Short Course on
"Hydrothermal alteration patterns in Iron Oxide-Copper-Gold Systems: Recognition, Interpretation and Implications to Exploration"

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Proposed language: English.

COURSE DESCRIPTION

Hydrothermal mineral systems are the end products of large-scale fluid circulation through porous and permeable rocks and structures, fluid-rock interaction and focusing of hydrothermal fluids at the site of ore deposition. During global tectonic cycles, ore-forming processes involved a wide range of sources of heat, fluids and metals which may have led to the formation of several types of world-class (> 100 Mt) deposits in specific locations of the Earth´s crust. The mineralization in these deposits are typically enveloped by zones of hydrothermal alteration which, together with other geological and analytical tools, are fundamental information to ore vectoring during green and brownfield exploration programs.

Among the world-class deposits, iron oxide–copper–gold (IOCG) systems have become attractive targets to exploration companies due to its polymetallic nature and huge resource. IOCG systems have currently contributed in the order of 5% and 1% to the copper and gold world production, respectively. In the Andes (e.g., Chile and Peru) and the Amazonian craton (e.g., Carajás Mineral Province – Brazil), these systems are important base and precious metal producers. Nevertheless, in Colombia the precious and base metal endowment is due essentially to porphyry Cu (Mo-Au) and epithermal Au-Ag systems, whereas the IOCG potential has still been underassessed.

Within this context, this one-day short course intends to focus on ore-forming processes in IOCG systems, with particular emphasis on the recognition and interpretation of their hydrothermal alteration patterns. The topics to be explored are as follows:

1. Definition and classification of IOCG systems.

2. If IOCGs are so diverse, what are their common geological features relevant to exploration?

3. Hydrothermal alteration and ore mineral assemblages in IOCGs: implications on fluid evolution and conditions of ore deposition.

4. Transport and deposition of metals by hydrothermal fluids in IOCG systems. IOCG fluid regimes and genetic models.

5. The IOCG systems of the Carajás Mineral Province, Amazonian craton (Brazil): a case of multiple Archean and Paleoproterozoic episodes.