

GEOPHYSICS IN GOLD EXPLORATION

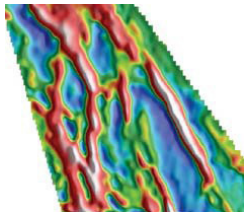
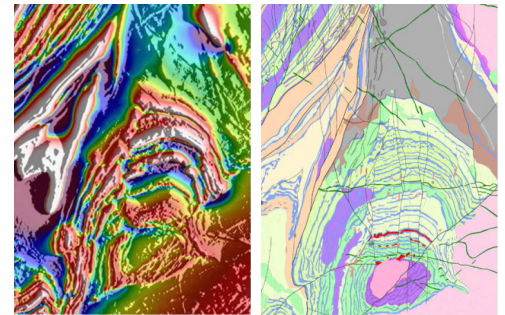
SGC have extensive experience working throughout Australia, Asia, Africa, the Americas, Europe, the Middle East and Russia. We are specialists in geophysical exploration for many commodities and mineralisation styles.

SGC can guide you in all aspects of geophysical data acquisition, interpretation and targeting.

GOLD EXPLORATION TOOLBOX

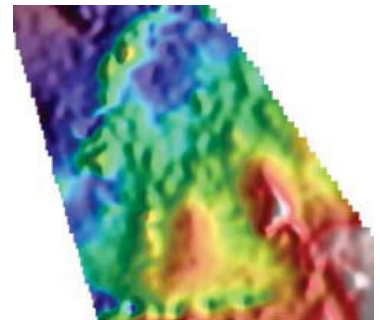
POTENTIAL FIELD METHODS – MAGNETICS, GRAVITY

Map the rock response to magnetic minerals and varying densities to produce litho-structural geological maps and identify anomalous features for targets. Can be performed in any environment, widely used for orogenic and porphyry style Au deposits. Recent developments in 3D inversion have led to improved integration with geological models in a variety of gold deposit settings and mineralisation styles.



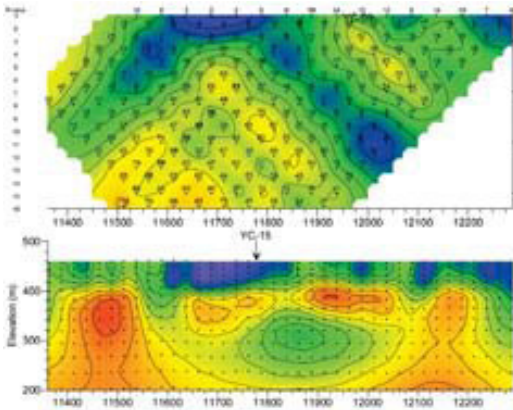
ELECTROMAGNETIC (EM) METHODS

Identify, map and model conductive (gold related) massive sulfides, including those found in BIF related deposits and conductive sediments related to shear zones. Surveys can be airborne, ground or down-hole.



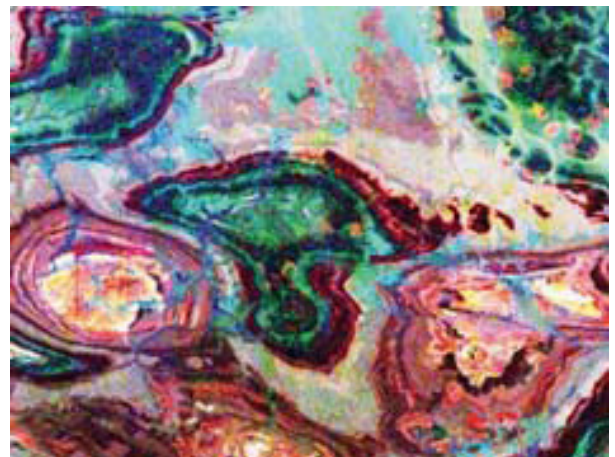
SUB-AUDIO MAGNETICS (SAM)

Simultaneous high spatial resolution mapping of magnetic and electrical characteristics of rock including mineralization and/or related geological features such as shear zones, disseminated and massive sulfides.



ELECTRICAL METHODS – RESISTIVITY, INDUCED POLARISATION

Induced Polarisation method capable of direct detection of disseminated sulfides through chargeability data. Resistivity data provides excellent mapping of lithology and alteration, and can directly detect massive sulfides. Widely used in exploration for most gold deposit types.



OTHER METHODS - RADIOMETRICS, SEISMIC, REMOTE SENSING

Identify lithological and alteration changes in outcropping rock through the distributions of radioactive Potassium, Thorium and Uranium, and directly detect outcropping Uranium deposits.

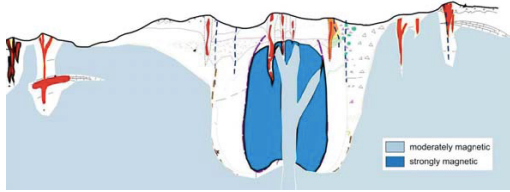
Remote sensing (ASTER, Landsat 8, SRTM) assists interpretation of regolith and outcropping rocks. Seismic data assists in identifying structures at depth in sediments.



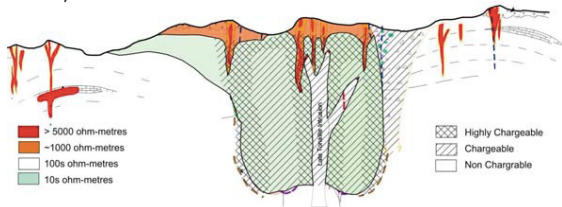
GOLD EXPLORATION - EXAMPLES

PORPHYRY AU-CU-MO

Porphyry deposit alteration and mineralisation can be readily mapped by geophysics.

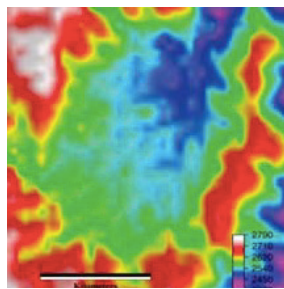


Genetic model of a porphyry, showing zones detectable by the magnetic method (top) and zones detectable by induced polarisation (chargeability/resistivity - bottom).

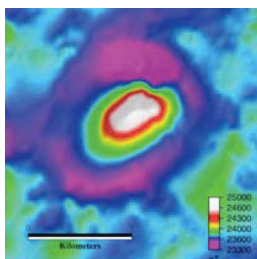


Alumbraera, located in north-west Argentina, is a large, low-cost gold mine that commenced production in 1998. It has a classic geophysical signature associated with mineralization (Proffett, 1996 and Hoschke, 2015).

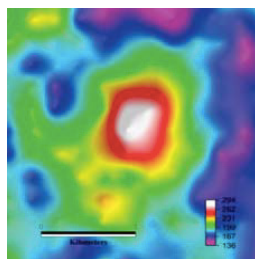
Alteration Halo



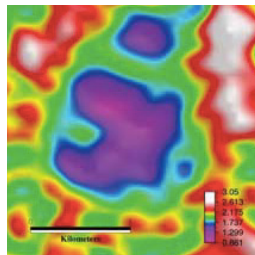
Topography



Magnetics - highly magnetic (magnetite-rich) core associated with mineralisation, coupled with a magnetically quiet (magnetite-destructive) alteration halo. (Above)



Radiometrics (K) - Radiometric response due to potassic alteration



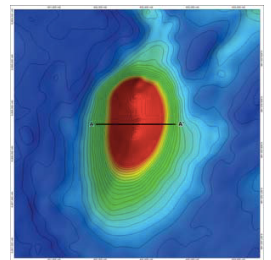
Resistivity - Conductive clay alteration and sulphide veins. A resistive silica cap can sometimes be detected.

OROGENIC GOLD

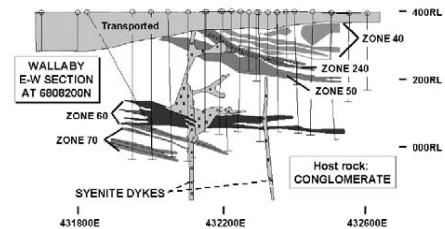
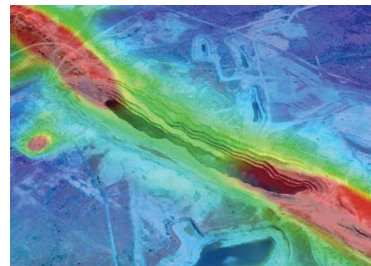


An array of geophysical methods can map structures and lithologies in orogenic gold environments. Airborne magnetic data is cheap to acquire and delineates folds, faults and major shear zones, under cover, extremely well. Magnetic data also enables discrimination of different rock types, especially BIFs which produce a large magnetic response.

The Mount Morgans BIF-Hosted gold deposit. Magnetic image overlain on Google Earth shows how the pit (and mineralisation) coincides with a magnetic low, due to magnetite replacement with pyrite.

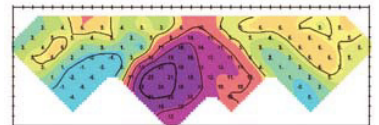


Wallaby deposit magnetic image. A "bullseye" magnetic anomaly is produced by magnetite accumulation.

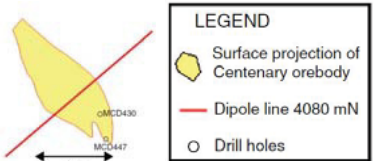
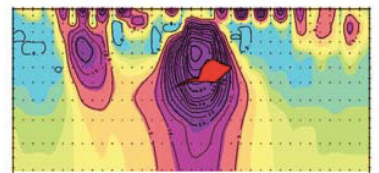


Wallaby E-W section. Stacked gold lodes are hosted by an actinolite-magnetite alteration pip (Coggon 2003)

Centenary deposit - Mineralisation is characterised by pyrite replacement of magnetite, mapped by an IP response. (Pittard & Bourne 2007)



Complementary methods include radiometric, SAM and gravity surveys as well as Landsat data. Electromagnetic and IP methods can be used to find base metals and pyrite that may be associated with gold, within greenstone belts.



FOR FURTHER INFORMATION PLEASE VISIT OUR WEBSITE

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