

3D-WEG Geological Modelling and Inversion Software Applied to the Geology of Broken Hill

Intrepid Geophysics, in collaboration with the BRGM, have applied BRGM's innovative Geological Editor (3D-WEG) to the geology of the Broken Hill mining district. The software has been used to develop a coherent 3D geological model, using existing government geological mapping, mining company section data, and the regional Broken Hill seismic line. Inversion of ground and airborne gravity data has been used to evaluate and further refine the model. Intrepid and BRGM presenters will report on this activity at the following two events ...

SMEDGE Meeting in August

at The Rugby Club The Rugby Club, Rugby Place, Circular Quay, Sydney

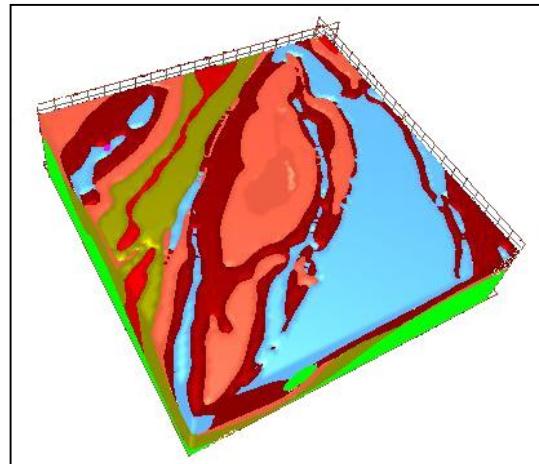
Thursday 26th August (5.30pm drinks) for 6.00 –7.00pm

26th August

The 3D-WEG Geological Editor, developed by the Bureau de Recherches Géologiques et Minières (BRGM) is a radically different approach to geological modelling. Whereas much geological modelling is based on engineering-type CAD 3-D visualisation software, the Geological Editor is purpose-built for geological modelling. Features which make it a leading edge technology include ...

- uses primary geological observations, together with a template of allowed stratigraphic relationships, to 'build' the geological model
- has geologically-intelligent editing to refine the model.
- 'new' observations are easily added, and a revised model rapidly rebuilt to incorporate these new data
- has an ability to use geophysical datasets, such as gravity, to refine the model by gravity-modelling inversion.

A 3D geological model of Broken Hill was constructed from a range of geological inputs. Constrained inversion of ground gravity was then carried out. Prompted by the results of initial inversions, a number of adjustments were made to both the geological model and estimates of the density for each of the units. The final inversion was used to demonstrate a high degree of internal consistency amongst these amended forms of the prior information. Inversion using 'gravity' from the Falcon AGG data was tested, but direct inversion of tensor gravity is proposed.

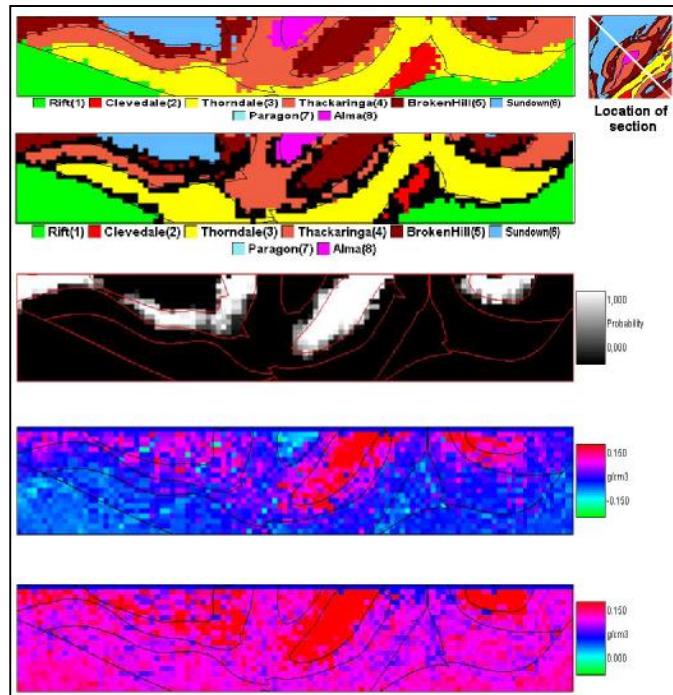


3D-WEG implements a constrained inversion method that uses lithology as the primary model parameter. The 3D geological model is used as the starting model; this defines the topology of the model. Other prior information are the observations of the gravity field, and formation density values expressed as probability density functions.

The inversion method returns a number of models which are consistent with the supplied prior information. This ensemble of acceptable models can be analysed statistically to derive conclusions.

NW-SE sections showing products derived from the ensemble of acceptable models: the most probable lithology; the most probable lithology with areas where this probability is less than 0.95 shown in black; probability of finding Broken Hill Group (black is zero probability whilst white is a probability of one); mean relative density; standard deviation of density.

(Length: 28km; V/H=1)



Download more information ...

<http://3dweg.brgm.fr>

<http://www.intrepid-geophysics.com.au>

The Broken Hill Geological Modelling Project was supported by the following sponsors ...



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For more information ...

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