Organic compounds in soil as pathfinders for porphyry and epithermal exploration through transported cover.

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Organic compounds in soil are a promising and under-researched tool for non-petroleum based mineral exploration. Traditionally, commodity and pathfinder elements in soil were used with geophysical and geological data to improve drilling success. However, in areas with glacially derived sediments, traditional geochemical signals are displaced and detached by clastic transport.

Hydrocarbon responses were tested over epithermal Au-Ag-Cu and porphyry Cu-Mo deposits in British Columbia. A commercially viable, statistically validated analytical method was developed to fulfil the major objective of this research: to identify the physical, chemical, and biological links between hydrocarbon abundances on the surface with the buried footprints of economic mineralization.

In the newly developed methodology, B horizon soil samples were subjected to solid phase microextraction (SPME) and analysed by GC to determine organic compound concentrations. Results show anomalous responses in soils overlying and adjacent to mineralization. Discrete geochemical responses to the deposit footprint, changes in lithology, and cross-cutting faults demonstrate the predictive capabilities of the technique.