

Critical Mineral Deposits: Case studies of volcanogenic and supergene deposits - Abstracts

Volcanogenic lithium deposits in SE Peru: Why are they the odd ones?

By Prof. Lisard Torró I Abat

Volcanogenic lithium deposits are a promising source of this strategic metal in high demand. The Falchani deposit in SE Peru contains total resources of > 5 Mt Li and represents a potential world-class hard rock source. The Li mineralization at Falchani is hosted within a Neogene volcanosedimentary sequence belonging to the Ignimbritic Province of the Central Andes. Unlike other volcanogenic deposits worldwide where lithium is mainly associated with secondary mineral phases (mainly clays such as hectorite), much of the resource at Falchani is hosted in lithiferous micas with a chemical composition similar to micas found in rare metal peraluminous granites and LCT pegmatites. In this seminar we will discuss some petrogenetic processes that may have been key to the Li concentration and try to understand why Falchani may be the exception within the Ignimbritic Province of the Central Andes.

Critical metals deposits in supergene environments: Ni-laterites (Ni, Co, Sc) and karst bauxites (REY)

By Dr. Cristina Villanova De Benavent

Part I: Karst bauxite deposits are among the so-called non-conventional REY deposits (as opposed to the main sources of REY worldwide, e.g., carbonatites and igneous alkaline complexes). The deposits located in the Pedernales province, in southern Dominican Republic, contain the highest REY (lanthanides plus yttrium) tenors reported in the literature for karst bauxites, so much so that, in certain locations, the REY mineralisations can be spotted with the naked eye. The REY-bearing mineralogy varies from one deposit to another, and includes: a) primary phosphates (monazite), b) secondary phosphates, and c) secondary carbonates (mainly bāstnasite group). In these minerals, the dominant REE is Y, but some minerals contain significant amounts of Nd, Gd, La, etc. The aim of this seminar is to discuss the mobility of REY in such supergene environments, based on the variations in REY concentrations, and the mineral diversity along the study area.

Part II: Ni-laterite deposits have become the prime source of nickel worldwide in the past few years, but have been recently targeted for other critical and/or strategic metals, i.e., Co, Sc, and REY. Nickel is present in nickeliferous serpentine, and in “garnierite” (green, fine grained and poorly crystalline phyllosilicate mixtures), from the silicate-rich, saprolite horizon, and in goethite from the oxide-rich, limonite horizon. In addition, Co (+/- Ni) is mainly hosted in Mn oxides, displaying a wide variety of textural features and compositions, in the transition between the saprolite and the limonite; and in maghemite, the long-forgotten Ni and Co scavenger in lateritic profiles. Highest Sc concentrations are found in certain goethites, whereas Mn oxides may also contain significant REY. In this seminar, we will discuss the critical metals enrichment in lateritic environments, and the influence of the parent rock.