Oasis montaj How-To Guide

CET Porphyry Analysis - Detect Porphyry Features

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Please send comments or questions to info@geosoft.com

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How to Detect Porphyry Features

The **CET Porphyry Analysis** system analyses the shape of anomalies to detect near circular features of a given range.

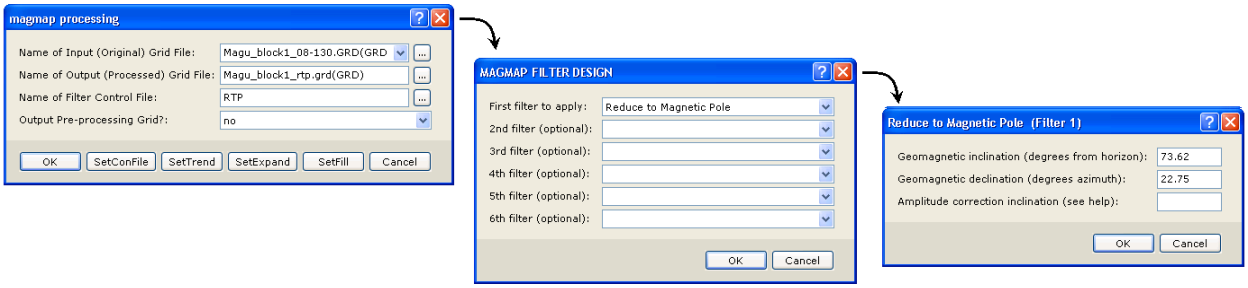
Porphyry deposits are igneous in nature, thus producing a near circular response. Porphyry deposits are sought after because they are the world's predominant source of Molybdenum, a highly important source of Copper and a major source of Gold, Silver, and other byproduct metals. Magnetic field data delineates the geologic structure relatively well and is best suited for this purpose. Nonetheless, since the workflow is directly applied to gridded datasets, any geophysical data sensitive to the geological structure could be subjected to this process.

When using magnetic data in this process, it is highly recommended to pole reduce the data first so that the anomalies are shifted over their causative structures.

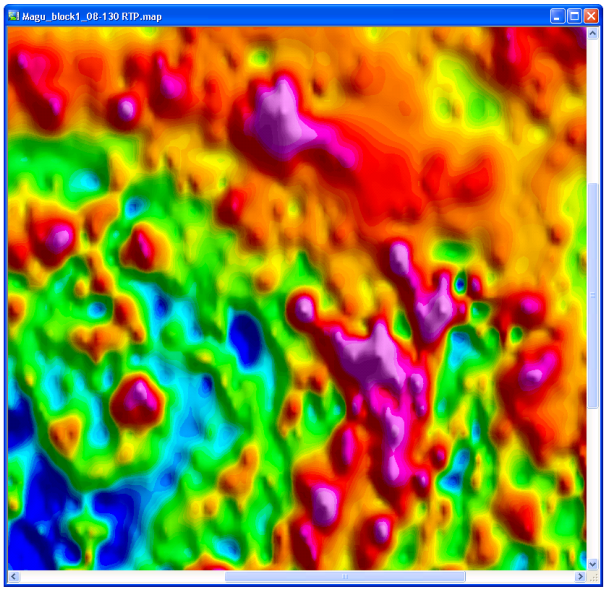
Start by creating an Oasis montaj workspace and load the **MAGMAP** and **CET Porphyry Analysis** menus.

To Pole Reduce the Magnetic Grid Data

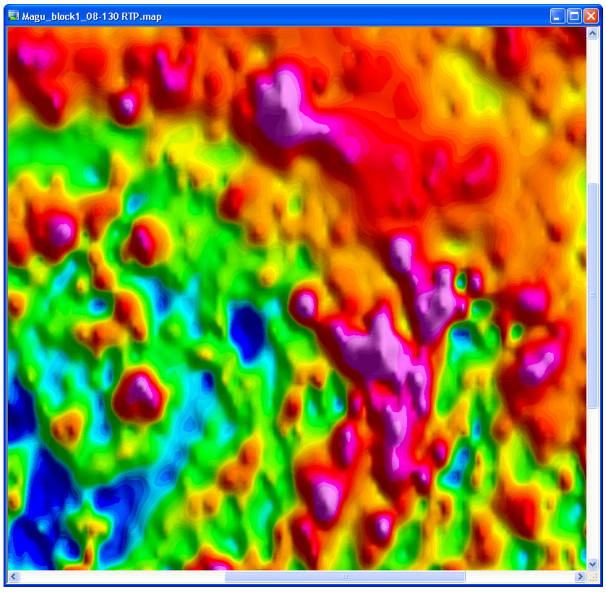
1. From the *MAGMAP* menu, select **MAGMAP 1-Step Filtering**. Specify your input magnetic grid, the output pole reduced grid,and the relevant geomagnetic field parameters.



2. Click **OK** and the pole reduced grid will appear.



Total Magnetic Intensity



Pole Reduced Field

For more information on how to use MAGMAP see the MAGMAP Filtering Tutorial.

To Detect the Porphyry-like Features

1. From the *CET Porphyry Analysis* menu, select **Circular Feature Transform**. This process will identify all such features with the specified size.

   The *Circular Feature Transform* dialog is displayed.

2. For *Input filename (grid)*, select the pole reduced magnetic grid; for *Output filename (grid)*, enter **Circular Features**.

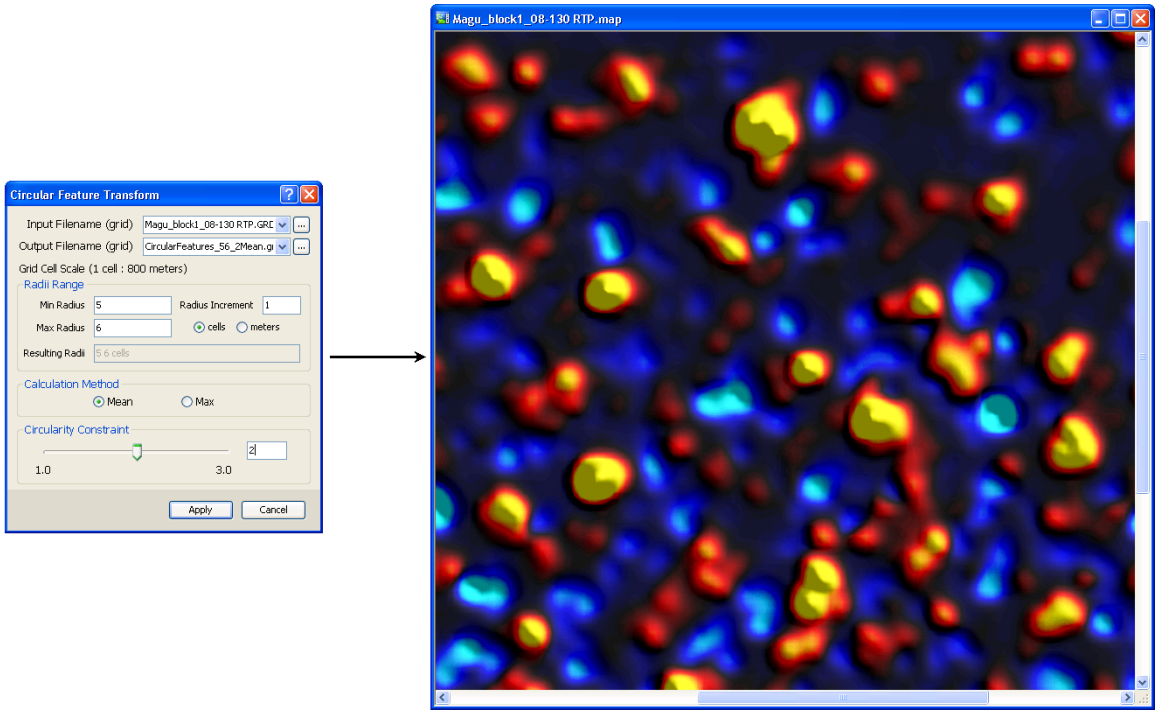
3. The *Radii Range* defines the size of the circular features to extract.

   Prior to running this tool, with the map open, use the ruler to determine the range of radii of the features under investigation.

   In the illustrated example, we confined the size between **5** and **6** grid cells. The default circularity constraint allows for some degree of compression.

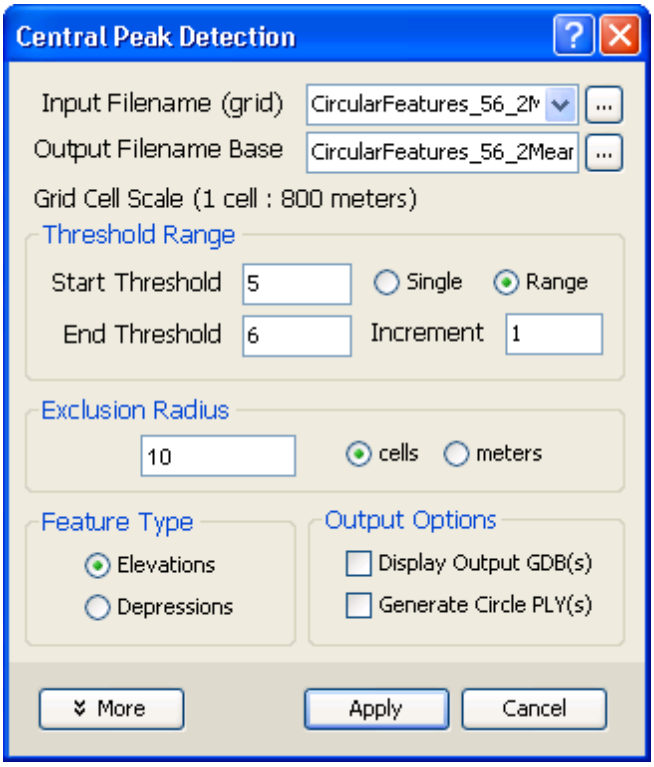
4. Select **Apply** and the features with relative circular symmetry within the specified radii will be calculated.

   In the illustration on the next page, the output grid depicting circular features has been displayed using the hot-cold colour table.



5. You can now detect the centre of these symmetrical feature. From the *CET Porphyry Analysis* menu, select **Central Peak Detection**.

   The *Central Peak Detection* dialog is displayed.



6. Set the *Exclusion Radius* to **4** and deselect in the *Output Options* the option that generates the

circles polygons (PLY(s)). The output database name will be set according to the input file name appended by the search radii as *CircularFeatures_xxx_CENTRES_t#.ply*. If the range includes a few radii, there will be a database generated for each.

- In this exercise, we generate 2 databases of radii 5 and 6. You can inspect both. We will proceed with the radius of **6**.

7. You can further decimate the picks by specifying the minimum distance between selected targets. Increase the *Exclusion Radius* to **10** Cells.
8. Click **Apply** to generate all the centres of the circular features in the output database(s).

To Plot the Detected Centres on the Original Mag Map

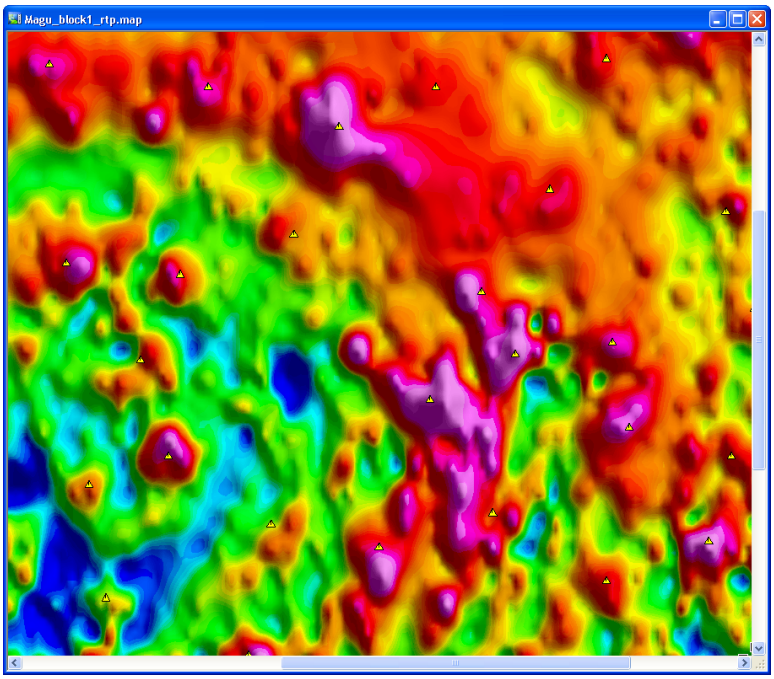
You will be plotting the detected centres on the map produced in the previous section. Ensure that the map is still open and proceed as follows.

1. From the *Map tools* menu, select **Symbols | Location Plot**.

   The *Symbol Plot* dialog is dispalyed.

2. Set the symbol to a triangle and accept the other defaults.
3. Click **OK** to see the symbols on the original map.

   These symbols are placed on the grid cells and should not be assumed as the definite centre of the causative structure. It is more appropriate to delineate the boundaries of the circular features with polygons.

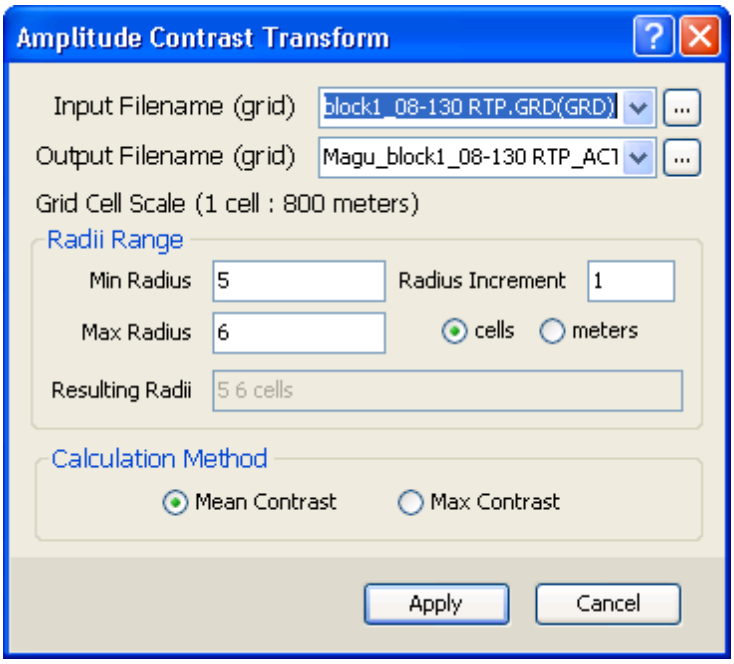


To Generate the Amplitude Contrast

This tool will generate an amplitude contrast grid along with the polygons delmiting the edge of the circular features.

1. From the *CET Porphyry Analysis* menu, select **Amplitude Contrast Transform**.

   The *Amplitude Contrast Transform* dialog is displayed.



2. As *Input Filename (grid)*, select the pole reduced grid. The output will be appropriately named by default.

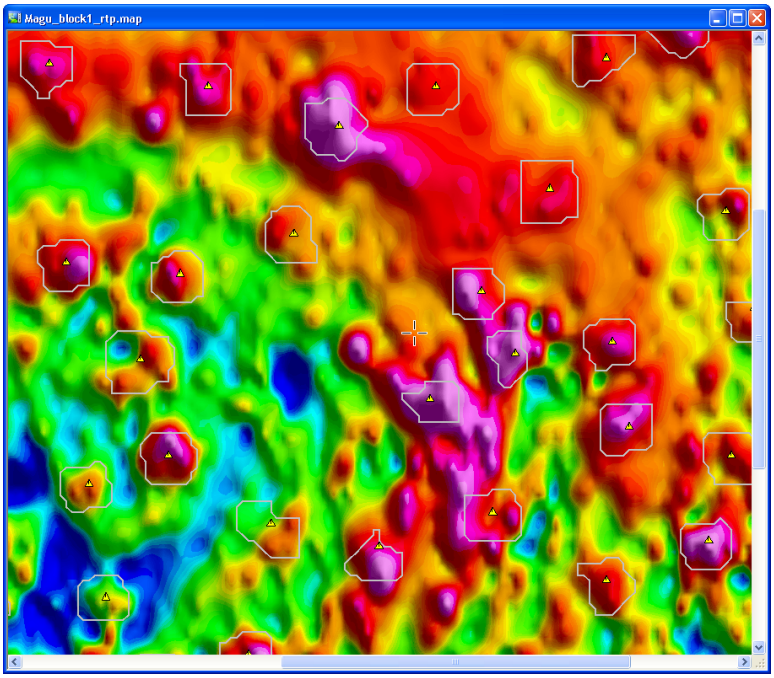
   The polygons will be calculated around each detected centre. The trace of the polygons will join the mid point between the minimum and maximum of the circular feature around each centre.

3. Plot the polygons on the original map. While this map is current, from the *Map tools* menu, select **Draw from PLY file**.

   The *Draw from a polygon file* dialog is displayed.

4. Select the polygon file named *CircularFeatures_xxx_BOUNDS_t#.ply* and accept the defaults.

   The polygons will be plotted.



The generated contrast amplitude grid is displayed.