Searching for concealed deposits: why metallogenic models still matter

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With increasing demand for natural resources, geochemical exploration faces new challenges requiring new methodologies and approaches to long-standing problems. It is recognized that new discoveries will target harder to find deposits [1]. We have been witnessing many developments in data treatment methods and the increasing ability to integrate multi-dimensional data sources. Data processing capacity has never been so powerful, while inputs from fundamental research on ore-forming processes and ore deposits have been comparatively modest. Besides, it is expected that in the future more state of the art analytical techniques will be incresingly availale to exploration as costs run down as expected.

Ore deposits form in many ways and include an all variety of geological processes. Hydrothermal deposits, for instance, require considerable amounts of fluids interacting with huge volumes of rock. Such interactions are likely to leave traces of fluid passage, but these are often faint and masked by an otherwise complex signal. One often found evidence, either mineralogical or geochemical, that can provide hints to the development of deeper concealed deposits [2, 3]. Also a detailed and careful study of mineral phases formed during chemical weathering may provide important clues to the deeper development of primary mineralization [4].

A recent evaluation of surface geochemical data from the W-Sn Panasqueira lode deposit (Portugal), revealed several domains where this multi-stage hydrothermal mineralization (yielding different, sometimes complementing, geochemical signals) can be expanded to further extend the mine's life-span [5], precisely by enhancing those signals and realise their relation to the host rocks geochemistry.

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References

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