montana G.I.S

180604_Bub_WR_SkyTEMmodels.docx

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CC:

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SUBJECT: Summary: White Range Skytem anomaly modelling

The following is a summary of the modelling of discrete Airborne Electro-Magnetic anomalies (AEM) identified in White Range SkyTEM data. The survey area is approximately 95km ENE of Alice springs and consists of 13 traverses flown in a North-south orientation 200m apart (Figure 1).

During a brief review of the data in December 2017; anomalies were identified as mid time peaks in the AEM "Z" component data. In general, the anomalies identified are not of high amplitude (low conductance) with narrow wavelengths (shallow).

The anomalies have been modelled in Maxwell using the CSIRO developed Leroi-Air algorithm. Leroi-Air enables the modelling of plate like conductor in a layered earth. This is superior to modelling in free space as the layered earth enables the background (earth response) to be replicated. This results in better modelling of the of the discrete anomaly sources (conductance, depth and geometry/dip).

During the modelling process additional anomalies were recognised and added to those previously identified. All bodies modelled are listed in Table 1; the best "targets" are highlighted (table 2 lists the originally identified bodies).

Observations from the Modelling:

- The modelling was very difficult: The area is quite resistive: signal dissipates very quickly. Generally, all the anomalies have narrow wavelengths and are low amplitude in the moderate time windows, indicating they are sourced by shallow low conductance bodies.

- The most robust anomaly(ies) sourced by discrete bodies (tabular dipping plates) is on line113: The anomaly is modelled as being sourced by two bodies dipping to the north (L103_N1 & L103CofN1). The Z and X component is quite coherent, the anomaly has a good wavelength. The bodies model in the Atnarpa Complex (Figure 2a, 2b & 2c).

- The best anomalies in the Heavitree Quartzite (HTQ) are on line 103 (L103_N1 & L103_S2) as well as on Line 109 (L109s).

- There is an increase in the signal to the east which correlates with the DTM and is indicative of mild increase in the oxidised profile i.e. Resistive Heavy Tree Quartzite (HTQ) in the west and more weathered slightly less resistive Atnarpa Complex in the east.

- EmaxAir has been used to calculate Conductivity Depth Image Model Sections

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(Figure 3a). Depth slices of the models display interesting continuity - structure? (Figure 3b). Some of these “structures” have a strong correlation with troughs in the DEM (current day waterways). However, there are some low resistivity zones that strike E-W ish through the HTQ and these do not correlate with the modern-day drainage; but in the orientations of the detailed mapped lithologies (Figure 3c). These trends along with the terminations and offsets present good target zones in the HTQ (Figure 3c).

PRODUCTS SUPPLIED:

3D model with plates, model sections., loe res model shells and RL slices.
“WhiteRange_3Dmodel.bin”
(viewing software: http://www.scicomap.com/3Dviewer.html”)

Model section and Depth Slices PDFs

GIS located CDI Mode Slices

GIS vector file of top of modelled sourced (top/centre)

Maxwell Model sessions