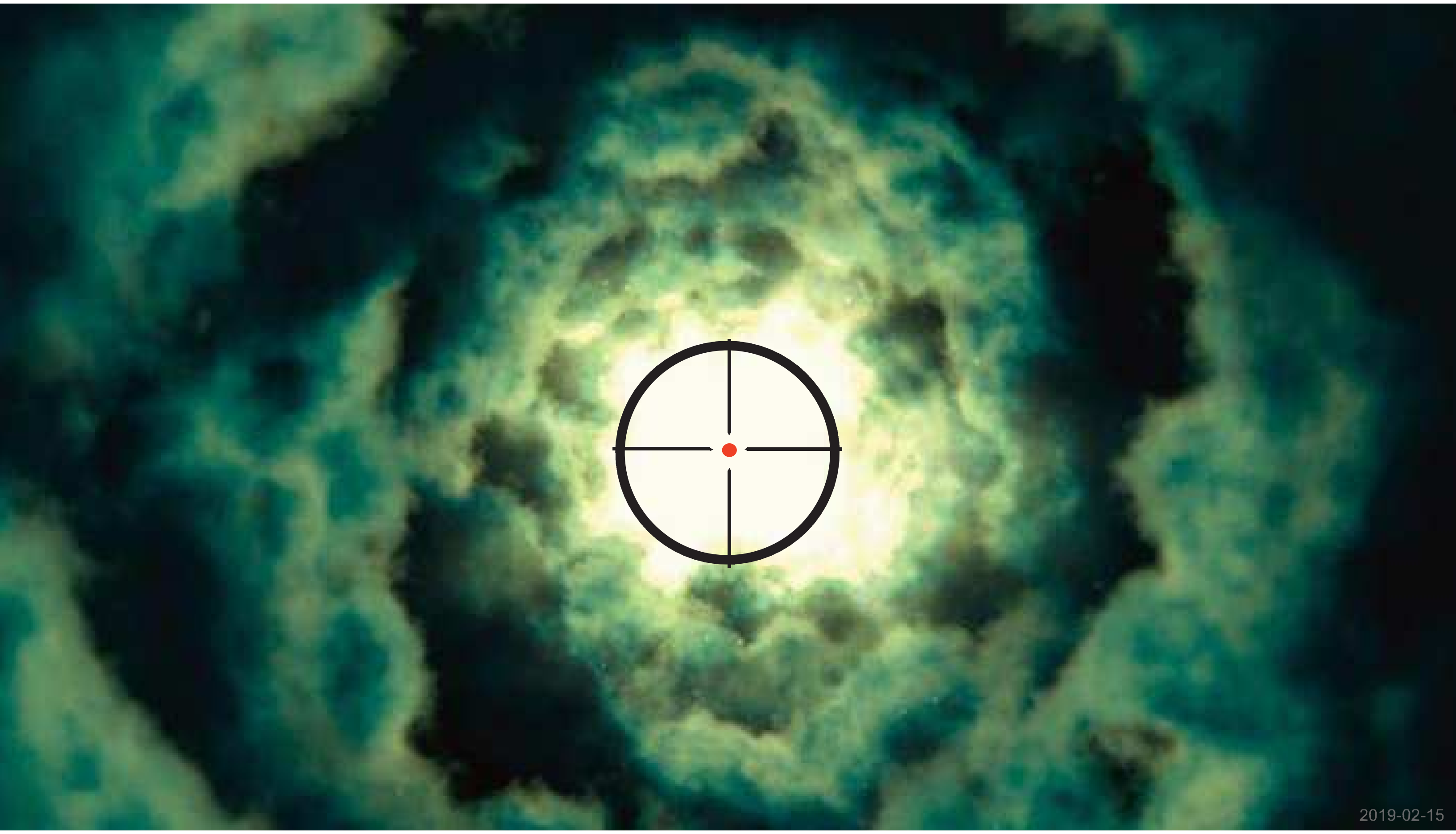
Spatiotemporal Geochemical Hydrocarbons (SGH)



SCOPE YOUR CLAIM

Spatiotemporal Geochemical Hydrocarbons (SGH)

Our Spatiotemporal Geochemical Hydrocarbon (SGH) analysis is a high performance deep penetrating geochemistry which has successfully shown the presence of deeply buried mineral or petroleum deposits. In a Canadian Mineral Research Organization (CAMIRO) project initiated in 1997, nine of ten mineral deposits were successfully detected at study sites that were specifically chosen where other geochemical methods were previously unsuccessful. These study sites included Gold, VMS, Nickel, Copper, Kimberlite, Uranium, Lithium Pegmatites, IOCG, Silver, SEDEX, Tungsten, Platinum, Molybdenum, and Polymetallic-type dposits, Wet gas plays, Oil plays and Coal. In the follow-up CAMIRO Project 01E02, Kimberlites, IOCG, Sedex, more magmatic Cu, Ni and VMS deposit types were successful at identifying the deposit and provided a unique fingerprint. This level of high performance and proven success has become the norm with SGH.

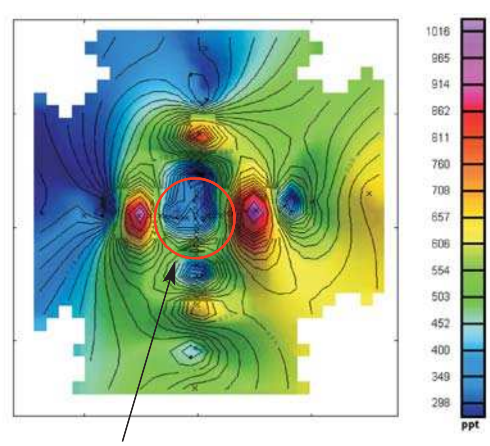
The SGH technique involves collection of soil samples in the field and then desorbing the weakly bound heavy hydrocarbons in the C5-C17 carbon series range (pentane through to heptadecane) at the laboratory. Using a new technology developed by Actlabs, the desorbed organic compounds are collected and introduced into a Gas Chromatograph/ Mass Spectrometer (GC/MS) where over 160 of these heavier hydrocarbon compounds are measured. Heavy hydrocarbons are used instead of light hydrocarbons (C1-C4 or methane through to butane) as they are much less affected by decaying biogenic material and diurnal variability. SGH is also more robust in terms of sample collection, shipping and storage conditions. Detection limits at low ppt (pg/g) levels are possible by this technology which allows background levels to be readily determined.

Actlabs' research and development into the applicability of SGH for exploration has resulted in the availability of a cost-effective method which can be used in tandem with geophysics to improve your success rate.

Sampling and Analysis

- SGH is capable of analyzing soil, rock and core (after milling), peat, vegetation, fully submerged lake sediments and even snow from a very wide variety of climates. Only snow surveys require special sampling instructions.
- An SGH survey is unique in geochemistry as it can use a mixture of different sample types in the same survey. There is no data leveling required for samples taken in swampy conditions (i.e. Humus samples) to samples of till or soil from drier areas. Contact Actlabs for a more complete explanation.
- Only one trip to the field is necessary to locate and collect the samples. A "fist" size sample is all that is needed for analysis. Samples may be collected in canvas, Kraft, or Ziploc bags. Wet samples can be drip-dried in the field. No preservation is needed for shipping.
- Samples are air dried at < 40°C and sieved to -60 mesh in the laboratory or on-site.
- In the laboratory, a sub-sample is accurately weighed and an extraction is done analogous to a weak leach.
- The extracted samples are analyzed by a High Resolution Gas Chromatography/Mass Spectrometer (HRGC/MS).
- This HRGC/MS method is highly specific and highly sensitive as each compound has a "Reporting Limit" of 1 part-per-trillion (ppt).
- Each sample is analyzed for 162 target hydrocarbons that have been specifically picked to define a variety of buried mineral or petroleum signatures. This selection of specific hydrocarbon compounds also eliminates interferences from sampling, shipping, handling and from general cultural activities.

Soil samples are preferably taken in a grid. One or two line transects provide much less information. Sample locations must be provided as UTM's or relative coordinates with the submission of samples. Samples should be taken to a distance at least the full width of the predicted target on either side, e.g. a 200 m diameter target would have samples taken at least 200 m further on each side of the target. For smaller targets, such as for Kimberlite or Uranium pipes, two intersecting transects in a cross formation might be used which provides for a significantly better interpretation than from a single transect but has less confidence than from using a grid. The minimum sample spacing for SGH is 20 or 25 m to a maximum of 1,500 metres depending on the type of target. To determine the correct spacing please contact our laboratory.

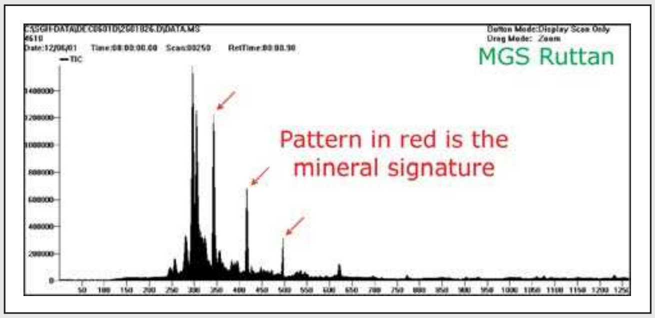


Canadian Diamondiferous Kimberlite Pipe

SGH is a dual purpose method that can locate a buried target as well as identify the type of target present. A pattern recognition approach to the data has resulted in defining specific SGH signatures for various types of targets. The SGH signatures in surveys over Gold, VMS, Nickel, Copper, Kimberlite, Uranium, Lithium Pegmatites, IOCG, Silver, SEDEX, Tungsten, Platinum, Molybdenum, and Polymetallic type deposits, Wet gas plays, Oil plays and Coal have been extensively studied.

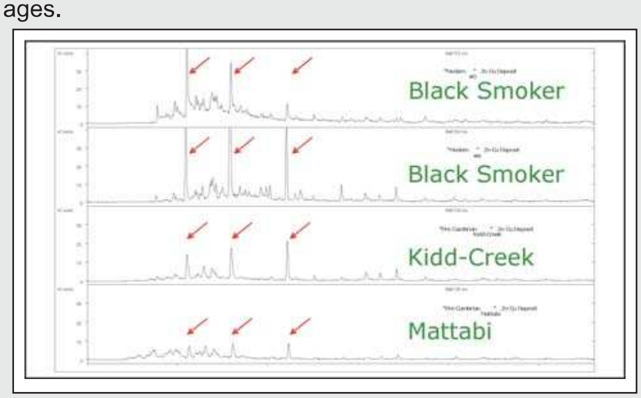
What does an SGH signature look like?

The following example illustrates the connection between the SGH signature in ore and the comparable signature one might observe from surficial soils at surface. This example does not illustrate the interpretation procedure used with SGH. This SGH ***soil*** sample signature contains a "visible" portion of the buried VMS target signature found in the ore.



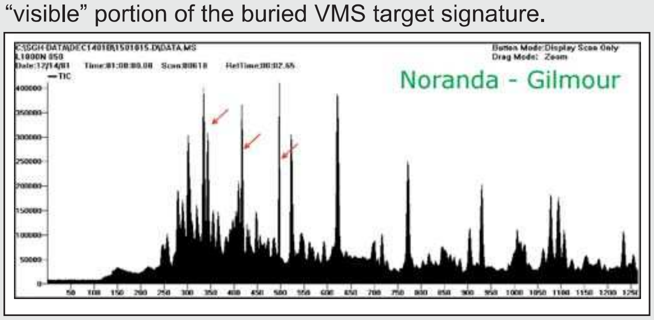
Consistent SGH target signatures.

Similar signatures are in the ***ore*** as in these VMS rock speciments samples from different locations and of various ages.



SGH target, different location?

Another SGH ***soil*** sample signature that contains the same "visible" portion of the buried VMS target signature.



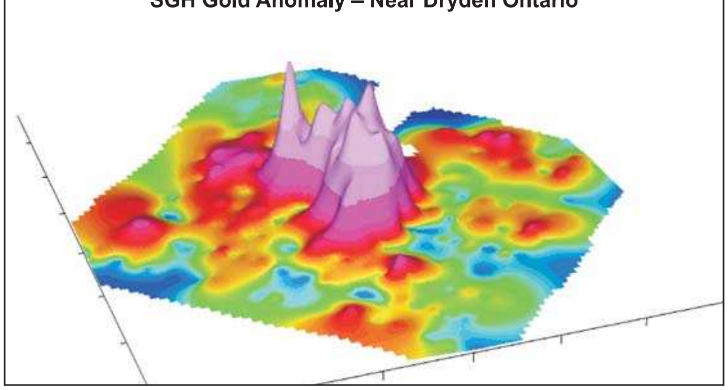
- SGH - A geochemical analysis researched and developed since 1996. Backed with 35+ years experience in HRGC/MS related research and development.
- Organic Hydrocabons are absorbed onto near surface material (i.e. soil, till, humus, sand, etc.) which act as a long-term collector of the hydrocarbon flux.
- Only one trip to the field is necessary.
- The laboratory procedure detects 162 specific organic compounds in the C5 - C17 carbon series range. This highly sensitive and specific Nanotechnology uses a Reporting Limit of 1 part-per-trillion (ppt, nanograms/kilogram).

e.g. C5 = Pentane - a compound made up of a straight chain of 5 carbons

- SGH is made up of 19 chemical classes of hydrocarbons. Specific classes are pathfinders for specific types of mineralization. Unique combinations of these classes provide specific signatures of mineralization.
- SGH are not gaseous compounds at room temperature but may migrate to the surface by various processes and may be in a vapour form at depth.
- SGH uses a weak leach to extract only the surficial bound hydrocarbon compounds from the sample particulate that are mobile and have moved upward from depth. These hydrocarbons are the decomposition products of bacteria and microbes that have been leaching mineralization at depth to support their metabolism.
- Compounds in the C5 - C17 carbon range are less affected by weathering by bacterial and UV degradation, or by seasonal water washing. It is thus a significant improvement over early methods of analyzing gaseous compounds from soil (soil gas) i.e. CO_2, O_2, and C1 through C4 compounds, etc.

SGH is a ***DUAL purpose tool*** used to vector to the location of a target through the use of Geochromatography and used to confirm the identity of a target through the specific mix of SGH classes found.

SGH Gold Anomaly – Near Dryden Ontario



Gold - Diana (WMC)

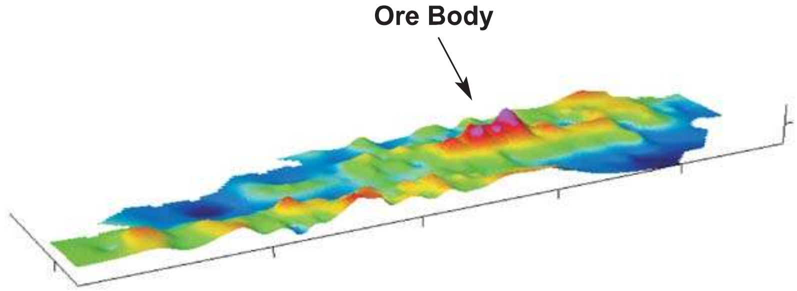
Location: 30 km southeast of Kambalda, Australia

Climate: Hyperarid environment

Mineralization: Paleochannel gold mineralization (1 Mt @ 2.5 g/t); Occurs almost exclusively in a gabbro: Minor mineralization in volcanic sediments

Deposit: Consists of a series of stacked flat-lying structures host to the mineralization ~ 25 m to the top of the first structure

Cover: Consolidated dune sands with a poor developed B-horizon

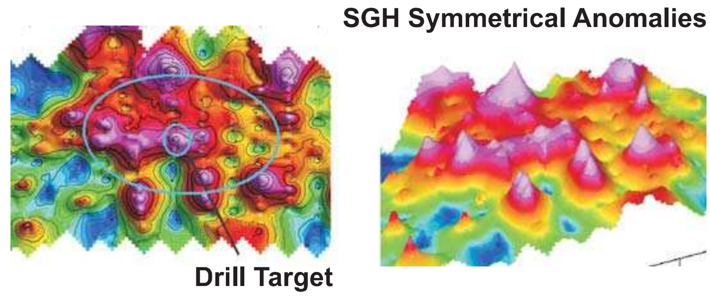


Survey Design: 310 samples - B-horizon soils 25 m over mineralization 50 m over background; 100 m between sample lines. Note: regular spacing is the preferred approach.

Gold - Rous Lake (Entourage Metals Ltd.)

SGH Snow Survey for Gold in the Hemlo District

Intersection of 2.5 g/t of gold-in-bedrock at a drill depth of 650 metres confirmed the central SGH signal in this symmetrical nested segmented halo anomaly. The SGH method has a high level of confidence even in areas of deep cover where conventional soil geochemistry is ineffectual. At Rous Lake, over 200 metres of overburden including raised beach sands covers most of the property.



Gold - Mali

Grass Roots Discovery – SGH Gold Signature – Mali

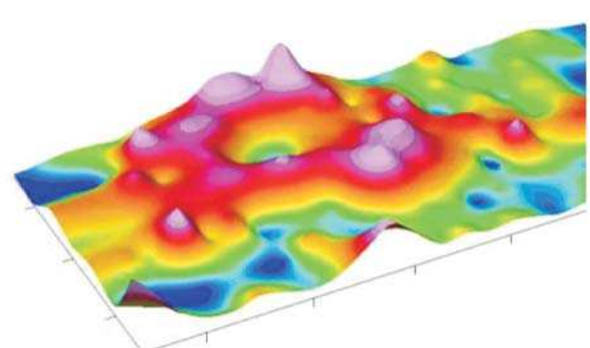
A lengthy pitting operation over a ppb concentration Gold in soil anomaly could not discover a vector to source mineralization.

A claim-wide 6 x 3 km grid of soil samples analyzed for SGH discovered this outstanding halo anomaly 10's of metres away and upslope. Pitting operations here encountered a basalt cap.

Drilling through the basalt cap intersected Gold mineralization. This location is now one of the new mines in Mali.

SGH thus did not respond to a transported Gold anomaly. SGH was able to find the source of the Gold mineralization.

Success – drilled and mine developed

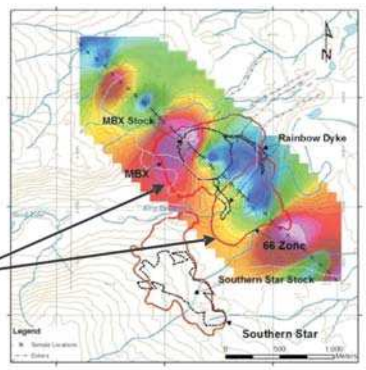


Copper and Gold - Mt. Milligan

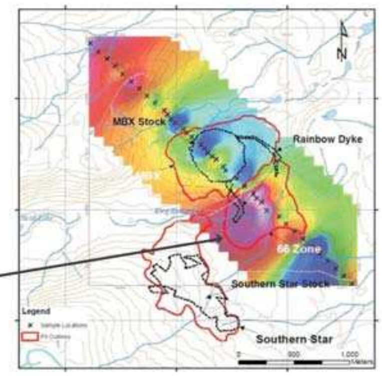
Geoscience BC Report 2010-8 "Assessment of Soil Geochemical Methods for Detecting Copper-Gold Porphyry Mineralization Through Quaternary Glaciofluvial Sediments at the MBX and 66 Zones, Mt. Milligan, North-Central British Columbia."

SGH and the analysis of Calcium were the only methods that worked at Mt. Milligan in this research study. SGH was the only geochemistry able to distinguish the Gold zone within the larger Copper zone.

This is one SGH Pathfinder Class map related to Copper. Multiple SGH classes agree with the observation of a rabbit-ear dispersion anomaly over these two high grade copper ore zones.



This is one SGH Pathfinder Class map related to Gold. Multiple SGH Gold Signature classes agree with the observation of an apical anomaly directly over the high gold content 66 Zone.

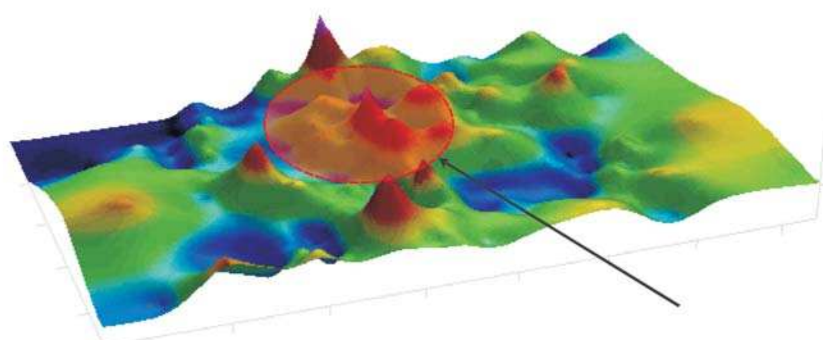


Ni-Cu - Montcalm (Outokumpu Mines)

Location: Montcalm Township, Ontario, Canada

Commodity: Nickel-Copper, 7 Mt of 1.6% Ni and 0.7% Cu hosted in norite and gabbroic units.

Cover and Thickness: An average of 30 m of transported overburden, consisting of peat, clay, clay-silt-sand with basal sands and gravel. Thickness of cover rock - approximately 100 m in this cool boreal climate. SGH provided a symmetrical nested-segmented-halo response with an associated high level of confidence.



Ore Body Zone

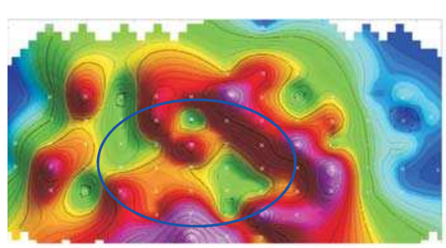
Cu-Pb-Zn-VMS

SGH Confidence Rating of 5.0 of 6.0

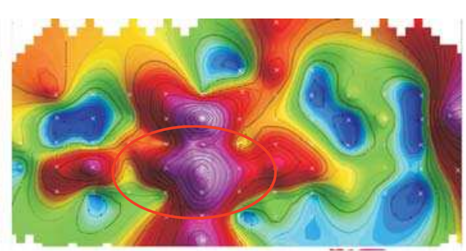
Irish Style Carbonate Hosted VMS with segmented halo anomaly delineating extent of VMS deposit surrounding centralized apical anomaly of mineralization.

Strong structural control resulted in a brecciated pipe like formation.

80 samples taken with a spacing of 100 metres x 150 metres.



Nested-segmented-halo massive sulphide zone



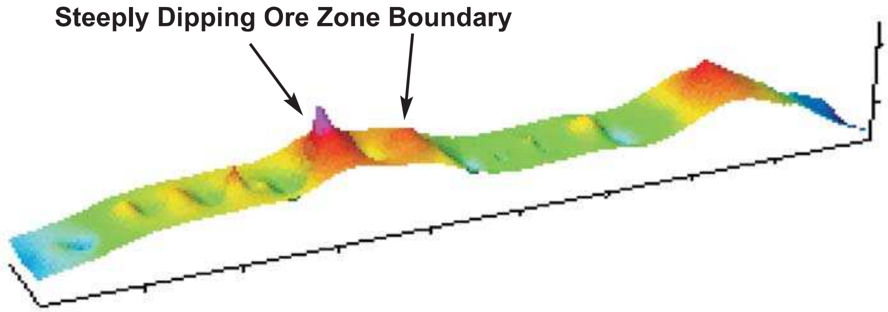
Central SGH anomaly for Pb mineralization

Copper - Poston Butte (BHP)

Location: 65 km southeast of Phoenix, Arizona, USA

Commodity: 360 Mt @ 0.34% Cu

Cover and Thickness: Mineralization is covered by ~140’ to >1,000’ of mineralized conglomerate and weakly mineralized colluviums shed from nearby outcropping porphyry copper deposits in this semi-arid climate. SGH delineated the copper ore zone.



Copper - Namibia, Africa

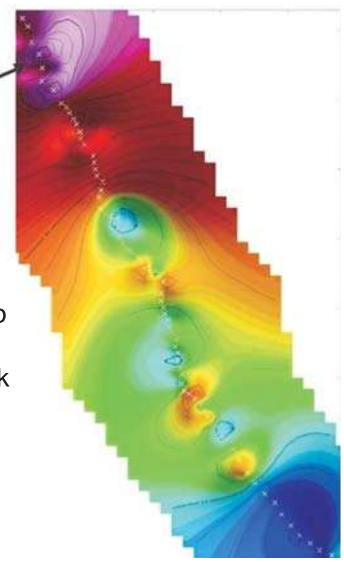
Redox zone with SGH-Copper Signature

Apical Anomaly

SGH Signature rating relative to “Copper Target” = 5.5 of 6.0 positively identifying and locating this ore zone.

Anolalous zone but does not have SGH-Copper Signature

SGH Signature rating relative to “Copper Target” = 1.5 of 6.0 SGH correctly indicated the lack of copper mineralization in this survey.

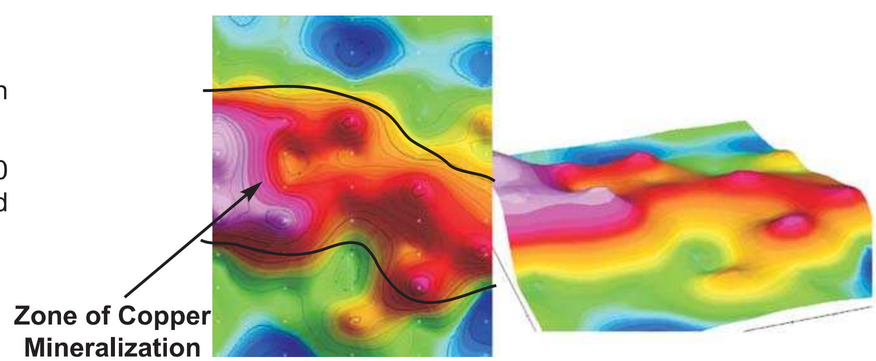


Copper - Northern Saskatchewan

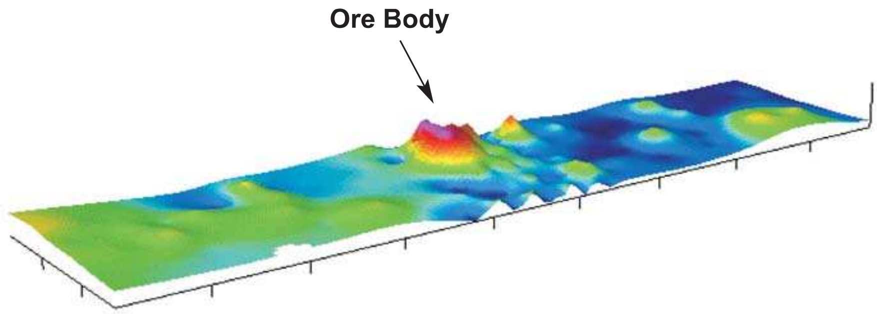
SGH Confidence Rating of 5.5 of 6.0

Sedimentary hosted Copper deposit in Northern Saskatchewan.

55 samples taken in swamp with a spacing of 100 metres x 50 metres. SGH successfully indicated the mineralized copper trend in this survey grid.



Ni-Cu - Birchtree (INCO)



Location: Thompson Nickel Belt, Manitoba

Climate: Subarctic with scattered permafrost

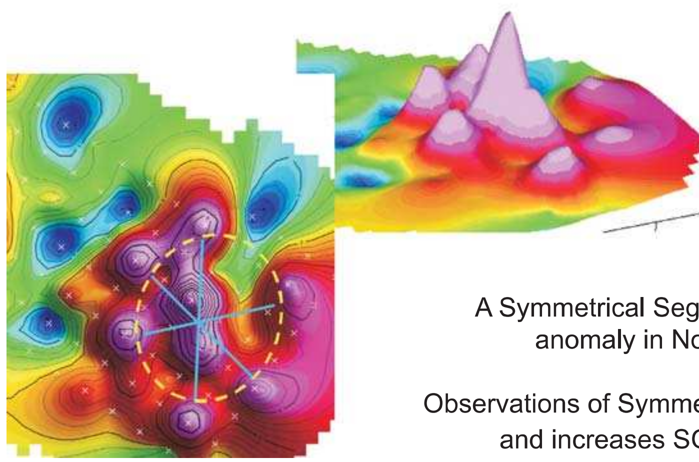
Mineralization: 48.5 Mt of 2.0% Ni, 0.13% Cu and 0.005% Co Pyrrhotite-pentlandite lenses (10-20 m of 2% Ni) in a steeply west-ward dipping, blind (200 m below bedrock/overburden contact) peridotite boudin bounded by Archean gneisses to the west and Proterozoic metasediments on the east. Ore mineral assemblage is pentlandite, pyrrhotite, pyrite and chalcopyrite. Host rocks are a serpentinized peridotite or pelitic schists.

Cover: ~ 25 m glaciolacustrine clay silt, ~ 50 m of basal till with poor water drainage , ~ 200 m below bedrock/overburden

Survey Design: 190 samples, B-horizon soils 50 m over background, 25 m approaching mineralization, 12.5 m over and adjacent to mineralization

Nickel target - Northern Ontario

SGH Pathfinder Class Map associated with Nickel targets. Observations of Symmetry improves confidence and increases SGH Rating Scores. This SGH anomaly lead to a successful drill intersection.



A Symmetrical Segmented-nested-halo anomaly in Northern Ontario.

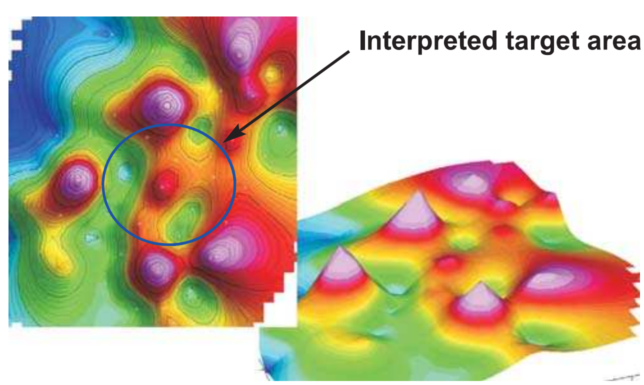
Observations of Symmetry improves confidence and increases SGH Rating Scores.

Ni-VHMS - Northern Ontario

Highest SGH Confidence Rating

Central Nickel "nested" anomaly surrounded by symmetrical segmented halo anomaly delineating the extent of the VHMS deposit.

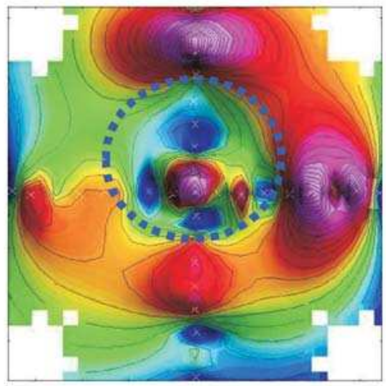
Total of 53 samples with spacing of 100 x 100 metres in Northern Ontario. Successful drill intersection at SGH anomaly.

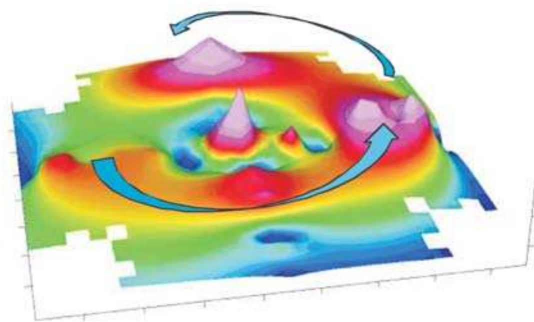


Uranium - Northern Arizona

Breccia Pipe - Northern Arizona

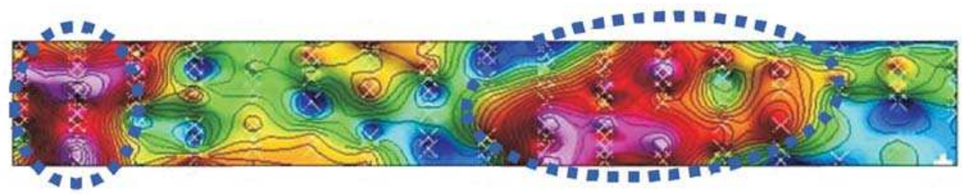
SGH yields high contrast symmetrical anomalies. A well developed Redox cell is illustrated as a "nested-halo anomaly". This SGH anomaly illustrates agreement with the geophysics of the electro-chemical cell model.

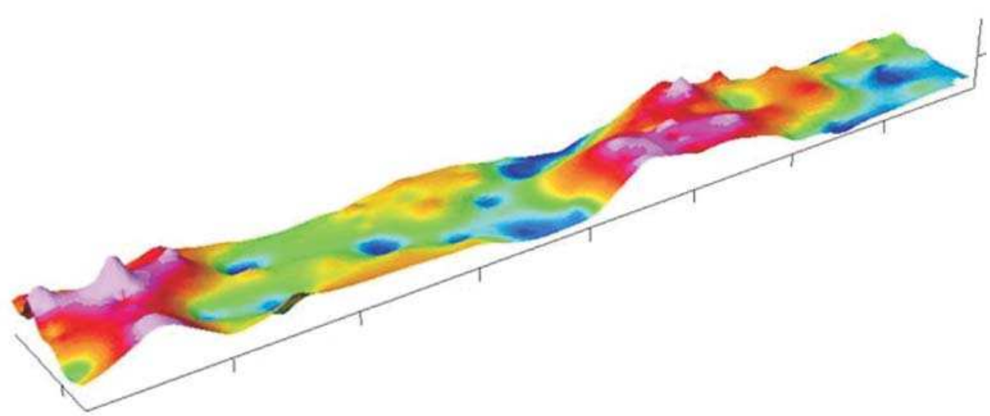




Uranium - Athabasca

SGH yields clear, easily interpreted anomalies. SGH located potential new mineralization at the west end of this survey that contained the known main resource

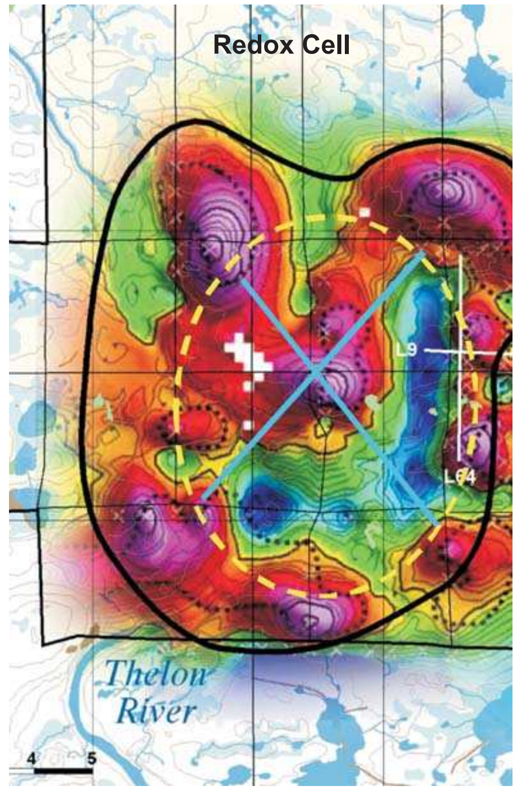




Uranium - Screech Lake Project (Ur Energy)

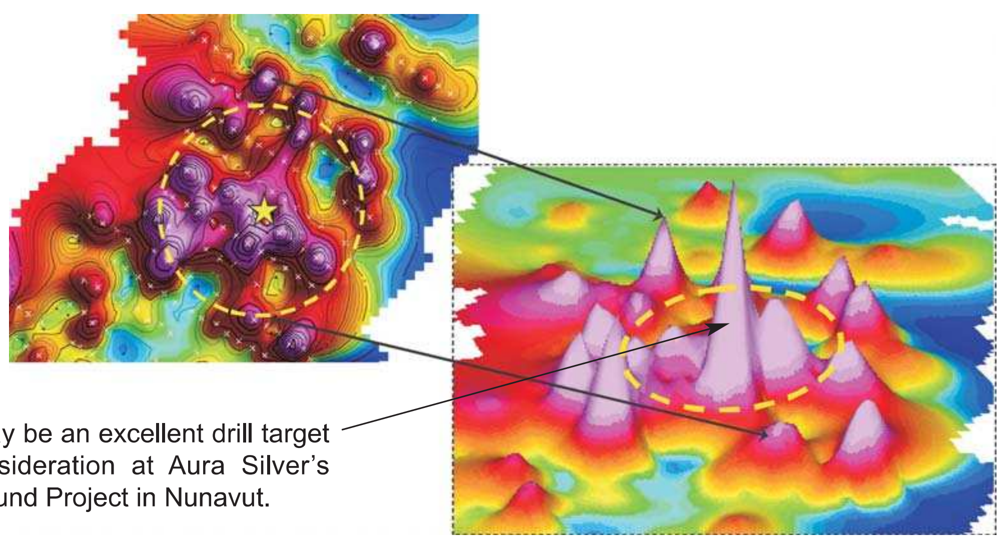
Ur Energy's Screech Lake Project, Thelon Basin, NWT, Canada

SGH depicts a nested-segmented halo as the Redox Cell. This SGH group of hydrocarbons are part of the SGH signature of hydrocarbons that has been associated with Uranium targets. The observation of this highly symmetrical anomaly adds confidence to the SGH interpretation.



Organo-Sulphur Geochemistry - Silver

The 3D-view of this OSG Class map related to Silver illustrates the excellent definition of the central location of the Redox zone. OSG has proven to be outstanding for Silver exploration.



This may be an excellent drill target for consideration at Aura Silver's Greyhound Project in Nunavut.

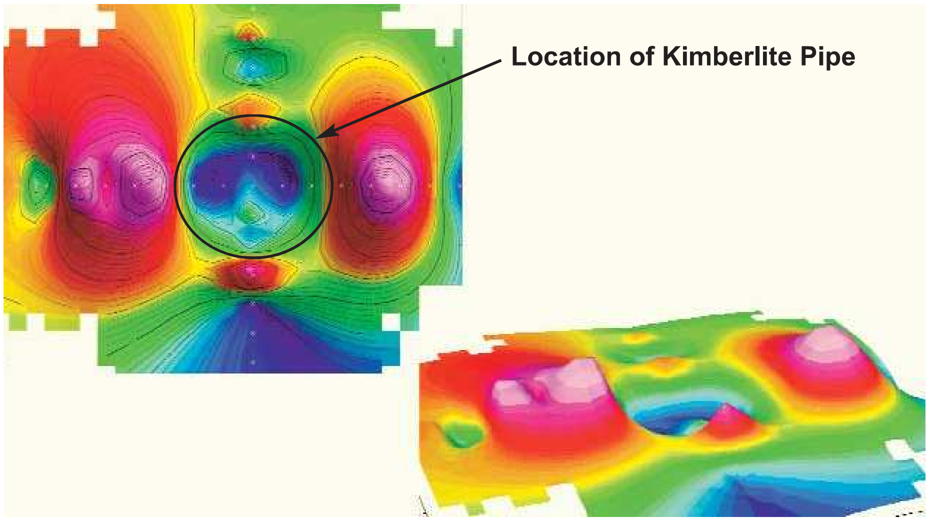
Kimberlite - Northern Ontario

Highest SGH Confidence Rating

Beneath 25 metres of James Bay overburden in Northern Ontario.

SGH matches the location of Mag high results.

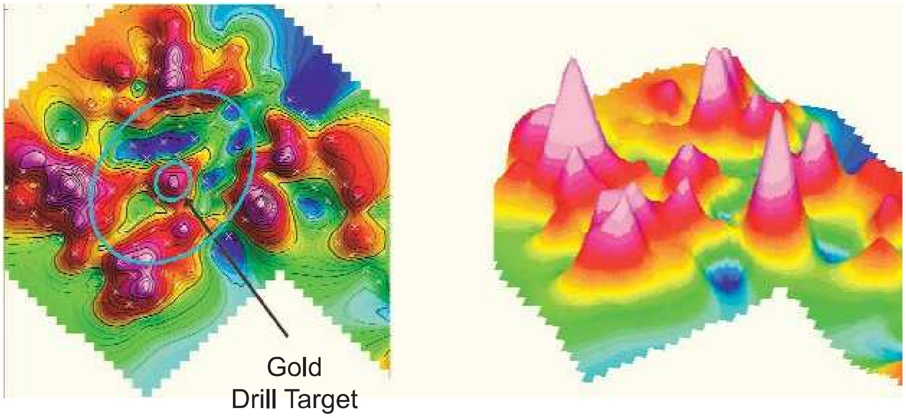
Spacing is 25 metres.



Snow Sampling Case Study

SGH Snow Survey for Gold in the Timmins Camp

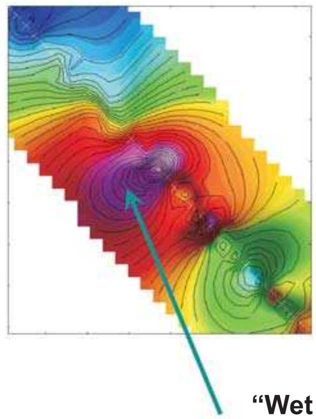
This snow survey in the Timmins Gold camp illustrates the outstanding symmetry of the SGH anomalies. From a 3D-SGH interpretation the observation of symmetry significantly increases the confidence of the results and the interpretation.



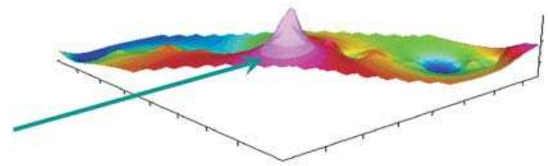
Templates have been developed that describe the SGH signatures for Gold, VMS, Nickel, Copper, Kimberlite, Uranium, Lithium Pegmatites, IOCG, Silver, SEDEX, Tungsten, Platinum, Molybdenum, and Polymetallic type deposits, Wet gas plays, Oil plays and Coal.

Petroleum

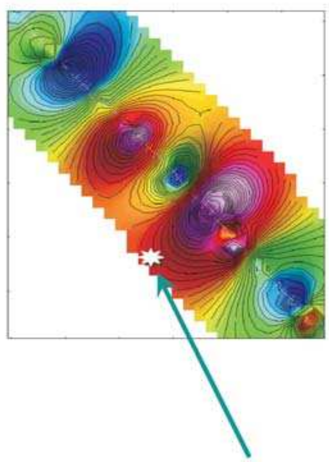
SGH can be used for Petroleum exploration. Although the SGH signature is different than for mineral targets, the geochromatography is the same. This transect of soil samples, taken in February and March of 2005, was taken along the road right-of-way. There was no interference to the SGH data from activity on this paved road.



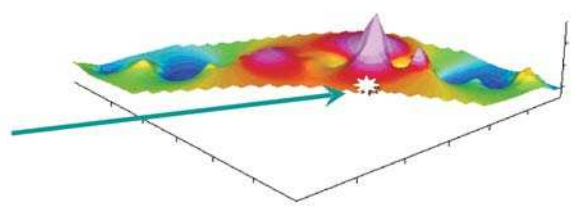
Gas well intersected two zones at 410 m and 535 m that reached down into the Grimsby formation, Ontario.



A second case study again showed excellent agreement with the location of a nearby gas well. Samples were taken from the road right-of-way for this client by Actlabs' personnel. The SGH signature contained compounds that were consistent with the condensate of this "wet gas" play.

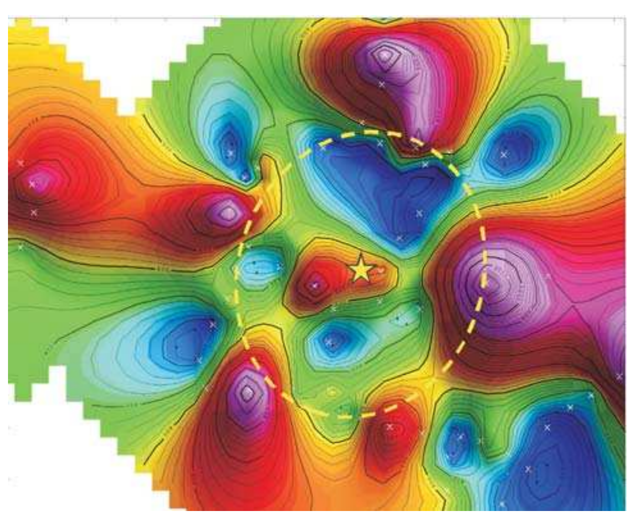


SGH anomaly was directly adjacent to another gas producing well from this roadside sampling conducted in the same township.



SGH Pathfinder Class Map for Petroleum – a Symmetrical Segmented-nested-halo anomaly

SGH located a new Petroleum play at a depth of 4,725 metres (15,500 feet) in Florida.



Benefits of Spatiotemporal Geochemical Hydrocarbons (SGH)

This geochemistry is rugged to sampling procedures
This geochemistry is rugged to geographical features
This geochemistry is rugged to cultural activity
The SGH geochromatography “vectors” to the deposit
SGH Pathfinder Classes “identify” the type of deposit
Has been used to further define the latest Redox/electrochemical cell theory
Has lead to the creation of a new Organo-Sulphide Geochemistry (OSG)
Compatible with previously collected samples
Can delineate mineral extensions for known deposits
Use snow surveys in areas of very difficult terrain
Effective for a wide range of lithologies & geographic regions
Successful in grassroots projects
Can approximate depth in some surveys
Succeeds in areas were other geochemistry's have been ineffective
Regional surveys possible
Zero environmental footprint

This SGH Geochemisty has a success rate of over 90%.

For additional information or a custom quotation on your project, contact us at:

SGH@actlabs.com
Phone: 1.905.648.9611
Toll Free: 1.888.228.5227 (ACTLABS)
Fax: 1.905.648.9613

Activation Laboratories Ltd. (Actlabs)
41 Bittern Street
Ancaster, Ontario   CANADA
L9G 4V5