

# CET Porphyry Detection

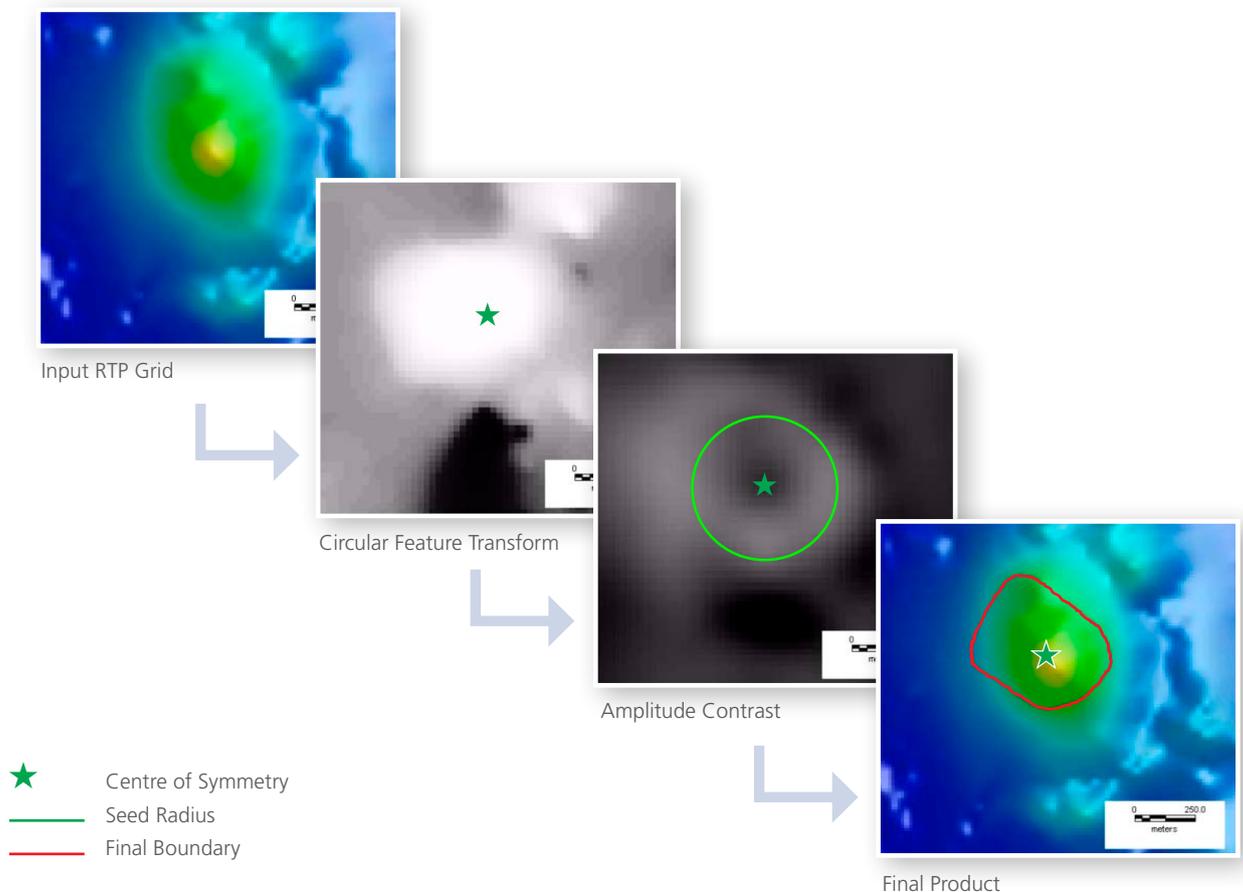
## montaj plus Extension

The new extension for CET Porphyry Detection was specifically designed to locate porphyry magnetic signatures. Hydrothermal alteration associated with porphyry-style mineralisation typically comprises concentric near-circular alteration zones surrounding a roughly circular central intrusion. The intrusion itself and the proximal alteration zone is usually associated with positive magnetic anomalies whilst the outer alteration zones are much less magnetic. Because the country rocks are usually magnetic, this pattern of alteration produces a central magnetic 'high' surrounded by an annular magnetic 'low'.

This detection method locates and outlines sub-circular zonation patterns in the magnetic data that are associated with the central intrusion and inner alteration zone of the porphyry system. Specifically, it uses a circular feature detection method to locate sub-circular anomalies. Next, their boundaries are traced using deformable splines that are drawn to the locations of

### Use the CET Porphyry Detection Extension to:

- Provide rapid, objective and consistent analysis of magnetic data to automatically locate porphyry magnetic signatures,
- Add a new tool to your workflow for interpreting magnetic data,
- Tune the results based on target shapes and sizes of the porphyry systems.

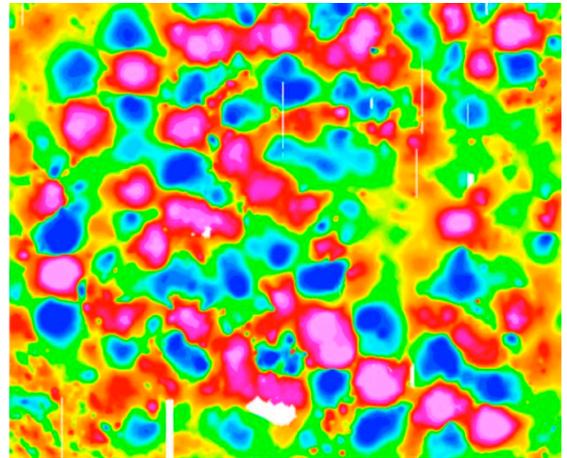


maximum contrast between the amplitudes of the central 'high' and surrounding area of lower magnetisation.

While it is most useful in detecting copper (Cu) and gold (Au) porphyries in covered or magnetic terrains, it is a generic tool that is suitable for other circular feature identification.

## Circular Feature Transform

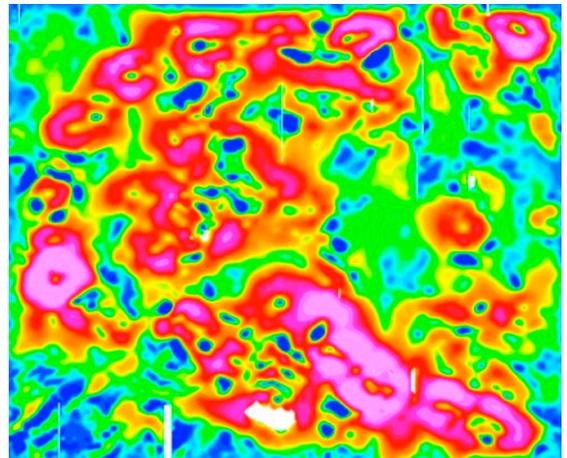
The circular feature detection process consists of two steps. The Circular Feature Transform (CFT) highlights the locations of circular features within the data. The Central Peak Detection algorithm is then used to find the centres of the circular features highlighted by the circular feature transform output.



Circular Feature Transform

## Amplitude Contrast Transform

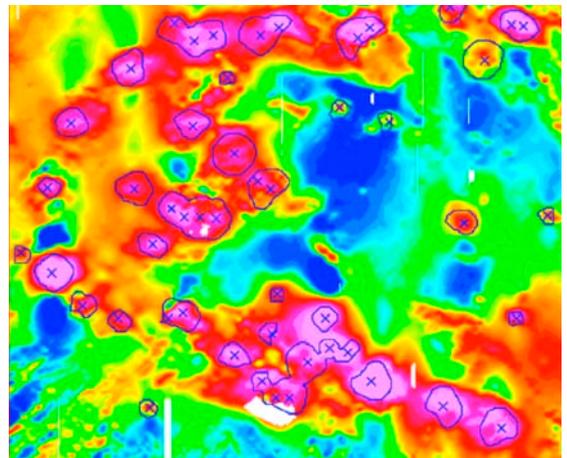
The Amplitude Contrast Transform (ACT) emphasises the boundaries of circular features. Whilst the CFT is specific in detecting the centres of circular features, the ACT is used for locating the rim of the circular feature. In effect, the boundaries of circular features are revealed as 'halos' in the ACT output.



Amplitude Contrast Transform

## Boundary Tracing

The Boundary Tracing tool is useful for outlining detected porphyry-like features. This approach utilises output from both the Central Peak Detection and Amplitude Contrast Transform. It uses deformable splines to converge to the feature boundaries highlighted by the ACT output. The output provides indicative geometry of the feature boundaries.



Boundary Tracing

### Key Functionality

The porphyry detection process involves a three stage sequential approach.

- Circular feature detection
- Boundary enhancement
- Boundary Tracing

\*This new extension was developed by innovative collaborative research between Barrick Gold who initiated and funded the original research and the Centre for Exploration Targeting (CET) based at the University of Western Australia.