Aeromagnetic and gravity processing

Clancy Exploration Limited (Clancy) acquired an option to purchase the North Arunta Project from ABM Resources NL (ABM), subject to completion of financing. Unfortunately the financing could not be completed due to market conditions. However, Clancy commenced a substantial program of compilation and re-processing of potential field datasets covering an Area of Influence (AOI) in the Tanami – North Arunta region, which includes the Bonita project. This work was undertaken by Fathom Geophysics.

Magnetic data over the AOI consists of various regional surveys flown by NTGS/GA (between 200 and 500m line spacing) as well as numerous public domain surveys flown by companies (some with 50m line spacing). There are two regional grids covering the AOI, the 2011 NTGS stitch and the 2010 GA Magmap stitch. Neither incorporates all the detailed public domain survey data available, and both have merging artefacts. In addition to the public domain data, ABM provided Clancy with 7 closed file surveys which warrant inclusion in a single-coverage grid.

Review of the NTGS survey catalogue (open and closed file surveys) revealed many surveys that were open file and suitable for merging; i.e. those surveys having a line spacing considerably less that the regional NTGS-flown surveys. These surveys were acquired from the NTGS and incorporated into the processing. The objective of the processing is the provision of a single 'best available data' magnetic grid that could then be filtered and used for ongoing targeting and exploration.

To facilitate ordered and manageable stitching of 40+ grids, a number of areas were defined covering the zones of detailed data (Areas 1 to 8). Higher resolution company data within each of these zones were stitched to the regional grid, generating detailed TMI stitches with grid cell size ranging from 25m to 50m. The regional grid has a grid cell size of 80m.

The Bonita project is located within AOI and is covered by the regional 80m grid. Before Total Magnetic Intensity (TMI) data can be used for interpretation it needs to be Reduced to the Pole (RTP) to shift anomalies over their sources. The RTP operator transforms the data to that which would be observed at the earth's magnetic poles, where the inducing field vector is vertical (assuming there is no remanence). For a small survey area, a single inducing field vector (made up of the inclination and declination at the centre of the survey) can be used effectively. When the survey area is large, such as the North Arunta AOI, this assumption is invalid and can lead to distortion of the transformed field, distal from the single control point (usually the middle of the survey area). The inducing field vector varies both spatially and temporally, and the range of solutions needs to be considered when transforming a TMI grid covering a large area.

The 'differential RTP' method was used to reduce the data to the pole using the inducing field vector for each data-point, assuming negligible temporal variations (this was tested and is valid). The spatial variation across the AOI is significant, necessitating the use of the differential RTP (dRTP) algorithm.

A number of filters were then applied to the dRTP grid including:

- Depth residuals: shallow (0-160m); intermediate (160-640m) and deep (640-2560m)
- Depth residual grids combined in a ternary display
- First vertical derivative

- Horizontal gradient
- Tilt angle
- Residual pseudogravity
- Analytic signal of the vertical integral
- Ternary display
- Directional derivatives

The dRTP AOI image covering the Bonita project is shown in Figure 1.

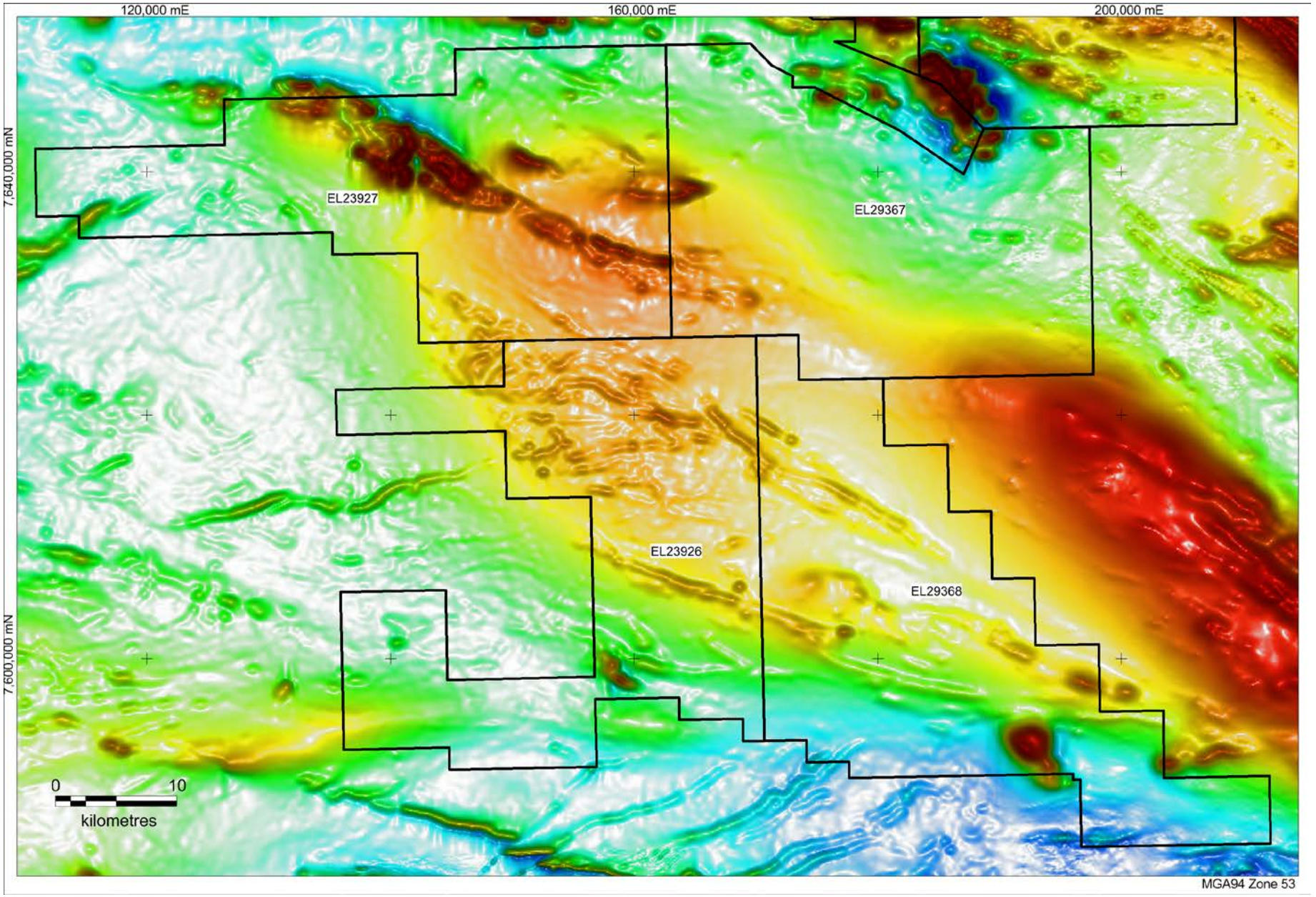

Figure 1 – *Regional AOI dRTP image for Bonita.*