



Tanami Radial Symmetry Processing

Memo written for Darren Holden and Luke Forti of ABM Resources

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Method

Radial symmetry in magnetic and gravity data can be indicative of intrusive rocks or certain alteration patterns. There are several methods that can be used to locate radially symmetric anomalies in gridded data. Many of the anomalies of interest on this project are fairly subtle and they are not particularly round. The best method for locating these types of anomalies is a gradient-based method that uses slopes in the grid to find points where the grid slopes away in all directions to locate radial highs. Lows are found where the grid slopes toward a point in all directions.

Since this method uses slopes in the grid, it can be affected by features that are different wavelengths than those of interest. Therefore residual grids are used as input to minimize the effects of noise and long wavelengths.

The inputs to the method are the grid, the radii of the anomalies of interest and a parameter describing how round objects need to be called alpha. For this work, radii of 300, 500, and 4000 m were used and an alpha value of 2 was used. This alpha value should reject bodies with no radial symmetry while not requiring perfect radial symmetry.

Lake Mackay

Figure 1 shows the results for Lake Mackay. The goal here was to highlight possible deep intrusions. There were three highlighted in the scoping document sent by Darren. Several radii were tested and a radius of 4 km seems to do the best job of highlighting the anomalies of interest. Several other anomalies are also highlighted in the area.

Runs at 500 m and 300 m were also completed. No examples of detailed anomalies that might be of interest were provided in the scoping document.

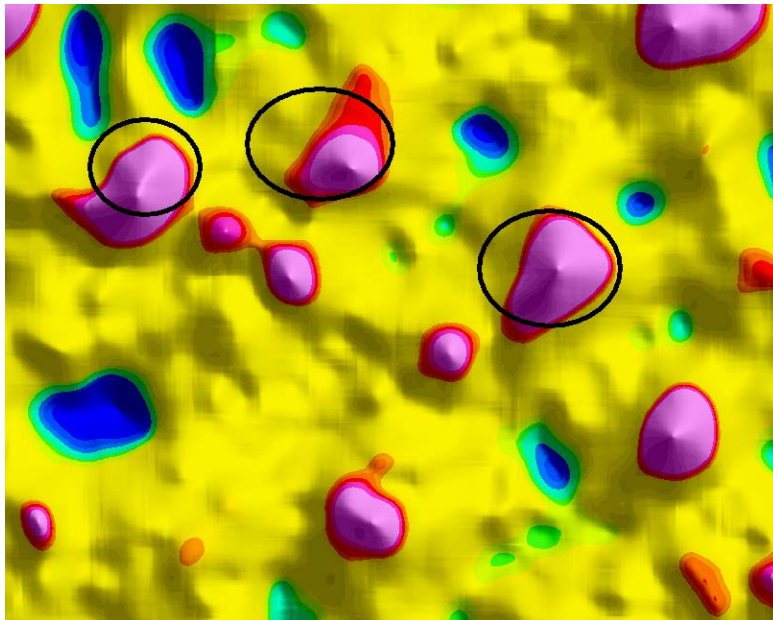
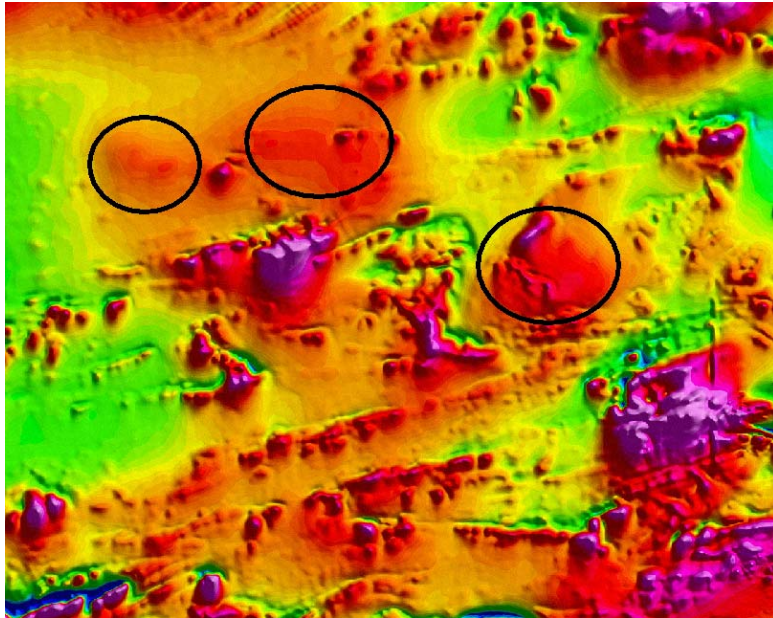


Figure 1. 4km radial symmetry in part of the Lake Mackay grid. The circled areas show anomalies that were highlighted in the scoping document. The top image is the RTP magnetic data and the bottom is the radial symmetry result. The anomalies are all detected.

Tanami

Two areas were highlighted in the Tanami grid in the scoping document. The first is just southwest of Callie where there is a large low (Figure 2). This is highlighted well with the 4 km radius filter that was used in the Lake Mackay area. Several similar anomalies are also highlighted.

The other area is the Twin Bonanza porphyry. There is a small round anomaly that is the porphyry and another larger and higher amplitude anomaly that is possibly a magnetite skarn adjacent to the porphyry. These are both highlighted well with the radial symmetry analysis.

The results using 300 m and 500 m radii are shown in Figure 3. The 500 m filtering has fewer anomalies but the porphyry and the magnetite skarn are amalgamated into one anomaly with two peaks. The 300 m filtering highlights more anomalies but shows the porphyry and skarn anomalies as separate. With both filters, a lot of anomalies were located. Additional information would be needed to use this for targeting.

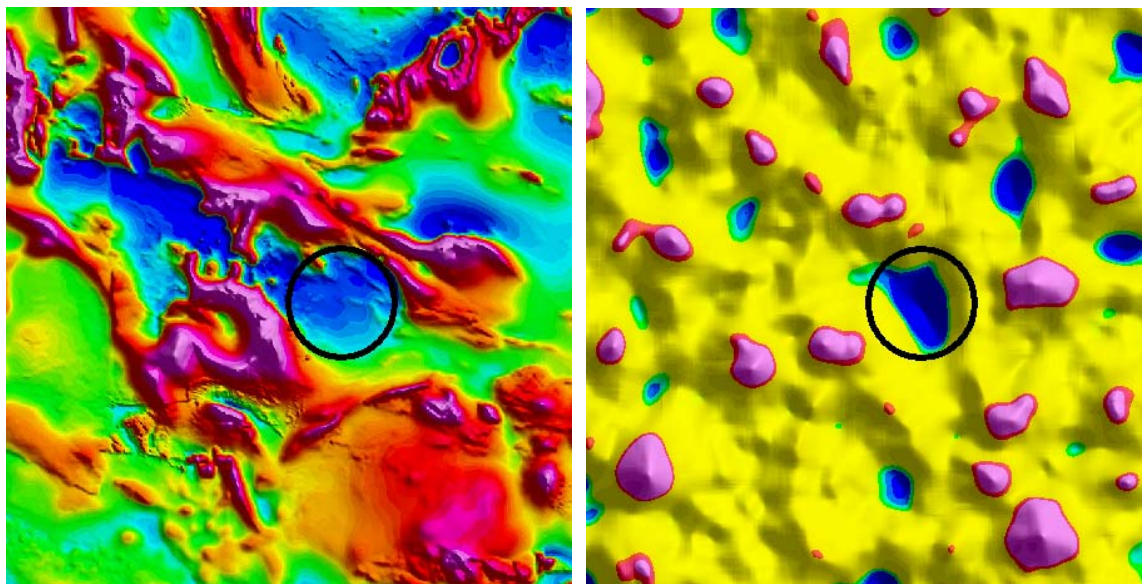


Figure 2. Results for the 4 km filtering on the Callie area. The black circle is the area from the scoping document that was highlighted as a possible intrusion. Left is the RTP image and right is the radial symmetry.

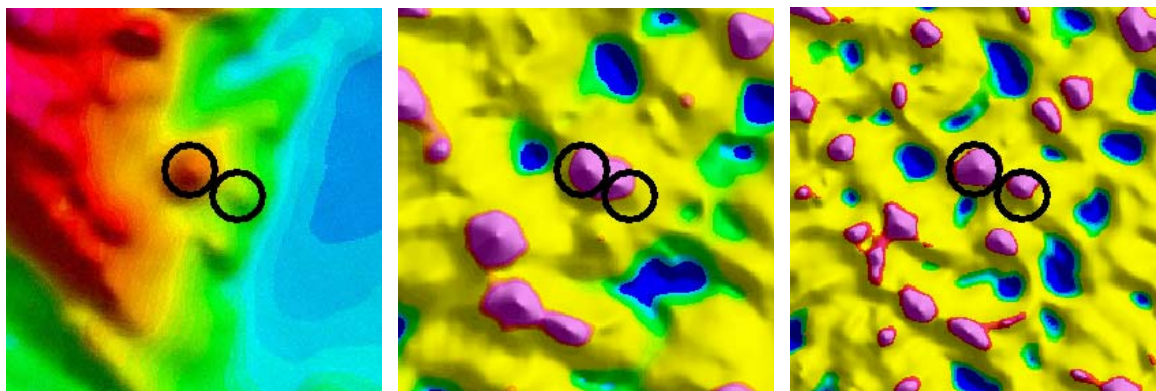


Figure 3. Results for the twin Bonanza area. Left is the RTP grid, middle are the results using a 500 m radius and right is the 300 m result. The 300 m result does the best job of highlighting both the porphyry and the skarn.