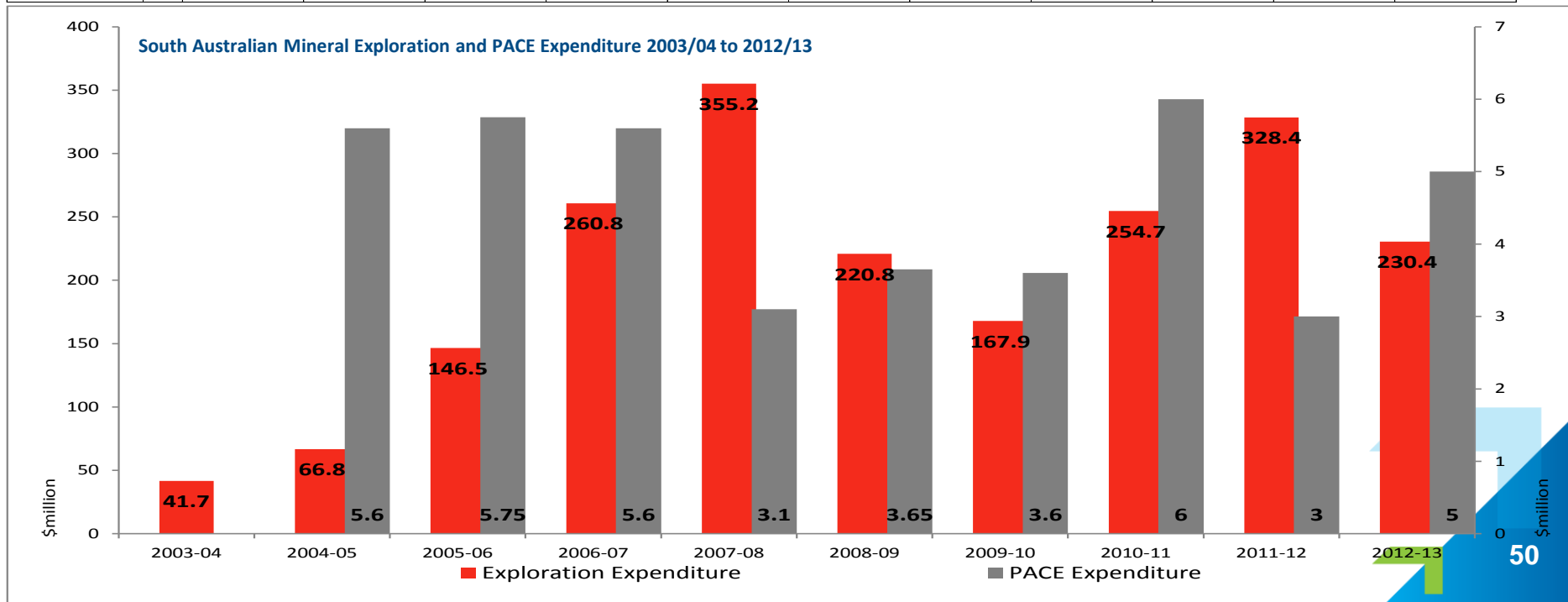
Government Exploration Initiatives Expenditure by State in Australia 2003-04 to 2012-13



Policy Potential Index – Australia



	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010 UPDATE	2010/11	2011/12	2012/13	
Nr jurisdictions	53	64	64	65	68	71	72	51	79	93	96	
AUSTRALIA	1	South Australia (3/53)	Tasmania (10/64)	Western Australia (11/64)	South Australia (5/65)	South Australia (15/68)	South Australia (16/71)	South Australia (10/72)	South Australia (15/51)	South Australia (11/79)	Northern Territory (11/93)	Western Australia (15/96)
	2	Tasmania (3/53)	Western Australia (12/64)	New South Wales (12/64)	Queensland (8/65)	Tasmania (20/68)	Northern Territory (20/71)	Northern Territory (14/72)	Western Australia (28/51)	Western Australia (17/79)	Western Australia (12/93)	South Australia (20/96)
	3	New South Wales (3/53)	South Australia (15/64)	South Australia (14/64)	Tasmania (9/65)	Northern Territory (21/68)	Western Australia (21/71)	Western Australia (19/72)	Northern Territory (29/51)	New South Wales (20/79)	South Australia (19/93)	Northern Territory (22/96)
	4	Queensland (9/53)	Queensland (18/64)	Tasmania (15/64)	Victoria (12/65)	Western Australia (25/68)	New South Wales (23/71)	New South Wales (20/72)	Queensland (33/51)	Northern Territory (27/79)	Queensland (28/93)	Victoria (24/96)
	5	Northern Territory (12/53)	New South Wales (19/64)	Northern Territory (20/64)	New South Wales (14/65)	New South Wales (27/68)	Queensland (25/71)	Tasmania (23/72)	New South Wales (38/51)	Tasmania (28/79)	Tasmania (30/93)	Queensland (32/96)
	6	Victoria (13/53)	Victoria (23/64)	Queensland (29/64)	Northern Territory (15/65)	Victoria (29/68)	Victoria (29/71)	Queensland (24/72)	Victoria (41/51)	Victoria (31/79)	New South Wales (32/93)	New South Wales (44/96)
	7	Western Australia (13/53)	Northern Territory (25/64)	Victoria (30/64)	Western Australia (18/65)	Queensland (30/68)	Tasmania (31/71)	Victoria (30/72)	Tasmania (42/51)	Queensland (38/79)	Victoria (44/93)	Tasmania (49/96)



A global game needs a national approach

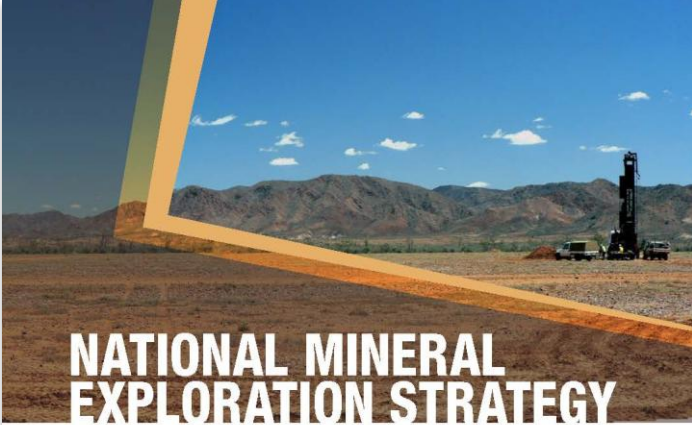


- National Depth and cover map
- National map of deep crust and upper mantle
- National distal footprints
- National 4 D Metallogenic Map
- Nation research network
- Technology transfer process

National Priorities for Earth Science

National Mineral Exploration Strategy.... Pre-competitive Geoscientific Information..

...



NATIONAL MINERAL EXPLORATION STRATEGY

VISION:
Unlocking Australia's hidden resource potential.

MISSION:
To address greenfield exploration challenges, stimulate new discoveries, ensure continuity of the pipeline of mineral resource investments, and the longevity of Australia's mineral resources industry.

SCOPE OF THE STRATEGY
This National Mineral Exploration Strategy focuses on the acquisition and delivery of pre-competitive geoscience, applied geoscience research initiatives to assist exploring undercover and a mineral exploration investment attraction plan. Supporting activities associated with the strategy aimed at cross-jurisdictional collaboration on regulatory reform are also underway. The strategy will not address the financial challenges facing the minerals sector.

THE THREE ELEMENTS OF THE NATIONAL MINERAL EXPLORATION STRATEGY ARE:

PRE-COMPETITIVE
GEOSCIENCE INFORMATION

MINERAL EXPLORATION
INVESTMENT ATTRACTION PLAN

NATIONAL GEOSCIENCE
RESEARCH INITIATIVE

MINERAL EXPLORATION INVESTMENT ATTRACTION PLAN

Mission:

- ▶ Reverse the decline in Australia's share of global non-ferrous minerals exploration expenditure, and
- ▶ Increase mineral investment expenditure in greenfields and undercover areas.

VANTAGE

are usually undertaken by major and mid-tier companies, financed generally from borrowing from large institutions, and/or own company funds. There are thus three target market segments - major mining companies, financiers and junior/exploration companies.

Canadian-listed companies had the largest exploration budgets in 2011 with Europe second in terms of the number of major companies with exploration budgets >US\$100 million in 2011. The Rest of the World group, including Russia, India and China, is close behind Europe. Exploration spending in Australia is noticeably low for Canada-listed (2%) and Latin America based (1%) companies, representing an opportunity for Australia Minerals to increase these percentages. The rapidly growing exploration expenditure by Chinese companies and Indian companies also represent major opportunities.

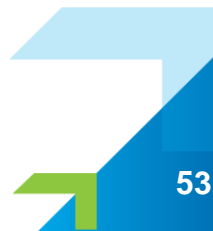
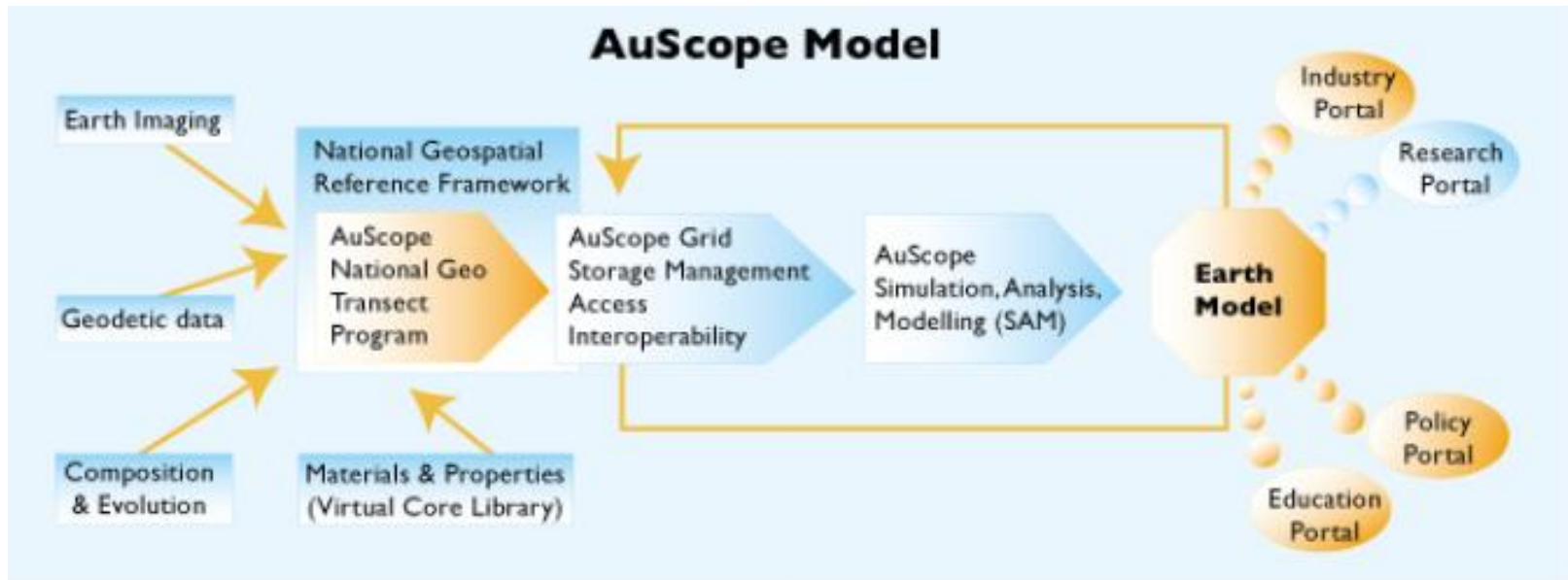
The world's largest stock markets - USA (NYSE), London, China (Shanghai, Hong Kong), Japan (Tokyo), and Canada (Toronto) - are a guide for the potential location of finance for mineral exploration and mining projects. London and Toronto in particular are markets experienced in funding high-risk mineral exploration. The Indian and Russian stock exchanges also represent major potential sources of funding, followed by Brazil and South Korea.

INVESTMENT ATTRACTION CHART

The target market segments and their requirements for investment into Australian mineral exploration are identified in the attached chart. Each market segment requires a range of products to address their needs delivered through the most effective channels.

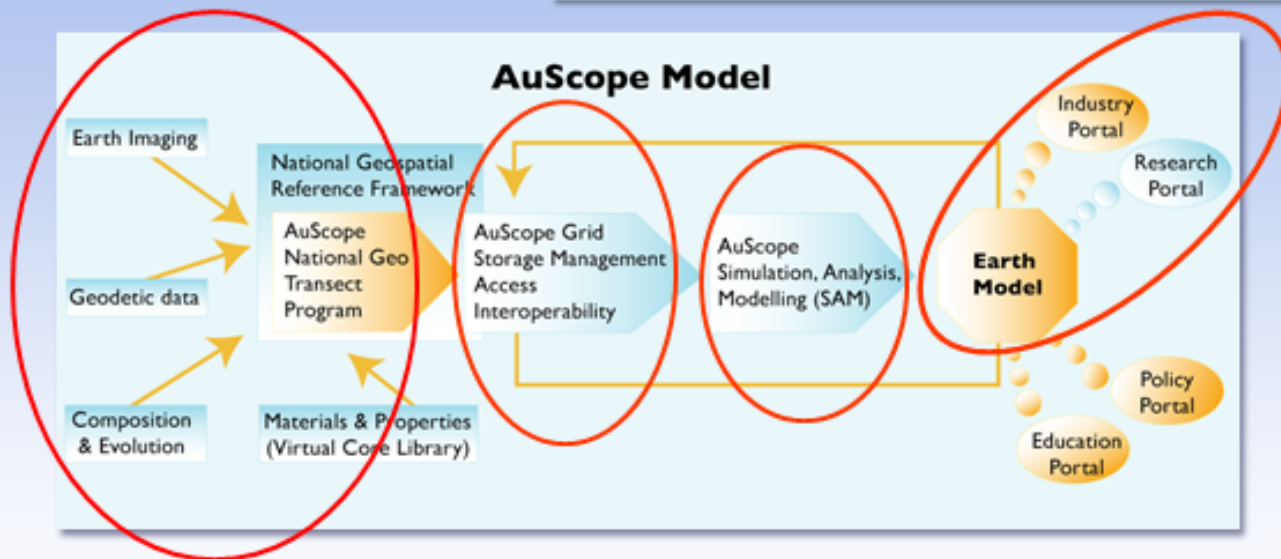
The investment attraction plan will be implemented, reviewed and assessed against performance indicators annually by the Exploration Investment and Geoscience Working Group with an annual report provided to the Standing Council of Energy and Resources.

“Auscope “Exploratorium”



AuScope Infrastructure System for National Data and Integration

a combination of research infrastructure and applied science infrastructure



Physical equipment and datasets

National spatial framework

Grid computing infrastructure to access data

Software for analysis and modelling

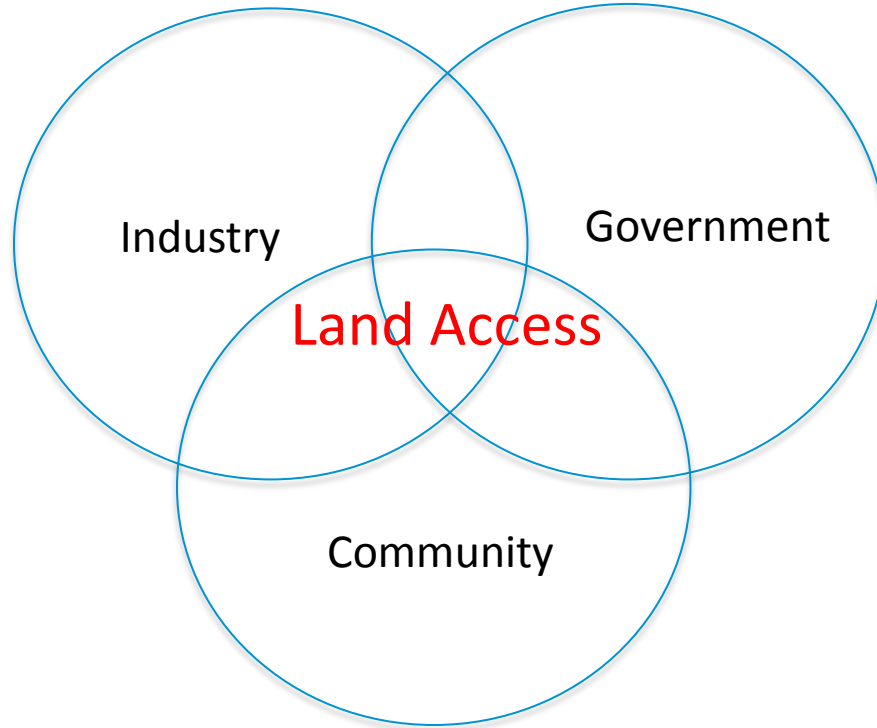
Models and concepts for the Australian Continent

It's a three legged race now

Access to capital

Costs escalating

**Market driven
timeframes**



Royalties

Local industry

**Regional
communities**

Facebook

Ok if it is somewhere else

Compliance

Overall Community Benefit

GUIDING PRINCIPLES

CO-ORDINATED PREPARATION INFORMED BY EFFECTIVE PLANNING

CO-EXISTENCE

BEST USE OF LAND RESOURCES

TAILORED PARTICIPATION OF COMMUNITIES AND LANDHOLDERS IN LAND USE AND ACCESS DECISIONS

ENGAGEMENT AND EDUCATION ARE PARAMOUNT TO INFORMED DEBATE

DESIRED FRAMEWORK OUTCOMES



EVIDENCE BASED, OPEN AND TRANSPARENT DECISION MAKING

EFFICIENT PROCESSES

ACCESSIBLE RELEVANT INFORMATION

Conclusion



- Australia has a the grand challenge supplying food and resources to the world
- Australia is losing global market position in exploration expenditure
- It's a global game and needs a national approach
- It's a three legged race now

