Aeromagnetic 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 Barrow Creek 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 Barrow Creek project is located within Area 8 and is covered by a detailed 25m 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 Area 8 image covering the Barrow Creek project is shown in Figure 1.

Basement geology Interpretation

The detailed Area 8 imagery was used to compile a 1:100,000 scale basement geology interpretation covering the Barrow Creek project and neighbouring Lander River project. This work was undertaken by consultant Dr Leon Vandenberg and the following is a summary of his findings (Vandenberg, 2014).

Area 8 lies approximately 275 km north of Alice Springs. The desert sandy plains that dominate much of this area are cut by southerly trending drainage systems and punctuated by several south-east trending low ranges. The drainage systems are only periodically subject to seasonal flooding events and are generally dry. The ranges typically comprise interleaved sedimentary and volcanic rocks of the Early Proterozoic Hatches Creek Group and/or Late Proterozoic -to Devonian rocks of the Georgina Basin. The northern edge of the Area 8 is occupied by the Cambro-Ordovician sedimentary sequences of the Wiso Basin. The oldest rocks in the region, interpreted from integrated geological-geophysical data, are unexposed lithostratigraphic correlatives of the Palaeoproterozoic Dead Bullock Formation. The Dead Bullock Formation is host to significant gold mineralisation to the northwest in the Tanami and underlies the poorly exposed Palaeoproterozoic Lander Rock Formation (and stratigraphic equivalents) and mafic intrusive rocks of the Aileron Province, Northern Arunta. In the Barrow Creek-Lander River region the Lander Rock Formation and mafic intrusives have proven gold and base-metal prospectivity and have been the focus of recent exploration. The region is also punctuated by several large Palaeoproterozoic felsic intrusive bodies. A suite of felsic intrusive rocks related to the Bean Tree Granite in the southern portion of the exploration area provides further opportunities for the discovery of commodities such as those in the Barrow Creek Sn-Ta-W Pegmatite Field.

Correlatives of the Dead Bullock Formation (-Ptd?) possibly occur along northern sections from Harrison through to the area north of Tulsa, adjacent to the southern edge of the Wiso Basin and several shear zone bounded granite domains. If correlation of lithostratigraphy from the Tanami to Barrow Creek is valid, then overlying Dead Bullock Formation are the metasedimentary rocks of the Lander Rock Formation. The Lander Rock Formation (-Plr) is considered a stratigraphic equivalent of the turbiditic Killi Killi Formation in the Tanami Region.

Within Area 8, metasedimentary rocks of the Lander Rock Formation exhibit Low Pressure – Medium-to High-Temperature metamorphic grade (LP-HT) and comprise biotite-muscovite-andalusite-bearing metapelitic schist, metapsammitic and psammo-pelitic schist.

Approximately twenty kilometres southeast of Waldron's Hill in the Lander River project area, partially outcropping fine-grained moderately foliated amphibolite (-Pld>a) is host to coarse-grained linear mafic bodies (-Pld1) that are generally less than 400 m thick. The cross-cutting coarse-grained mafic bodies may correlate to mineralised mafic material in granite and metasedimentary gneiss at the Waldron's Hill Prospect, as well as conformable mafic bodies of typically amphibolite-facies grade recognised throughout the Lander Rock Formation. These mafic bodies (-Pld1) occur as sills, pods or boundin bodies of coarse-grained gabbro, medium-to fine-grained dolerite and localised amphibolite. Mafic bodies in Lander Rock Formation are probable correlatives of dolerite, gabbro and minor monzodioritic sills in the Davenport Province to the northeast.

Granitoids are widespread throughout the northern part of the Aileron Province and extend from Barrow Creek into the Tanami Region to the northwest . These granitoids (-Pg, -Pg>1m, -Pg1, -Pg2, -Pg3, -Pg4, -Pga, -Pgb, -Pgg, -Pgw) intrude Lander Rock Formation and mafic bodies. A variety of textures, grainsizes and compositions are found in the study area. Granitoids are typically equigranular to porphyritic biotite-granite, biotite-muscovite granite, medium-to coarse grained quartz-feldspar-muscovite-tourmaline±garnet leucogranite with metasedimentary enclaves, biotite-granodiorite and monzogranite. Many granitoids display gneissic to locally mylonitic fabric (-Plg). In adjacent Lander Rock Formation local tourmalisation, pseudomorphic replacement of andalusite by quartz-muscovite and growth of minute garnet porphyroblasts (<2mm diameter) are interpreted to be associated with contact metamorphism during intrusion. Similarly, local hornfels and calc-silicate rock (-Plc) in areas such as the Ringing Rocks Ta-Sn Prospect may be attributed to contact metamorphism. Pegmatite dykes and sills are common in Lander Rock Formation and in particular the Barrow Creek Sn-Ta-W Pegmatite Field.

The metasedimentary rocks of the Lander Rock Formation, together with mafic and granitic rocks, are overlain by open-folded sedimentary and volcanic rock sequences of the Hatches Creek Group.

In Barrow Creek the Hatches Creek Group (-Ph) comprise lower most Gwynne Sandstone (-Phx), interdigitating Tinfish Sandstone (-Php) and Strzeleckie Volcanics (-Phq), and the Illoquarra Sandstone (-Phw). These rocks are interpreted to represent shallow-marine and fluviatile sandstone with predominantly subaerial felsic volcanic rocks.

Unconformably overlying the Hatches Creek Group and older stratigraphy are the unmetamorphosed, undivided Neoproterozoic-to Devonian sedimentary rocks of the contiguous Southern Georgina and Wiso basins. The interconnected Georgina and Wiso basins (and Daly Basin) collectively formed part of the vast middle-Cambrian Centralian Superbasin that extended across northern, central and southern Australia.

Flat lying-to gently undulating sedimentary rock sequences of the Georgina Basin are restricted to the east and southeast portions of Area 8. The Wiso Basin is restricted to the northern margin of Area 8.

Throughout Area 8 there are numerous W- WNW-to NW trending thick milky white quartz blows and resilicified creamy brown quartz-breccia zones. These structures are most likely associated with numerous W- WNW-to NW trending faults interpreted from geophysical . Similarly, the on-ground positions of interpreted faults are often coincident with elongate low mounds of milky quartz lag and areas of scattered quartz lag, float metasedimentary and mafic rock.

First (1) and Second (2) Order structures are large, fundamental crustal-scale structures that appear to have effected considerable deformation and possibly influenced tectono-sedimentation. The fault controlling and defining the southern margin of the Wiso Basin might be considered a First Order structure. In general the large faults and fault-networks across Area 8 were assigned Second Order status. Third Order structures (3) are mid-scale structures, many appear to merge or splay from Second Order structures and may be associated with mineralised domains. Fourth Order structures (4) are small scale structures, many of which may have acted in concert with higher order structures, most of which effecting minor apparent displacements (particularly within large granite bodies).

The age of the structures is uncertain however many appear to define a semi-continuous network from the Barrow Creek Region through to the Tanami, parallel to and coincident with the Willowra Gravity Ridge. Results of the 2005 Tanami Seismic Survey indicate many of the faults with comparable scale and along-strike position are fundamental crustal-scale features (associated with a buried Palaeoproterozoic-age continental suture zone) with a probable multi-phase history from the Palaeoproterozoic through to the ~300Ma Alice Springs Orogeny involving extensional basin-formation, reactivation (inversion?) and modification.

The basement geology map for the Barrow Creek project is shown in Figure 2.

References

Vandenberg, L.C, 2014 – Notes on the Prospectivity of the Barrow Creek-Lander River region, NT, based on the Basement Interpretation for Clancy Exploration Ltd. Unpublished Clancy technical report.

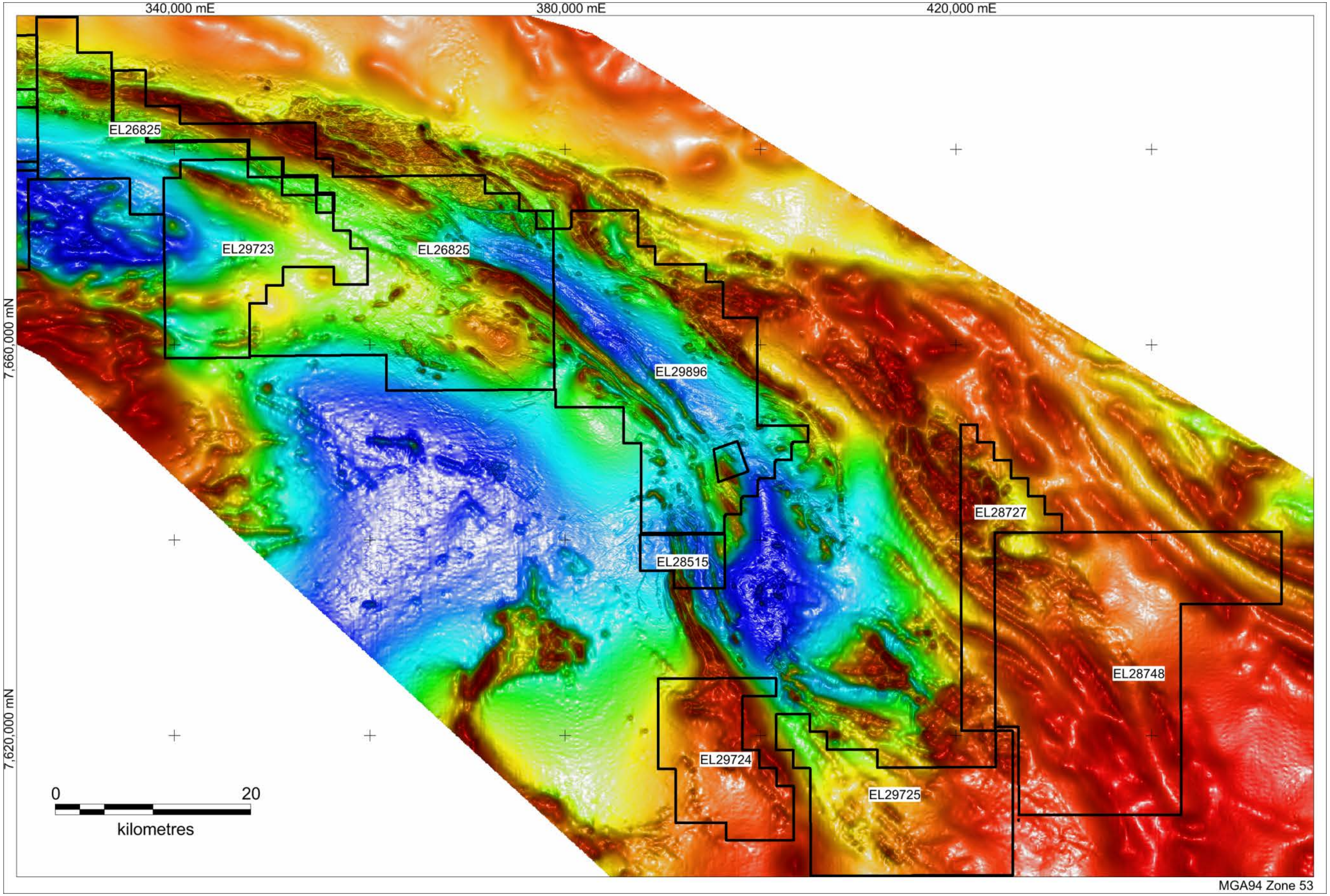

Figure 1 – *Detailed Area 8 dRTP image for Barrow Creek.*

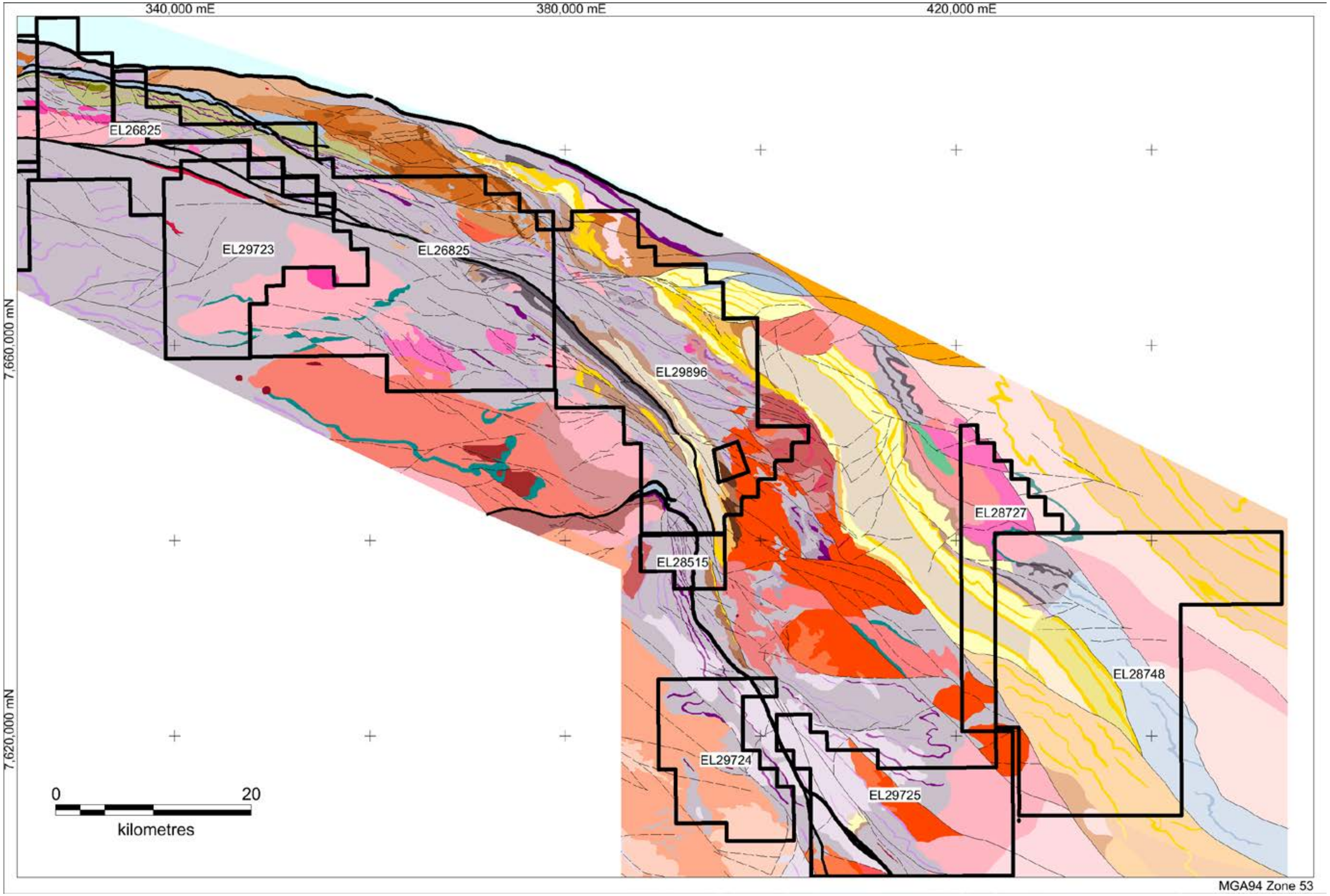

Figure 2 *– Basement geology and structure interpretation for Barrow Creek. Refer to Figure 3 for legend.*

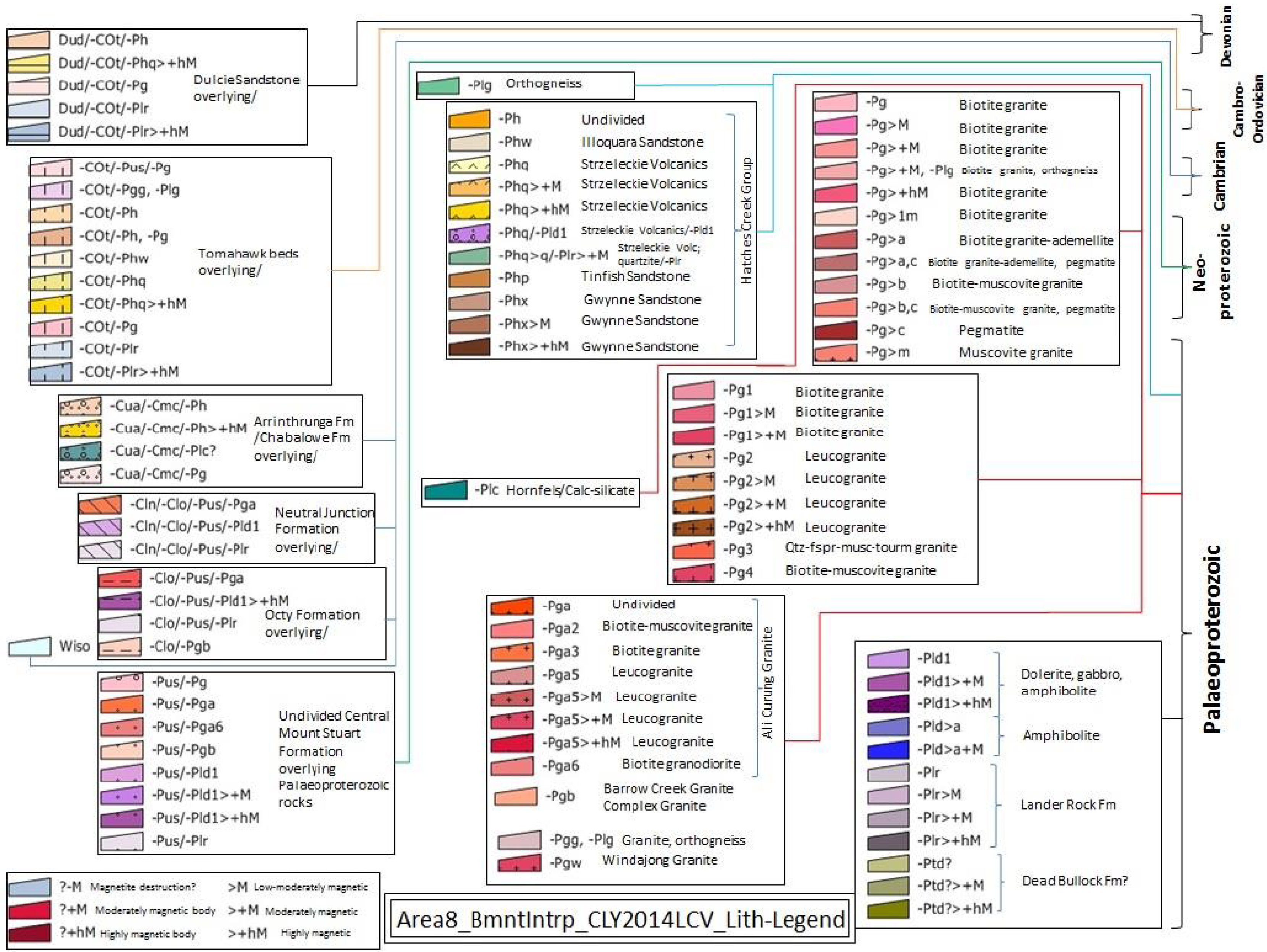

Figure 3 – *Legend for basement geology and structure interpretation shown in Figure 2.*