



## Teacher Earth Science Education Programme

# Introducing TESEP

... making a difference in the classroom

**Greg McNamara**

TESEP  
Executive Officer

**Jill Stevens**

TESEP  
Chairperson

# TESEP – who are we?



A collective of geologists and educators  
with a passionate interest in  
Earth Science  
education

## TESEP – who are we?



**Chairperson:** Jill Stevens (PESA)

**Executive Officer:** Greg McNamara (GSA, GEOS, AGC)

**Advisory Board:** ASTA, industry, government & prof. soc's.

**State Coordinators:** across Eastern Australia

**Supporters & Partners:** Industry, government & prof. soc's.



# Teacher Earth Science Education Programme PARTNERS

**PRINCIPAL**



**PLATINUM**



**GOLD**





# Teacher Earth Science Education Programme

## PARTNERS

### SILVER

- Department of Manufacturing, Innovation, Trade, Resources and Energy SA
- Rob Kirk Consultants
- Oz Minerals
- University of Technology Sydney

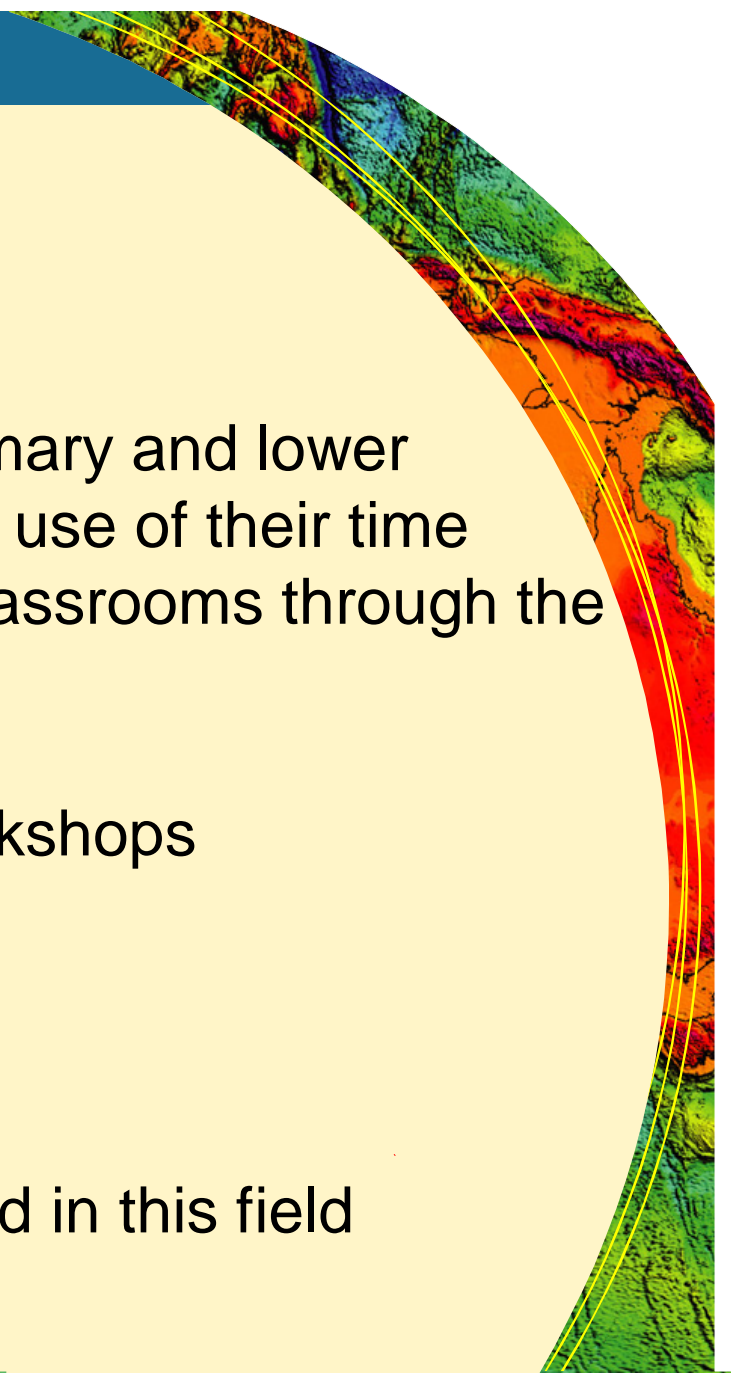
### BRONZE

- Australian National University
- Citigold
- Geological Society of Australia
- Grange Resources
- Macquarie University
- Mining and Minerals Group
- Pitney Bowes Software
- Queensland Department of Environment and Resource Management
- Toro Energy
- Victorian Space Science Education Centre

## TESEP – our aims:

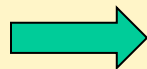
To help middle school [upper Primary and lower Secondary] teachers make better use of their time teaching Earth Science in their classrooms through the provision of

- Professional Development workshops
- Updates to existing resources
- New resources
- Ideas for field trips
- Access to teachers experienced in this field



## TESEP – our aims:

- Address requested topics based on a 2007 survey of teacher needs
- To promote student interest in earth and environmental sciences
- To raise student awareness of earth and environmental science careers
- To provide teachers with the knowledge and resources to develop interesting and relevant lesson plans



Our teach the teachers approach is designed to:

- Multiply our PD impact by knowledge transfer
- Multiply our impact on student understanding
- Engage and inspire teachers and students to seek more

# TESEP – what do we do?

Professional  
Development  
Workshops

## The Challenging Earth Series

- Face-to-face
- Webinars

... plus



Francois Gohler/Ardea London



# TESEP – where do we do it?

## All eastern States

- Face-to-face
- Field trips
- Site visits
- Webinars

## WA through ESWA

- Webinars
- Case Studies to go with E&ES text book

## International locations

- AAPG using the TESEP model

- 2008–2011 PD locations
- 2012 PD locations
- Current in-kind support (facilities/lab/staff time)
- ★ Field trips / site visits
- ◇ Possible Stage 2 location-specific support (could be subject-specific at multiple locations)





Finalist in the 2011 WA Science Awards

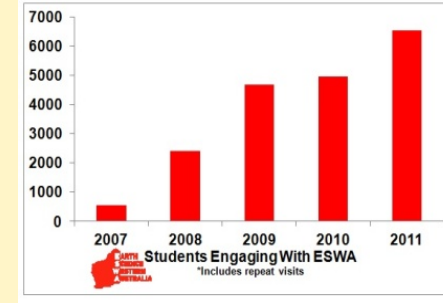
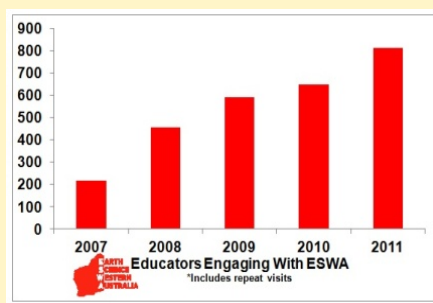
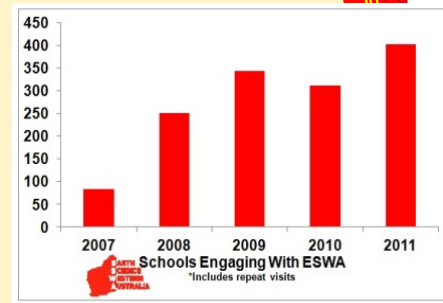
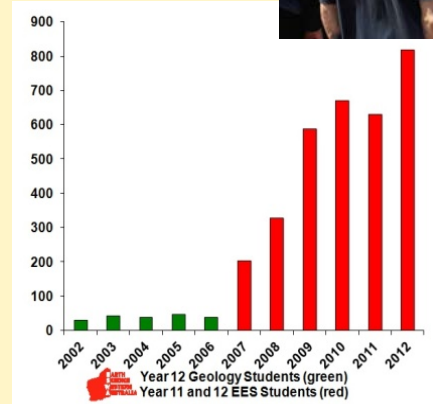
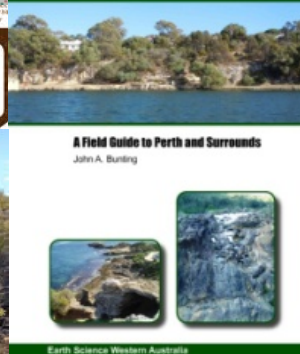
ESWA aims to raise the profile of geoscience in WA schools to a level matching the strategic needs of WA

### What does ESWA do?

*Works to support both Earth and Environmental Science (EES) in upper Secondary and Earth Science education in lower Secondary and Primary by:*

- **Presenting** at schools
- Creating and providing engaging educational **publications**
- Providing **physical resources** to schools (for loan and donation)
- Helping to fund, and run, **field experiences**
- Providing teacher **professional development**
- Facilitating **student revision seminars**
- for Earth and Environmental Science
- Ongoing support, including free access to volunteer **guest speakers**

[www.earthsciencewa.com.au](http://www.earthsciencewa.com.au)



# *The Challenging Earth*

## Professional Development Workshop Series

PD 1 Round and Round with Rocks

PD 2 Riding the Climate Roller Coaster

PD 3 Greening Coal

PD 4 Fossil Sunlight

PD 5 Wet Rocks

PD 6 Hot Rocks

PD 7 Our Place in Space

PD 8 Powerful Stuff



## TESEP PDs provide:

- Access to teachers, researchers and industry professionals on specific topics
- Materials all mapped to the Australian Science Curriculum
- Easy to understand explanations of topical issues
- New resources
- Updates to existing resources
- Field trips and ideas for field trips



## TESEP also provides:

- Presentations using peer reviewed materials
- PDs run at metropolitan and regional locations
- Low cost per attendee - only \$35
- ASTA certificate of attendance
- State PD certification in Victoria & ...
- Subsidies for meals, accommodation and travel for participants
- Course notes, up to date resources, classroom activities, DVDs, CDs, posters and field trips



# Our Presenters

- Passionate about their science
- Experts in their field
- Experienced science communicators
- Experienced in helping teachers and students



# PD 1 - Round & Round with Rocks

This session examines the rock cycle and places it in the context of plate tectonics, geological time and dynamic earth processes (including climate change).

We provide demonstrations, experiments and activities to use in the classroom plus fieldtrips to teach

- Rock Cycle
- Igneous, Metamorphic and Sedimentary Rocks
- Principles of Stratigraphy
- Geological cross-sections
- Geological Time Scale
- Plate Tectonics

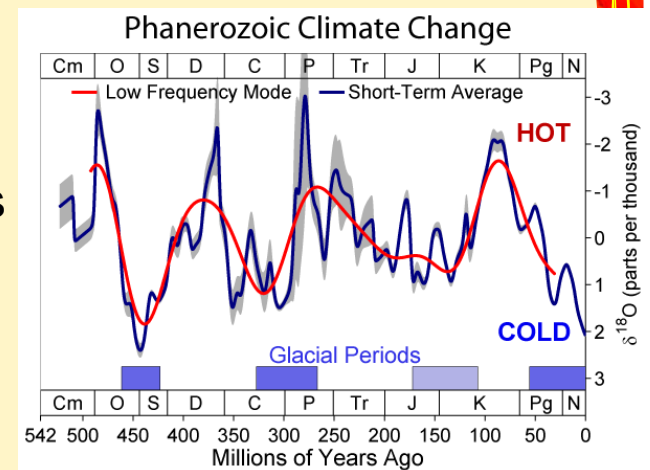


# PD 2 - Riding the Climate Roller Coaster

This session examines the Geological evidence for climate change throughout geological time, the drivers of climate change and the reliability of different data sets.

We also discuss modern climate change, greenhouse gases and how they work, modern drivers of climate change and look at data sets from around the world and how they influence the thinking of climate scientists.

We provide demonstrations, experiments and activities to use in the classroom plus fieldtrips to help teachers understand climate science.





## PD 3 – Greening Coal

This session examines Australia's power generation story and the role coal of all types presently plays. It also looks at:

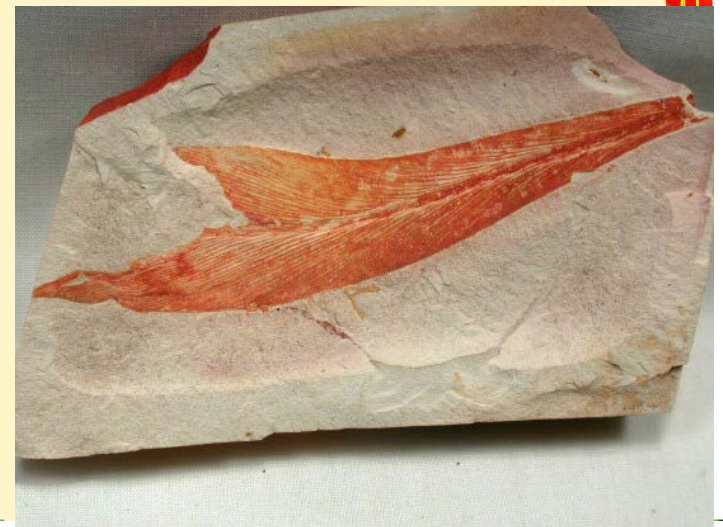
- How are we tackling CO<sub>2</sub> emissions?
- What clean coal-fired power generation trials are underway (oxyfiring, gasification)?
- Carbon capture and storage (geosequestration)
  - the CO2CRC Otway trials,
  - what makes a good storage site,
  - storage projects around the world.



## PD 4 – Fossil sunlight

This session explains the origins of hydrocarbons, especially oil and gas. Participants in this PD:

- Learn where oil and gas comes from
- See how seismic data is collected and used
- Take a virtual trip to an oil platform
- Discover the role of microfossils in our understanding of hydrocarbons



## PD 5 – Wet Rocks

This session provides participants with a broad understanding of:

- groundwater and hydrogeology
- the impact of groundwater use in society and in Australia

It also provides classroom ready materials. See:

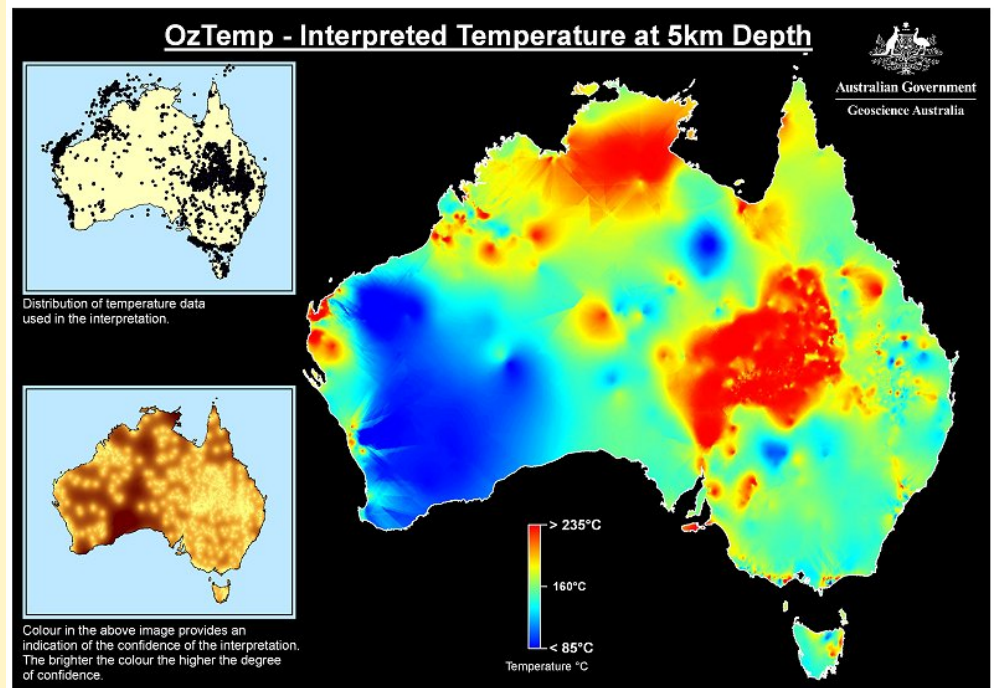
[www.wetrocks.com.au](http://www.wetrocks.com.au)



# PD 6 – Hot Rocks

This session looks at geothermal energy from an Australian perspective, explains why geothermal energy exists and compares all forms of renewable energy:

- Solar – directly or indirectly
  - Biomass
  - Solar thermal
  - Solar PV
  - Water (Hydro)
  - Wind & Wave
- Tidal [planetary gravity]
- Geothermal



# PD 7 – Our Place in Space

This session addresses the 'space' component of the curriculum and common misconceptions in teacher understanding of the topic:

Areas covered

- Movement of the Earth
- Solar System
- Planetary geology
- Rockets
- Robots
- Astrobiology



The night lights of Earth

## PD 8 – Powerful stuff

This session looks at electrical energy generation from an Australian perspective, discusses the geology of nuclear fuels, explains how nuclear energy is harnessed and compares all forms of electricity generation used here with nuclear powered generation:

- Fossil sunlight
  - Geologically sequestered biomass carbon
- Renewables
  - Water (Hydro)
  - Wind
  - Solar PV
- Geothermal
  - EGS & HSA pilot plants



# TESEP workshops & field trips



Hobart



# TESEP workshops & field trips





# TESEP workshops & field trips



# How have we done?

## PD workshops (Aug 2008 – July 2012):

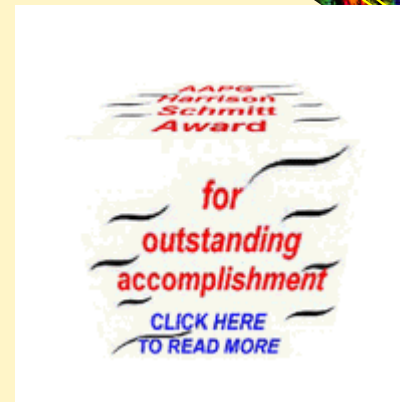
- 1122 Teacher attendances
- All states other than Western Australia
- Capital & regional cities + remote locations
- 7 of 8 workshops so far

## Field trips:

- 12 field trips
- 11 site/mine visits

## Multipliers:

- Knowledge transfer to 2 – 4 others
- Average of 3 classes of 25
- => 250,000 to 420,000 one-off student impacts
- => 1.25million – 2.1million over 5 years



Jill Stevens received the PESA 2008 award for her TESEP work



# Teacher feedback.....

*(I will) have more confidence in addressing this topic in future.*

Yr7-11 Mathematics/Science/Physics (1 year experience) Dec 2011  
Bacchus Marsh, Vic

*(These) activities were hands-on, easy-to-use and directly-connected to Science in the classroom!*

Yr8-12 Science/Chemistry teacher (10yr experience) May 2011  
Dubbo, NSW

*I am so impressed, so blown away, actually! It was a FANTASTIC day*

Yr 5/6 teacher (35 years experience) Dec 2011 Melbourne, Vic

*The mine tour is well worth it.*

Yr8-12 Science/Agriculture teacher (4 years experience)  
Rockhampton/Mt Morgan Qld

*(Oil & Gas & Coal Exploration)... real life examples and having an experienced presenter (industry professional) ... wonderful (teaching) resources.*

Pre-service teacher Dec 2009 Brisbane Qld

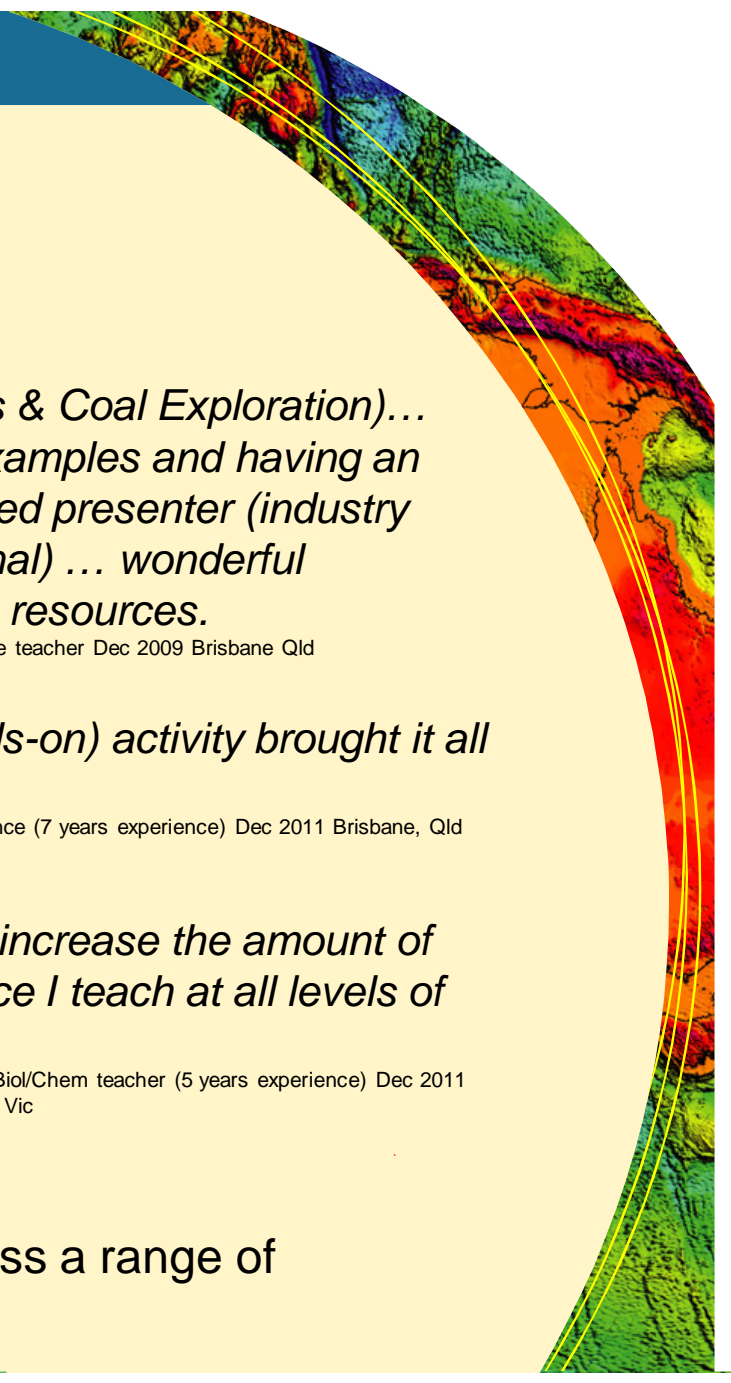
*The (hands-on) activity brought it all together.*

YrP-7 Science (7 years experience) Dec 2011 Brisbane, Qld

*Yes, I will increase the amount of Geoscience I teach at all levels of Science.*

Yr8-12 Sc/Biol/Chem teacher (5 years experience) Dec 2011  
Melbourne, Vic

Formal feedback on individual workshops across a range of indicators is exceptionally good.



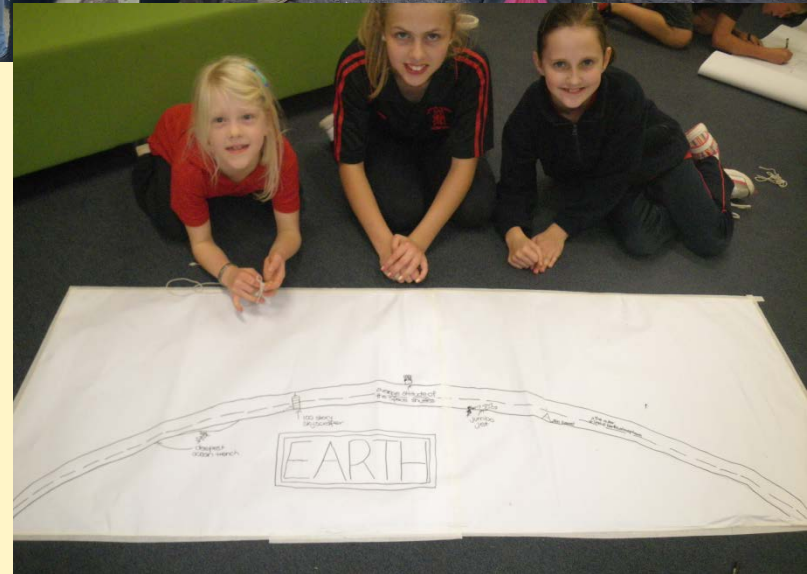
# ...and into the classroom

Teachers tell us they are using TESEP materials in the classroom

Teachers are using TESEP fieldtrips in their class plans

Teachers tell us their TESEP experiences have inspired them to:

- Teach more E&ES in class
- Learn more about the subject
- Research and design their own E&ES fieldtrips
- Encourage students into E&ES



# Would you like to attend?

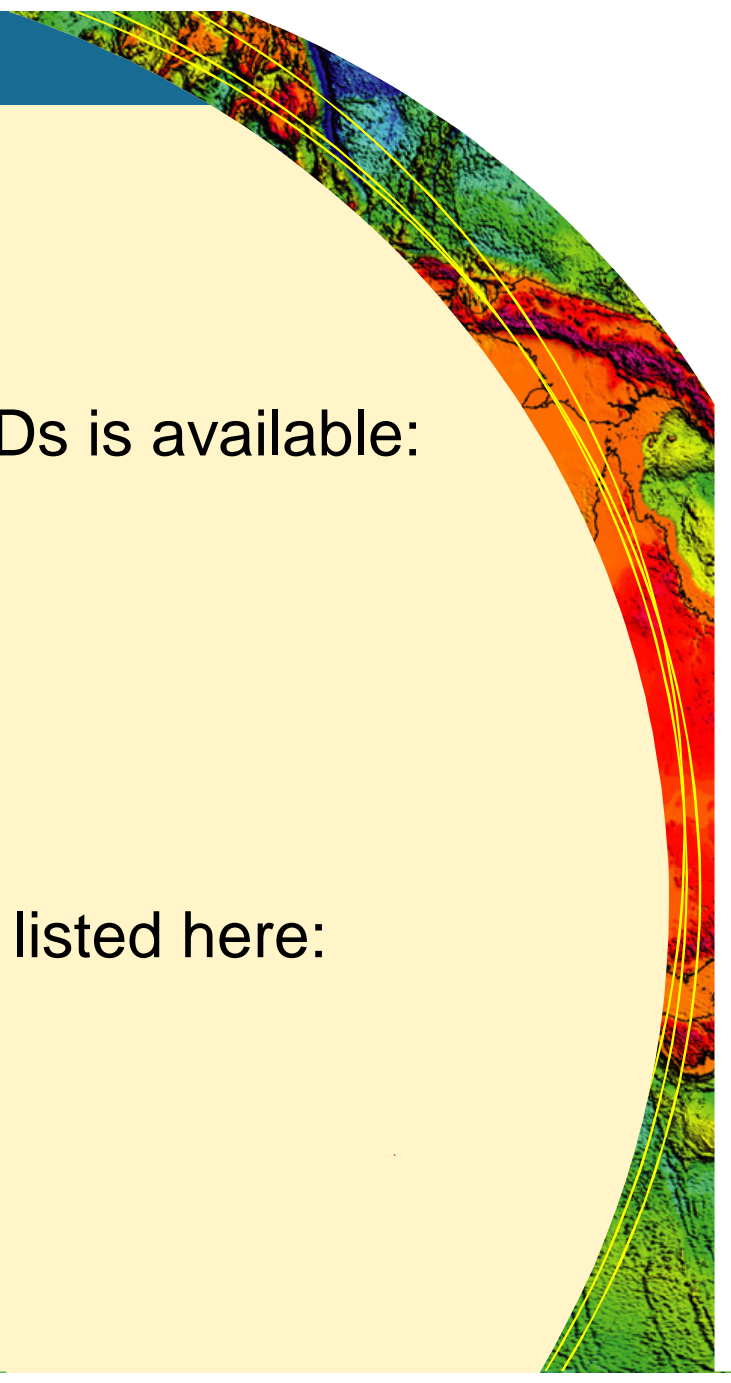
More information on TESEP and the PDs is available:

- On the website:

[www.tesep.org.au](http://www.tesep.org.au)

- By contacting your state coordinator listed here:

[www.tesep.org.au/contactus.html](http://www.tesep.org.au/contactus.html)



# TESEP needs partners!

Without financial partners TESEP cannot continue.

- Find out how to partner from the website:

[www.tesep.org.au](http://www.tesep.org.au)

[www.tesep.org.au/partnering.html](http://www.tesep.org.au/partnering.html)

**PRINCIPAL**

- A\$35,000+ (per year for 2 years)

**PLATINUM**

- A\$25,000+ (per year for 2 years)

**GOLD**

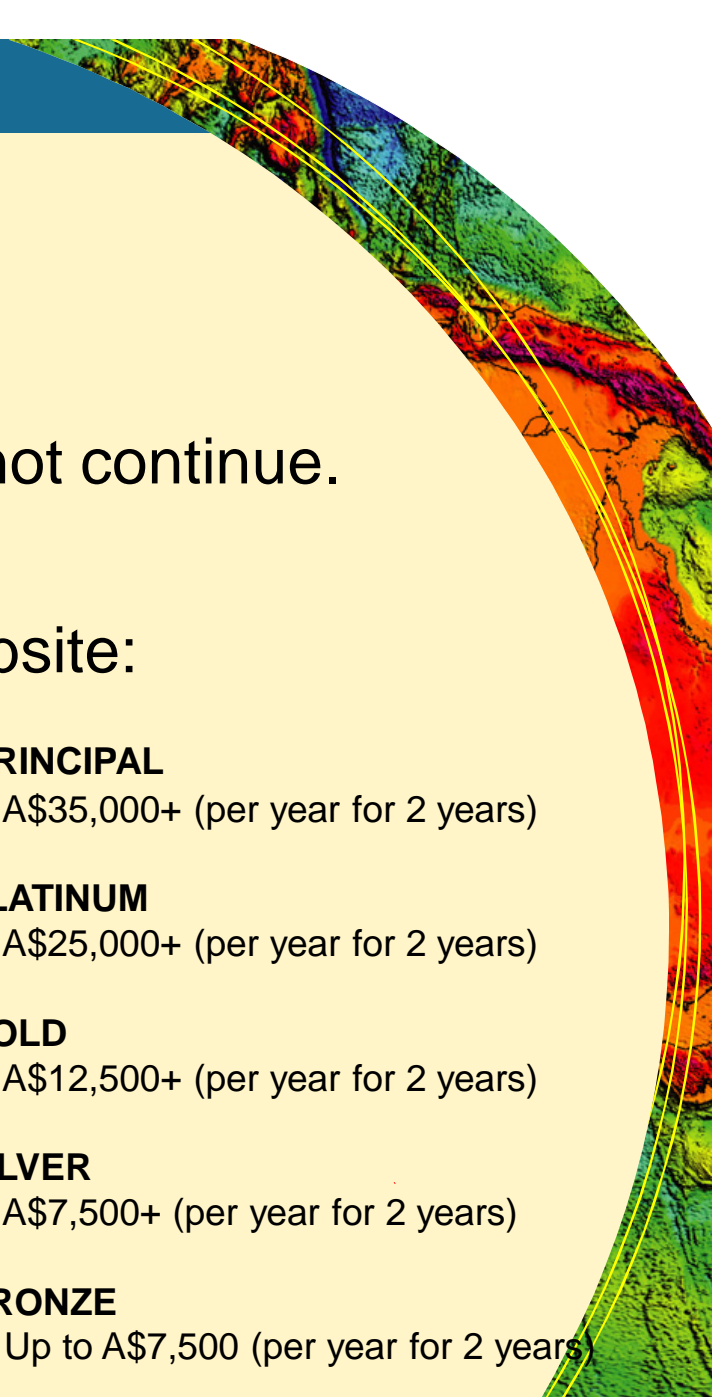
- A\$12,500+ (per year for 2 years)

**SILVER**

- A\$7,500+ (per year for 2 years)

**BRONZE**

- Up to A\$7,500 (per year for 2 years)



# Thank you

Contact details:

Greg McNamara: [eo@tesep.org.au](mailto:eo@tesep.org.au)

Jill Stevens: [cp@tesep.org.au](mailto:cp@tesep.org.au)

Web site: [www.tesep.org.au](http://www.tesep.org.au)

