AuScope
AN ORGANISATION FOR A NATIONAL
EARTH SCIENCE INFRASTRUCTURE PROGRAM

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AuScope Geothermal Demonstrators
Cooper Basin, South Australia/Queensland, Australia

AuScope aims to establish world-class research infrastructure to enable the characterisation of structure and evolution for the Australian continent. AuScope's Simulation, Analysis and Modelling capability makes it possible to draw together geological data-products and analysis software, for the purpose of developing quality scenario models. This allows researchers to test geological hypotheses and to answer large-scale "what-if" questions relevant to Australia's geological resources.

The following is an example "what-if" scenario. The model below shows forward temperature modelling in the Cooper Basin area, located on the border between South Australia and Queensland. The region is intruded by large volumes of high heat producing Big Lake Suite Granodiorite, the locations of which are coincident with a prominent geothermal anomaly. A 3D geological map of a 300 x 450 x 20 km volume in this region has been produced (Meixner and Holgate, 2009) and was built using seismic reflection data and well intersections, together with 3D property inversions of Bouguer gravity data. The gravity inversions delineate low density bodies that are inferred to be granite within the basement, some of which coincide with known granite intersections. The 3D map which delineates the 3D distribution of potential heat sources and thermally insulating sediments forms the basis of the scenario modelling used in the example below. Other parameter scenarios can be tried at the Geothermal Model Library (*http://www.underworldproject.org/geothermal*).

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Description:
The AuScope software infrastructure Underworld *(http://www.underworldproject.org)* offers the novel capability of metre-scale resolution, yet resolving to depths of tens of kilometres. The 3D model and source data information can be found through the AuScope Discovery Portal's geothermal layer *(http://portal.auscope.org)*.

Underworld (*http://underworldproject.org.au*) has been used to produce a thermal model of the Cooper Basin region (Figure 1) based on the above 3D geological map. The following parameters were used in the thermal model:

Unit	Heat Production Rate (μW/m3)	Thermal Conductivity (W/mK)
Above C (Upper Eromanga Basin)	1.0	2.0
Z to C (combined Lower Eromanga and Cooper Basins)	1.0	1.2
Known and inferred Granite	8.0	2.4
Basement	2.0	3.1

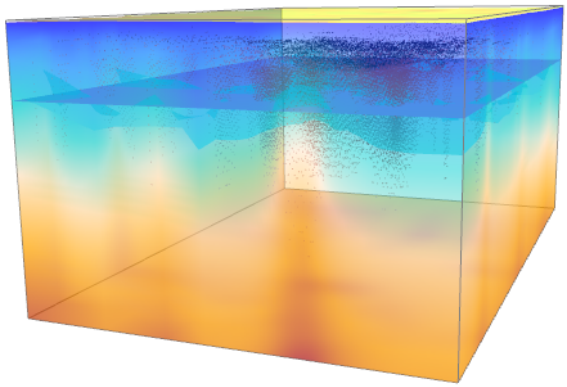

Figure 1: 3D Underworld model of Cooper Basin geothermal properties, visualised using gLucifer (to view and rotate interactively in 3D, open in Acrobat Reader v. 8.0 or higher).

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Reference: Meixner, A.J., Holgate, F.L 2009, The Cooper Basin Region 3D Map Version 1: A Search For Hot Buried Granites. Geoscience Australia, Record 2009/15.