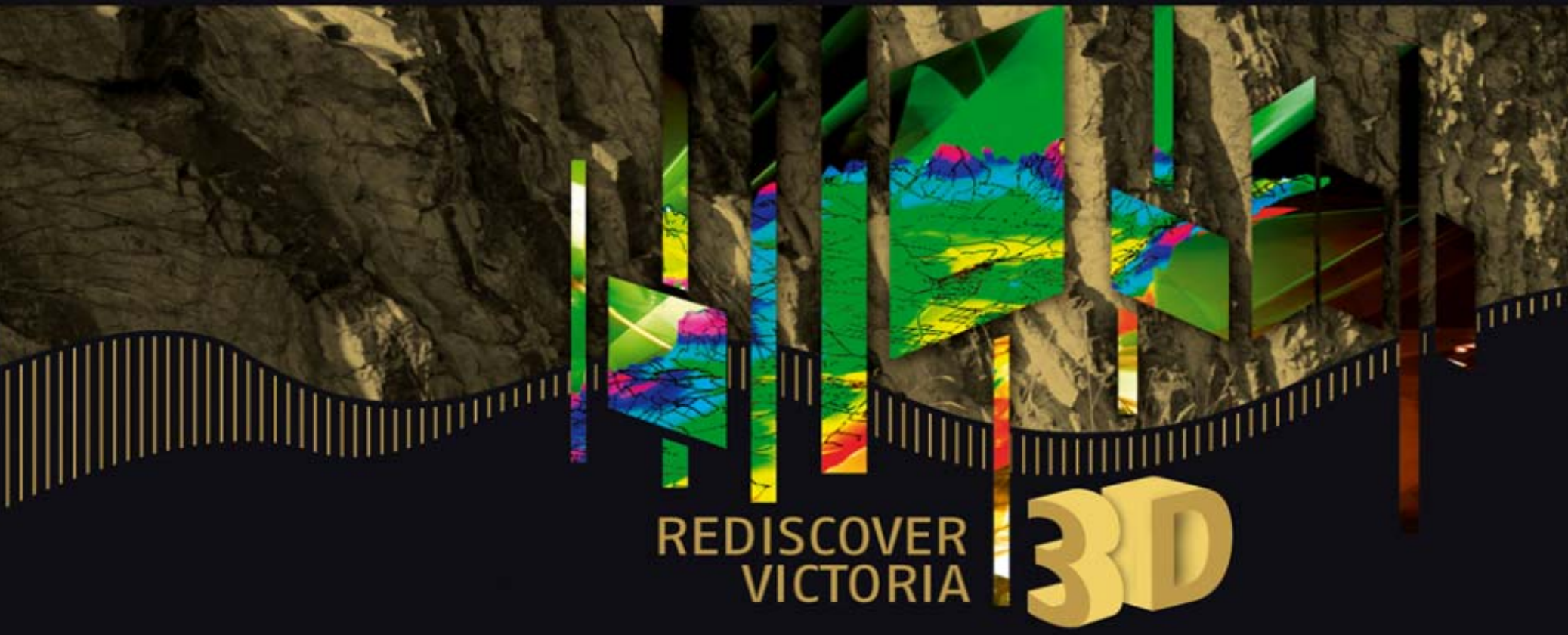
DEPARTMENT OF
PRIMARY INDUSTRIES



New techniques in regional 3D geological mapping, simulation and visualisation and their application in predictive mineral exploration.

State Government
Victoria
AUSTRALIA

MELBOURNE
VICTORIA AUSTRALIA

3D Modelling in Victoria

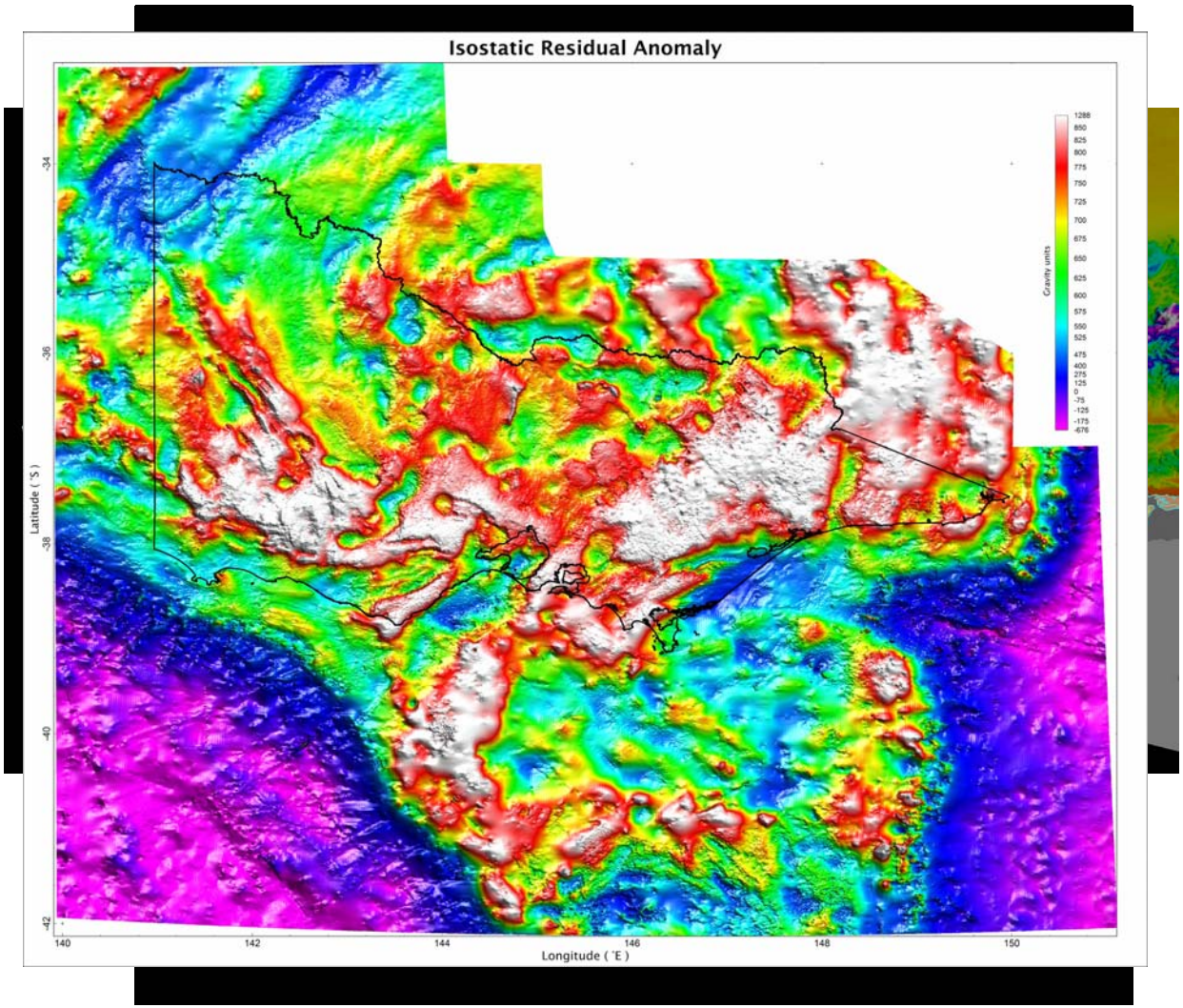
- The program
  - Rediscover Victoria 3D
- The models
  - New outputs
- Model delivery
  - 3D data provision
- Adding value
  - how the models can be used

Rediscover Victoria 3D

- Accelerated development of a 3D geological map of Victoria
  - The project will develop a sophisticated, fully attributed 1:250000 scale three-dimensional model **linking** the onshore and offshore geology of the state.
- Regional 3D geological models
  - 1:1M and 1:250K scale models
  - Full crust – Moho to the sky
- Define large scale geometry
  - Architecture
  - Plumbing
- Fluid pathways
  - Most stakeholders
    - Gold, base metals, oil and gas, groundwater, geothermal, carbon sequestration
    - Explorers, resource managers and researchers

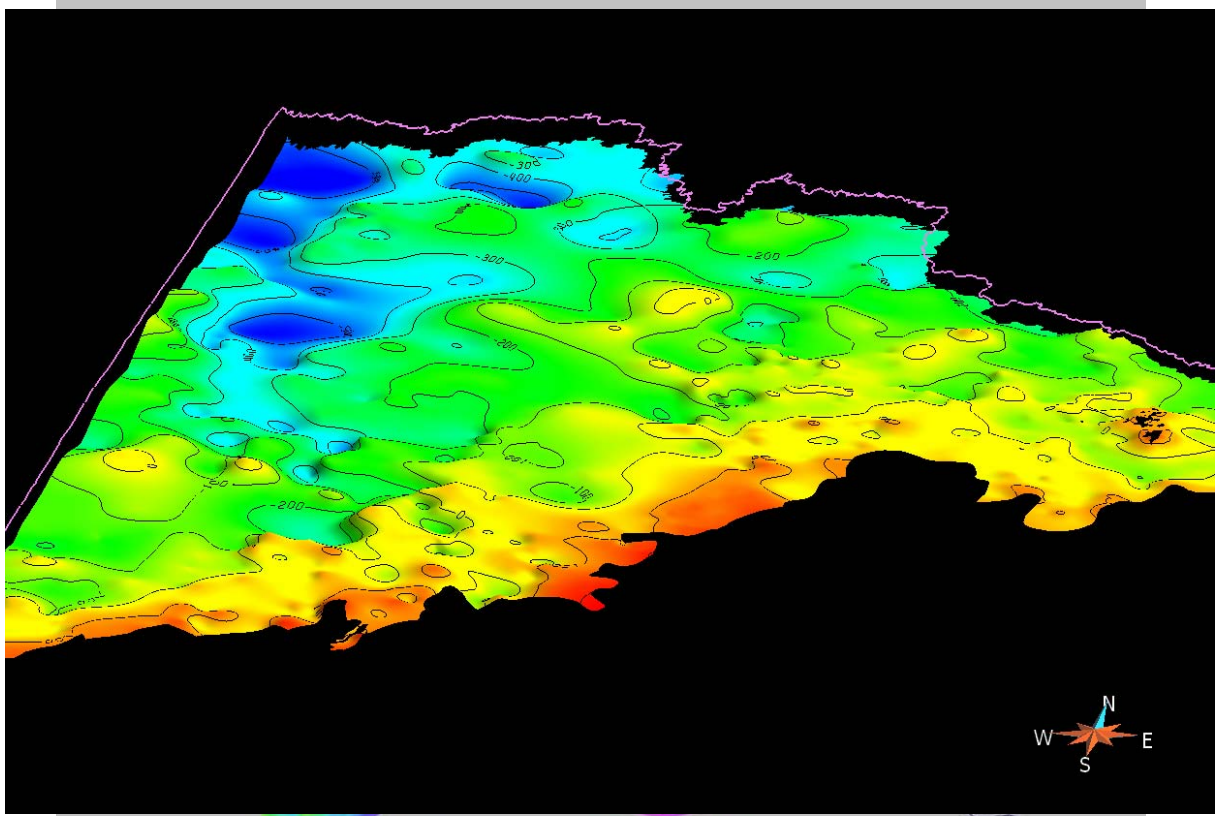
New Outputs

- Complete and available
  - Bendigo Zone 1:250000
  - Otway Basin framework study
  - Isostatic gravity dataset

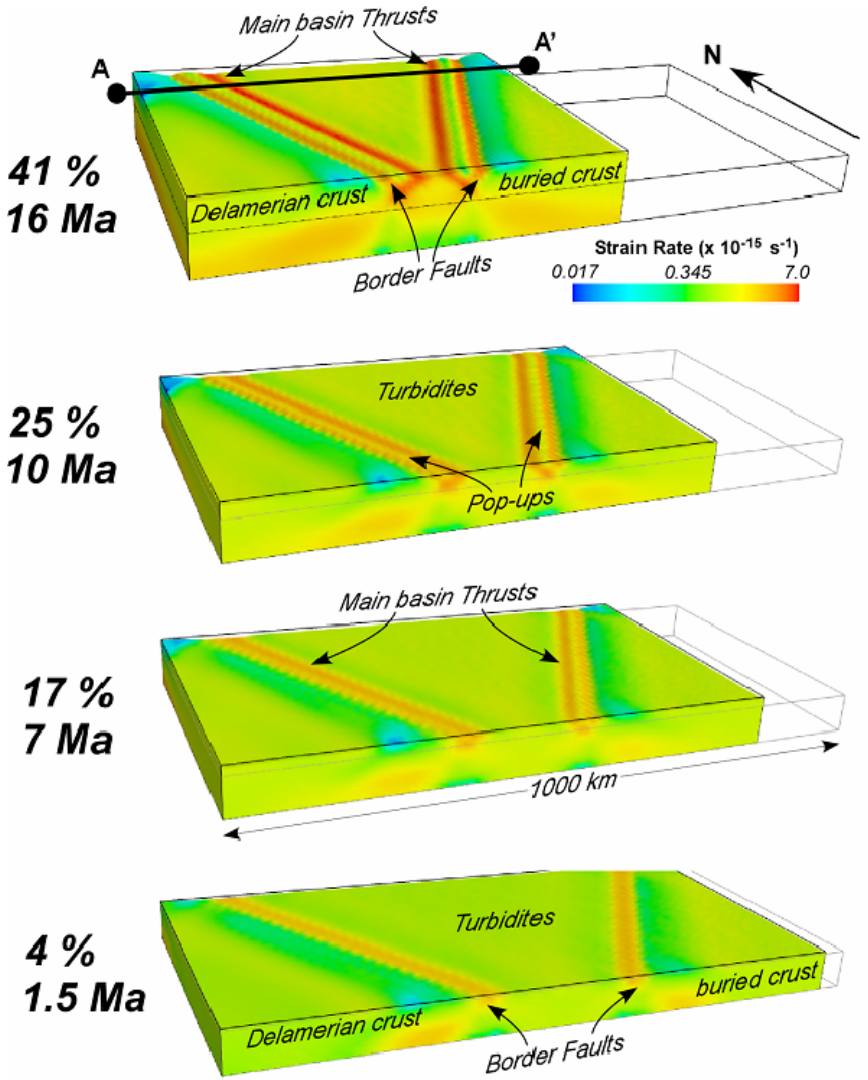


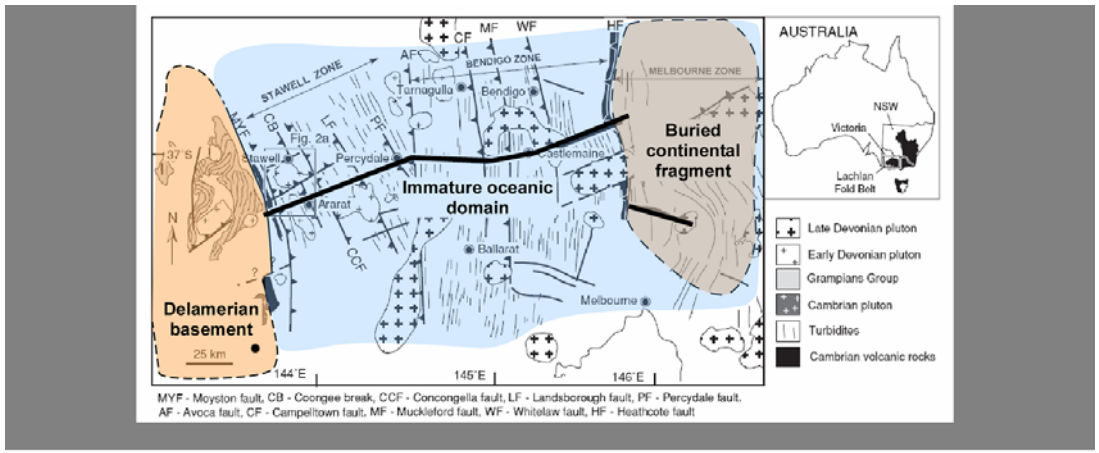
Work in progress

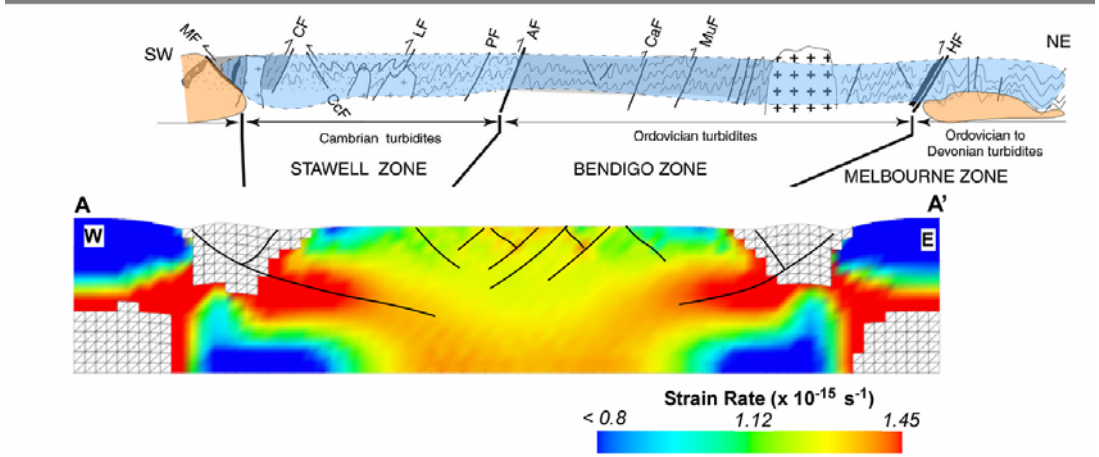
- Work to be completed in 2009
  - Western Victoria 1:250000
  - Western Victoria basement / basin integration
  - Murray Basin depth to basement surface
  - Gippsland basin potential field study



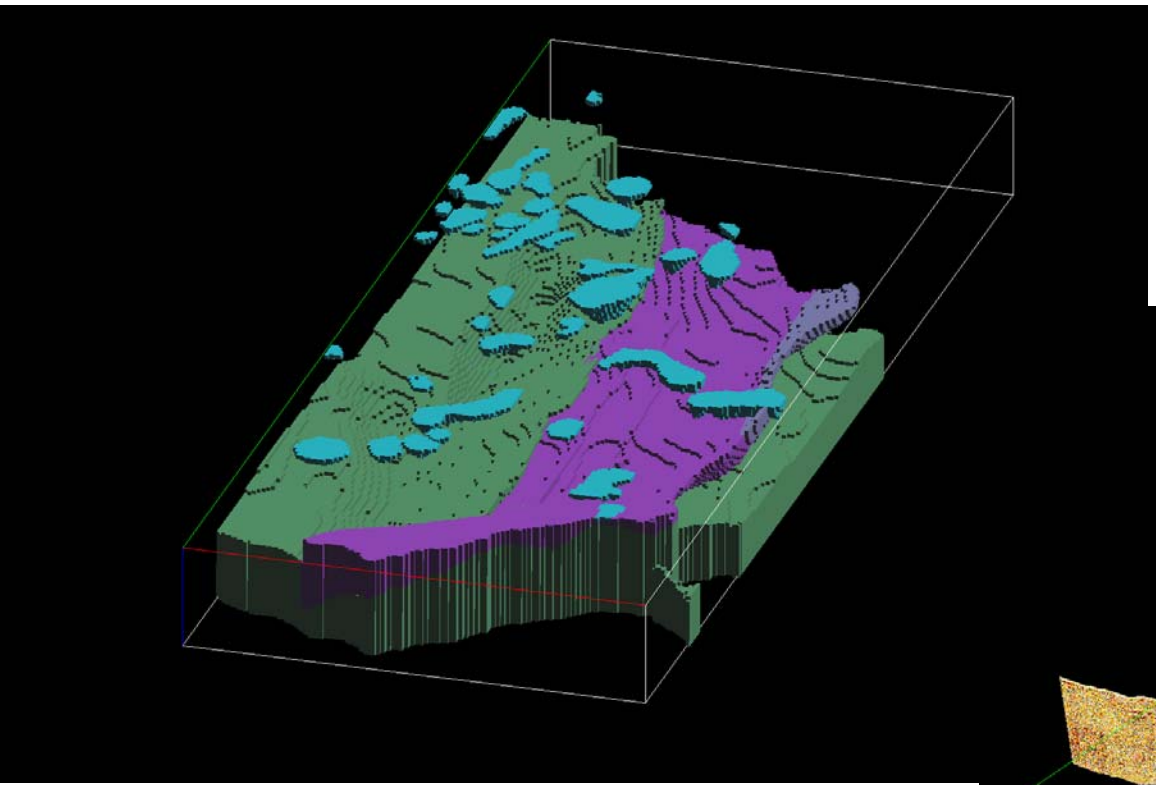
3D modelling and the mineral system





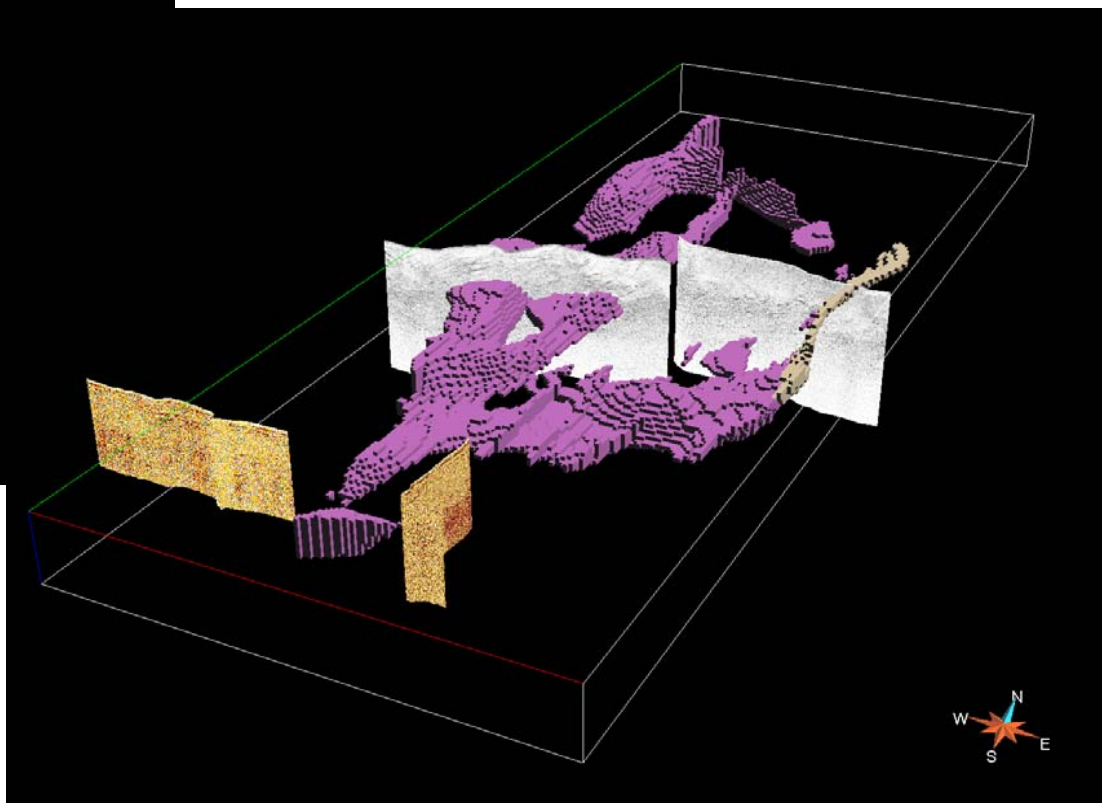


Source rock distribution analysis



Block model based on 3D geology

3D gravity inversion modifies geometry



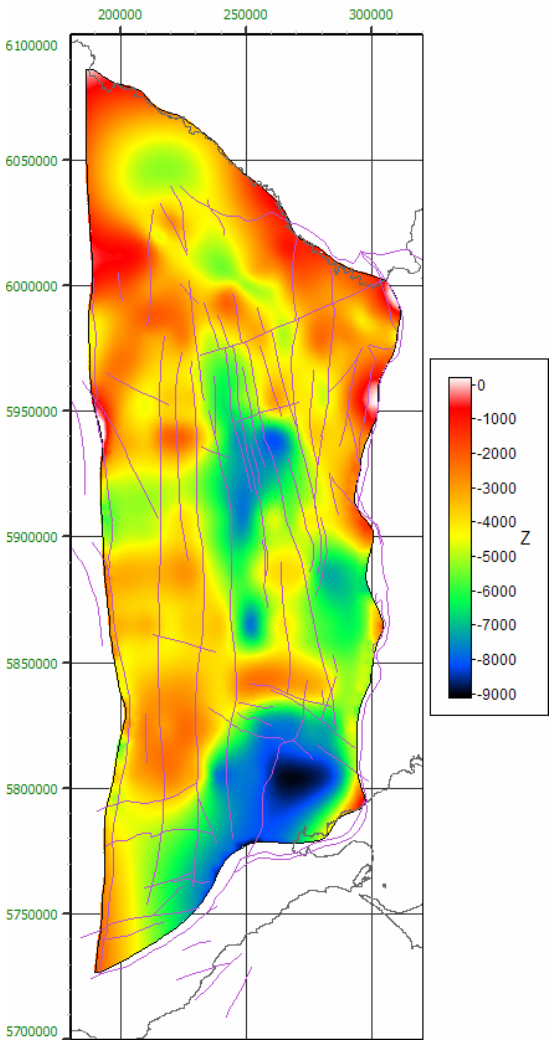
Allows explorers to refine their search area based on distribution of potential source rocks and fluid pathways

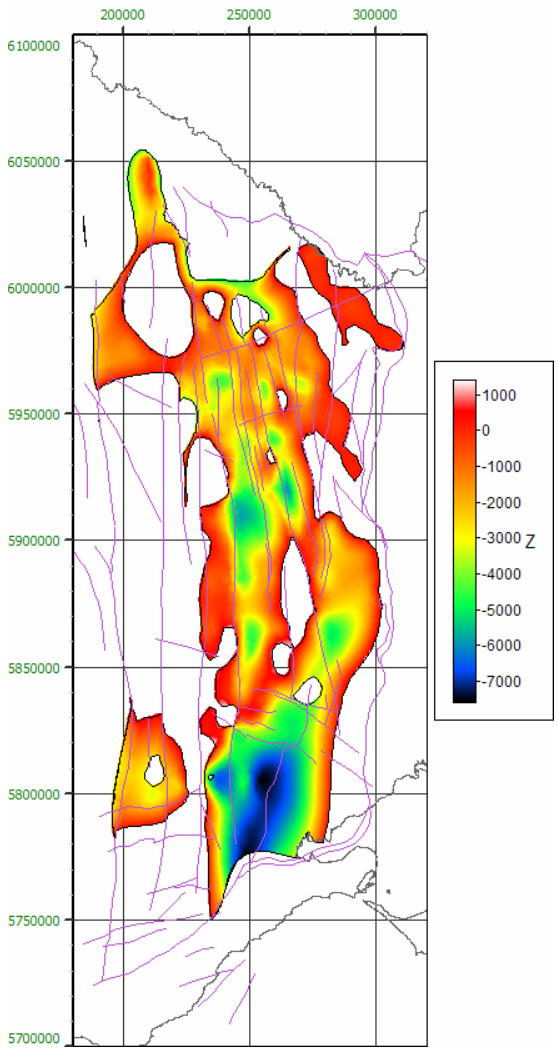
Area selection overlays

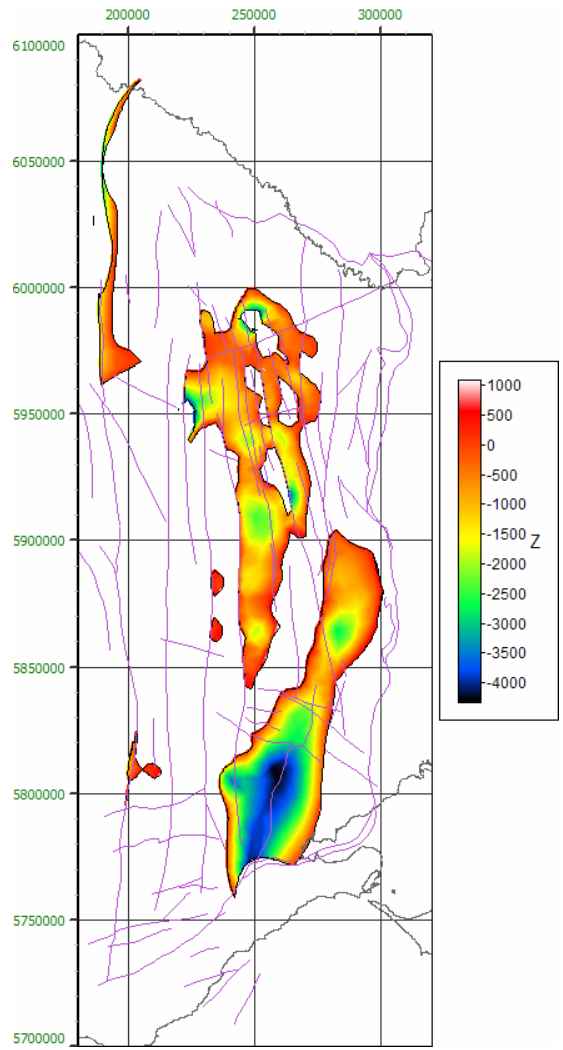
Top Cambrian Volcanics

Top St Arnaud Gp

Top Lancefieldian

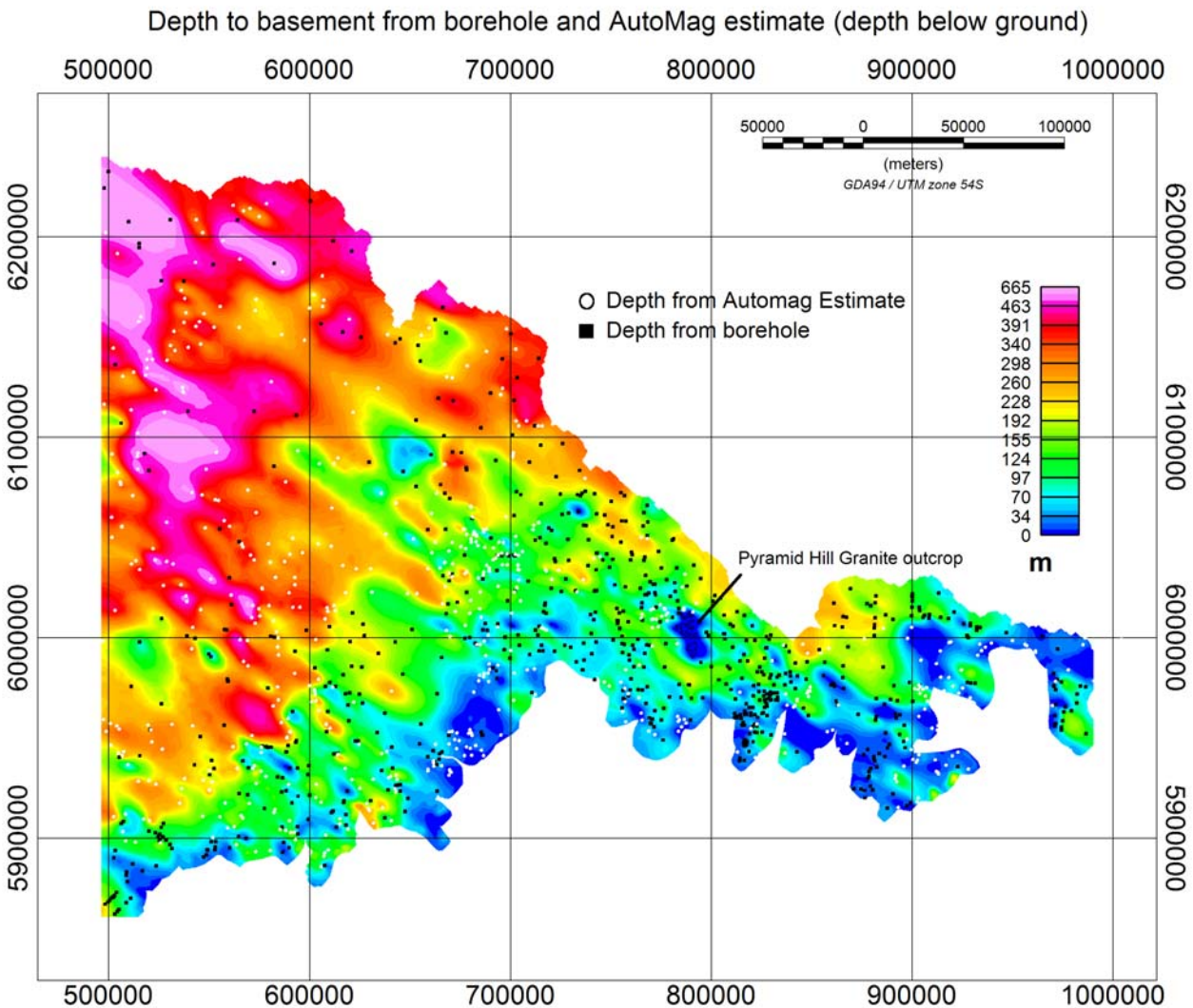




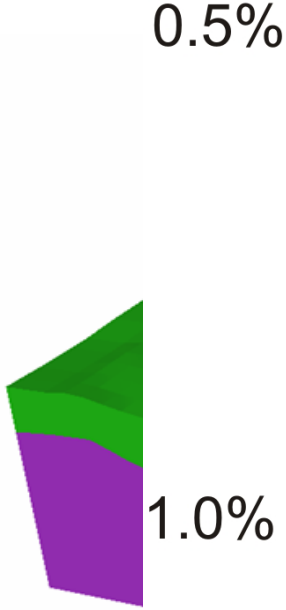


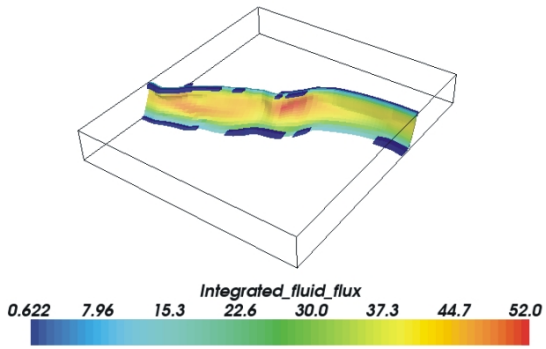
Area selection overlays

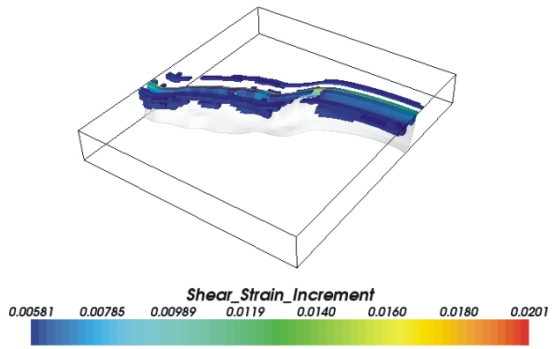
Combined with depth to basin surfaces potential exploration areas with thick cover or inappropriate buried stratigraphy can be eliminated.

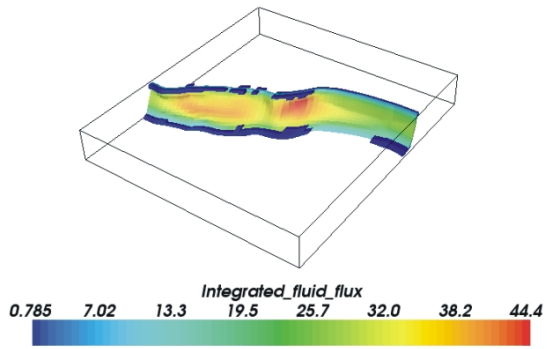


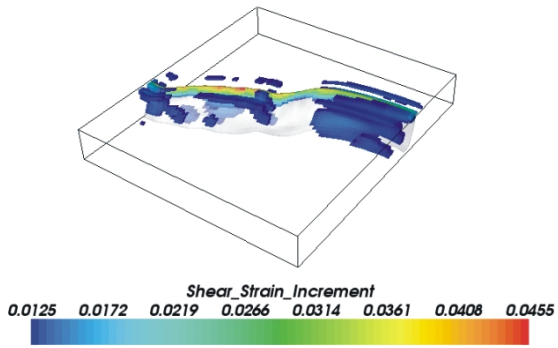
Regional and camp scale fluid flow modelling



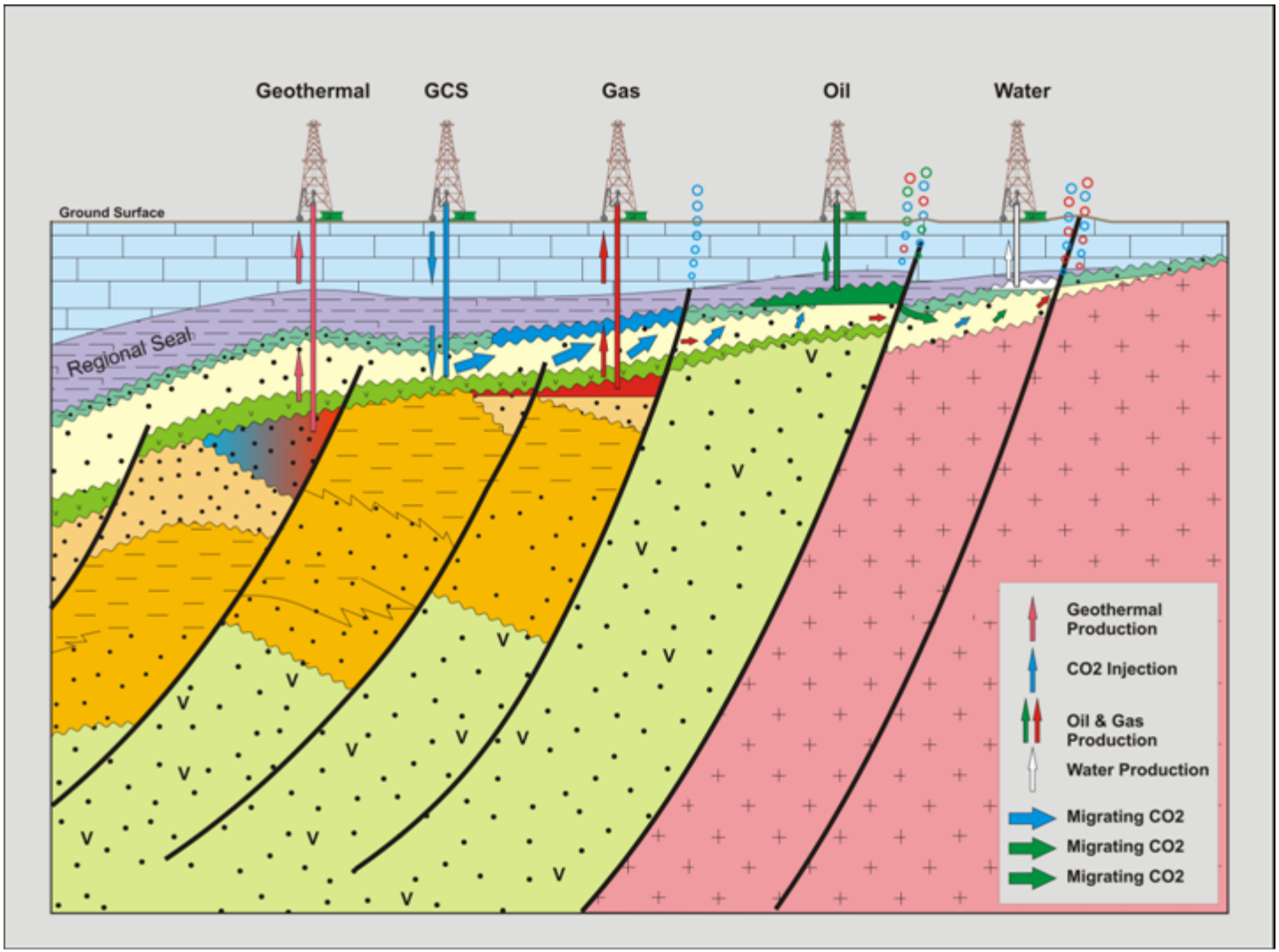








The pore-space as a resource

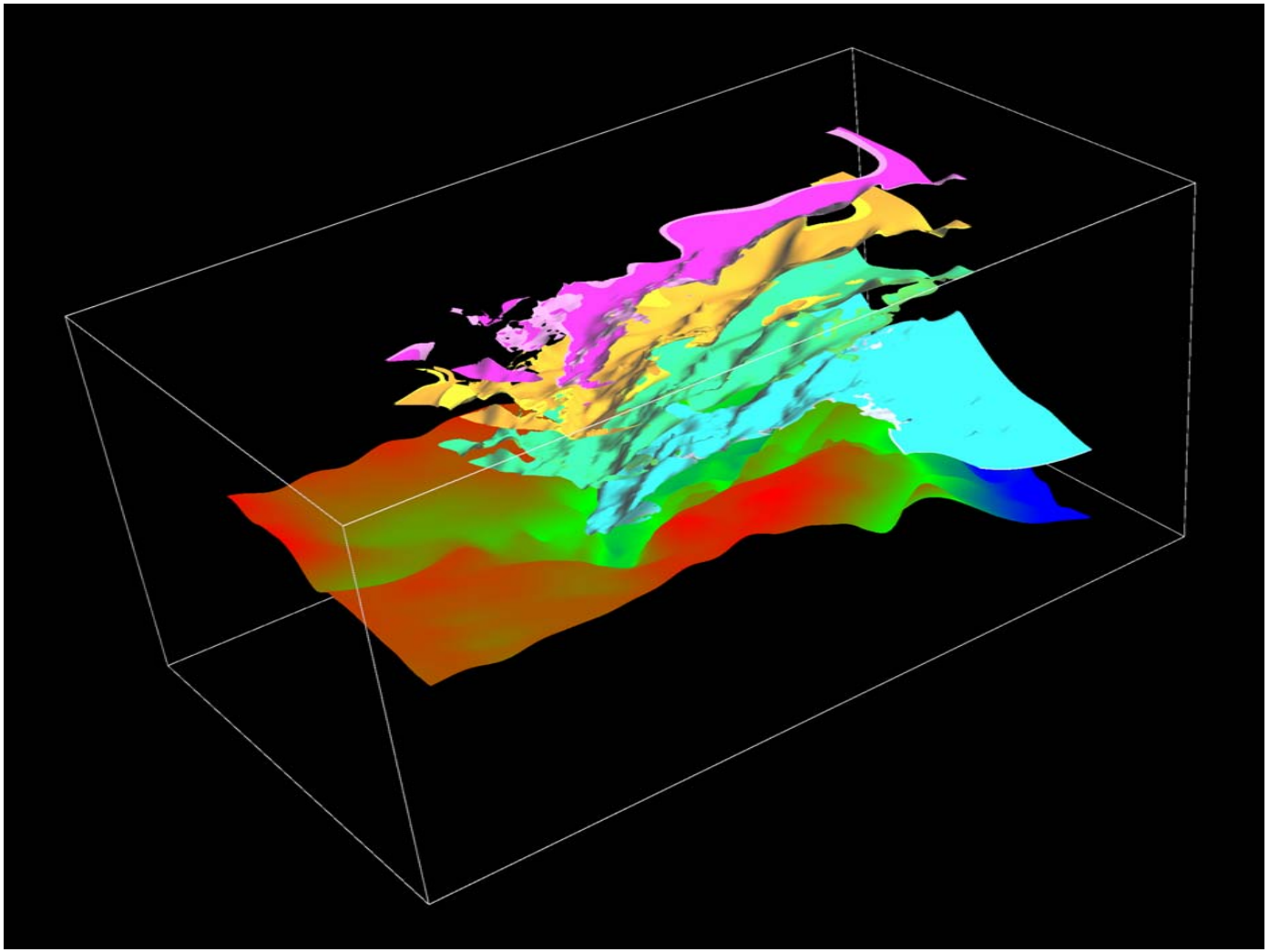


Applications for geothermal exploration

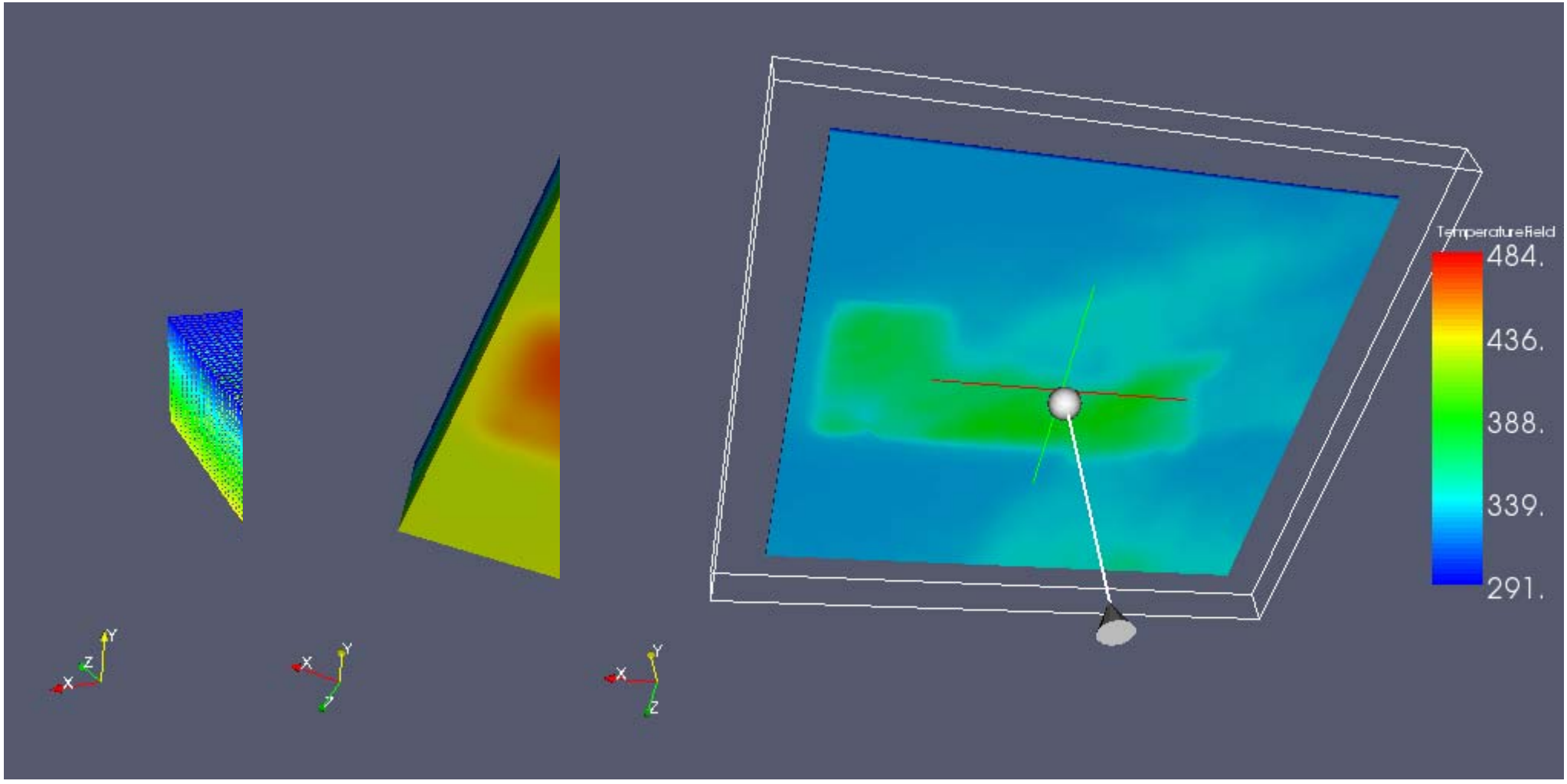
Exploded view of the Latrobe Valley coal seams

Modelling done by Chris Osborne, CCV

Value-add to this dataset by using it to model heatflow

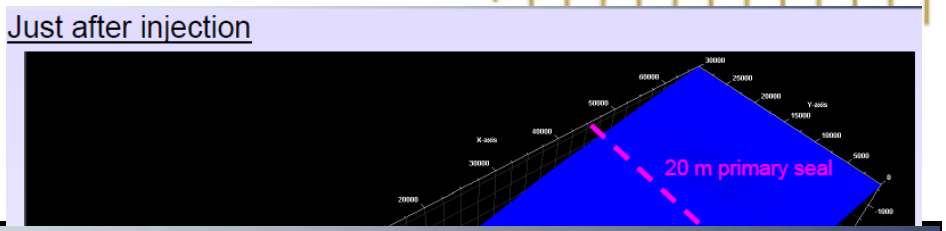


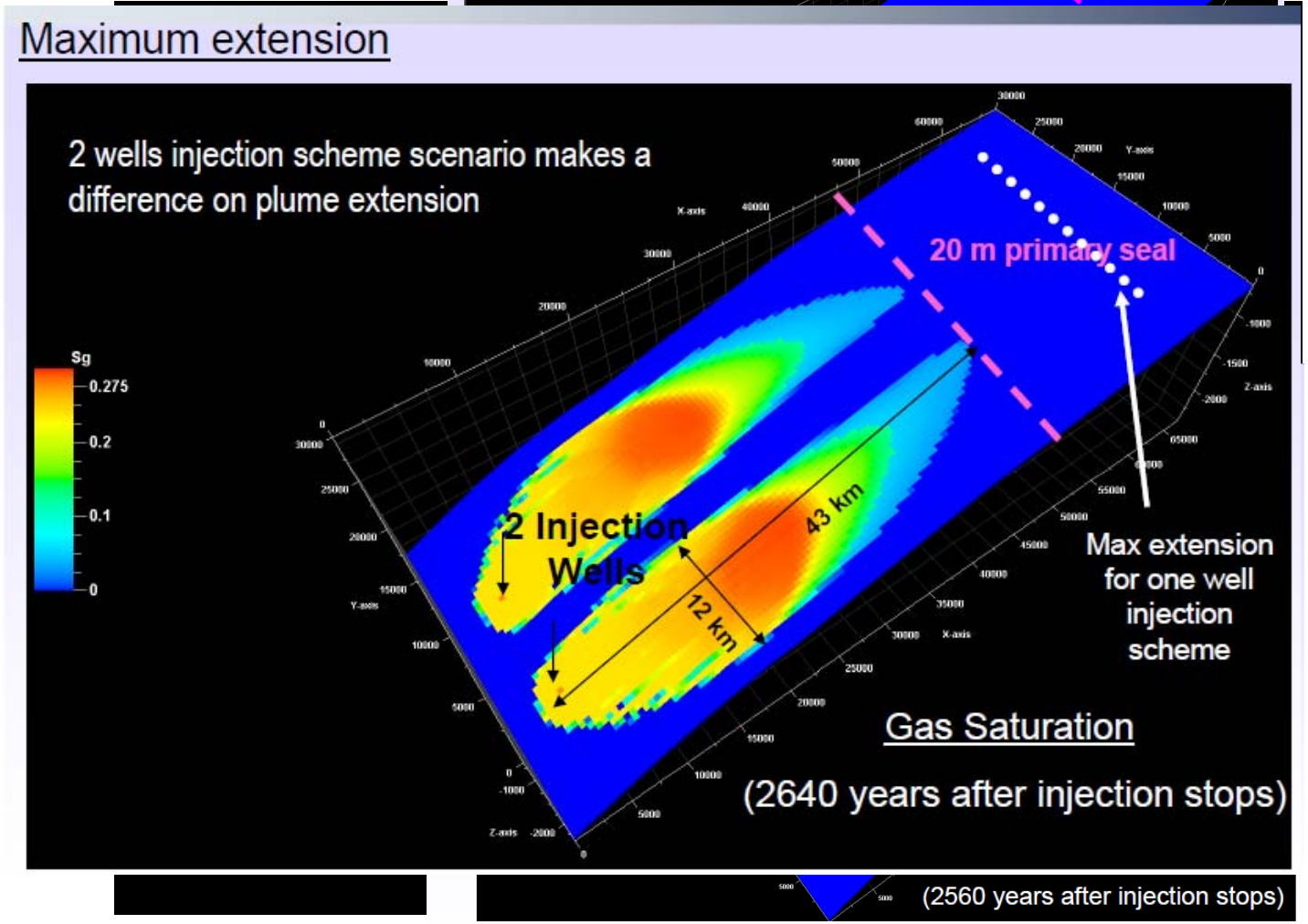
Applications for geothermal exploration

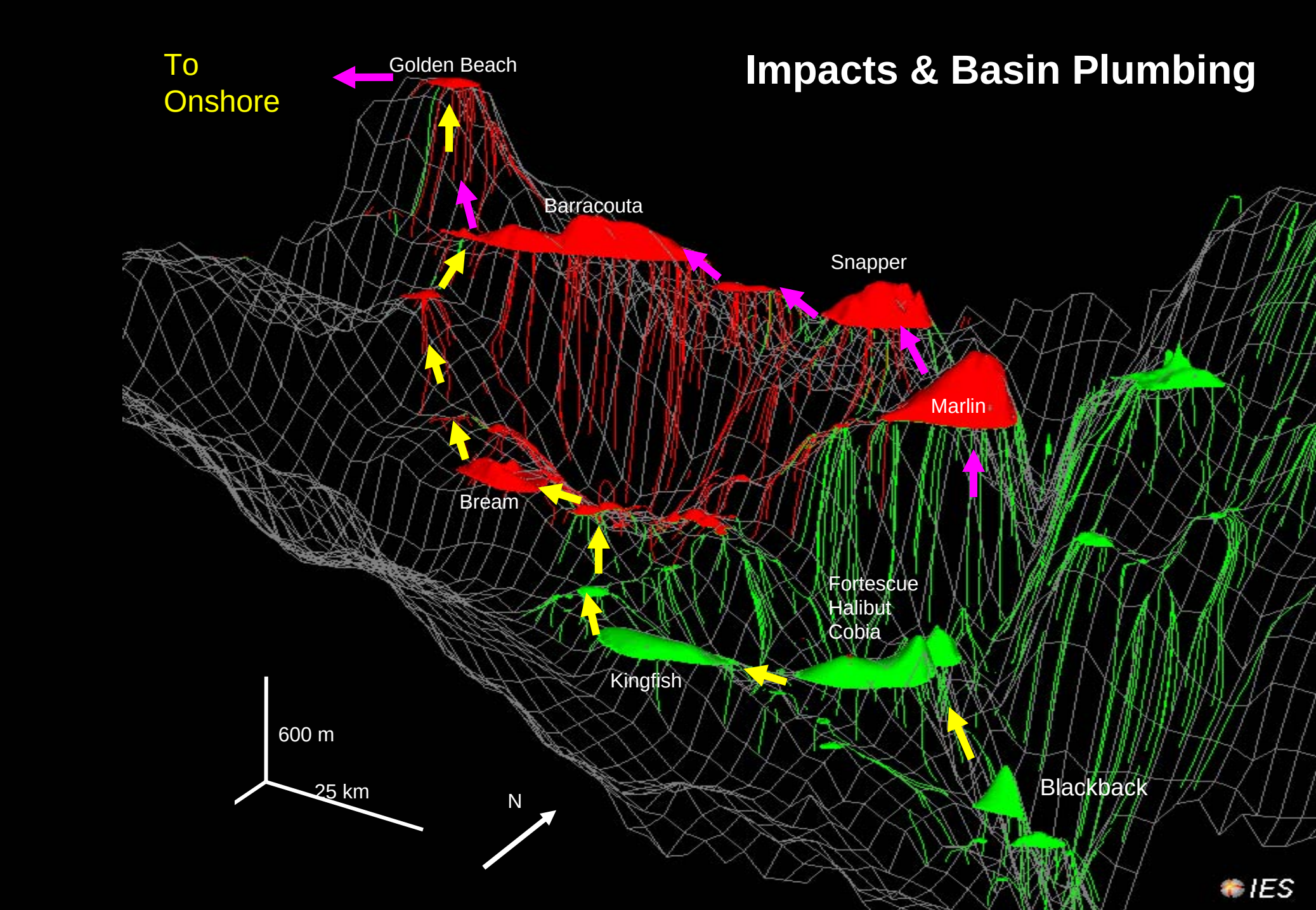


Hydrocarbon and GCS targeting and prediction

So where and how can we inject 200MT of CO2 into a basin?






To
Onshore
Golden Beach
Impacts & Basin Plumbing
Barracouta
Snapper
Marlin
Bream
Fortescue
Halibut
Cobia
Kingfish
Blackback
600 m
25 km
N
IES

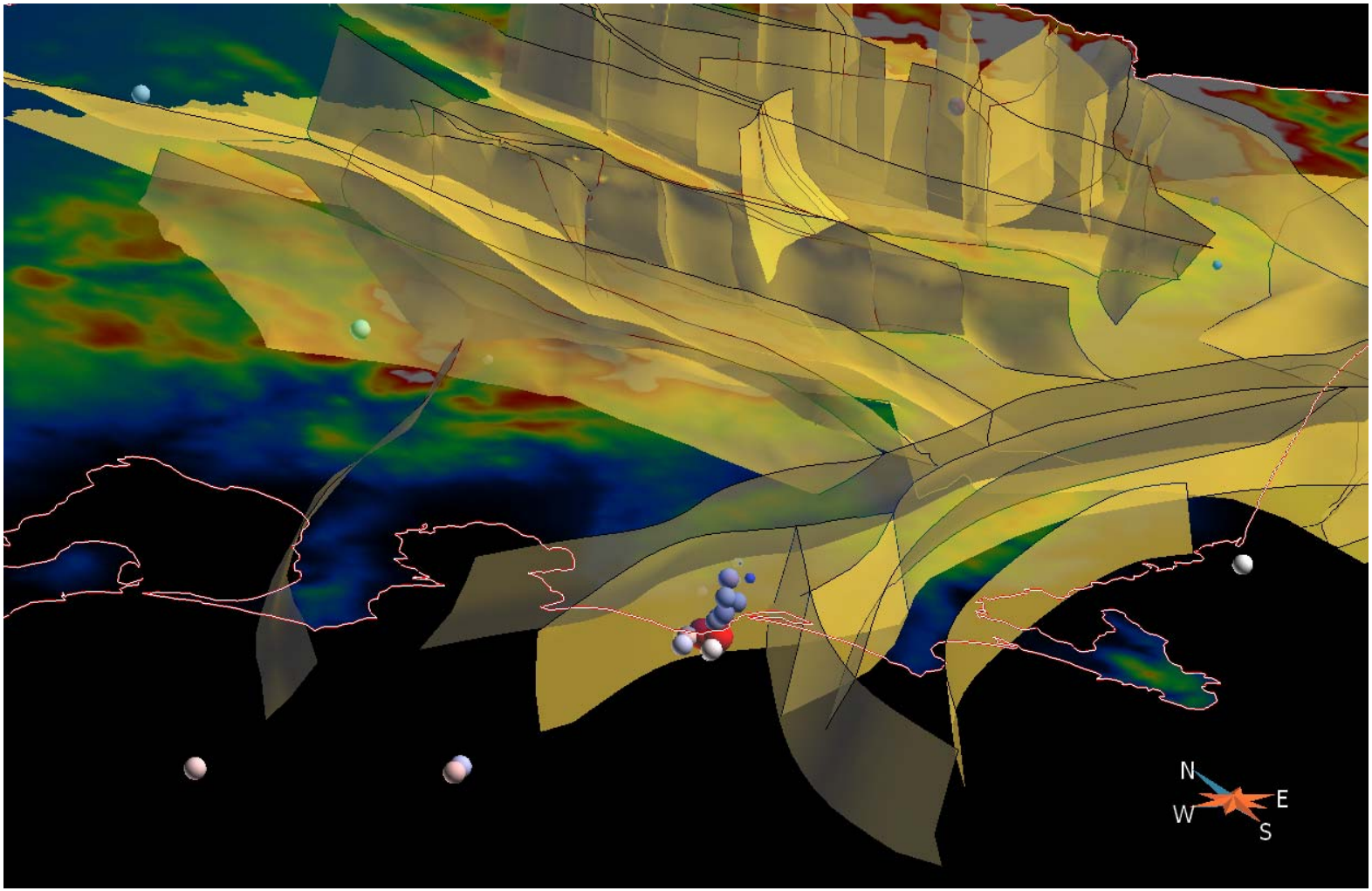
General research applications

Recent earthquake mapping

Stress field analysis

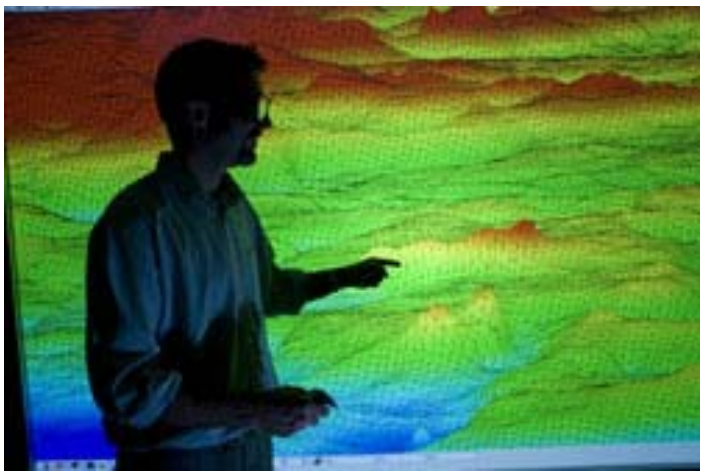
Model calibration

Earth system monitoring



3D Data delivery

- 3D Model Manager System
  - Storage
  - Data management
  - Data delivery
    - Coordinate, datum and format conversion
  - Visualisation capability

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S180
E
Clipboard
F4 Street Furniture
F3 Manipulate
F2 Perimeters
F1 Solid Revolve
(4) Camera is now immersive
(3) Camera is now eyeball
(2) Display captured
(1) Camera is now immersive
Controls
F5 Create Building
F6 Texture Paint
F7 Carving
F8 -
0s Cu1
0s Hd2 100s 1f G3

Conclusions

- We are providing next-generation fully attributed, high resolution 3D geological models
  - of the whole state
  - of the whole crust
  - for all commodities
  - to which Government, industry and research groups can add-value
- And its FREE!