

SEG 2023 Conference: Resourcing the Green Transition

From Planets to Protons - New Geoanalytical Workflows for Characterizing Rocks of Economic Importance

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The dream of some geologists is to be able to image and analyse our planet at various scales, with different techniques, and in different dimensions. Although we are still far from reaching this ultimate goal, new geoanalytical workflows developed over the past 10 years or so have allowed us to get fairly close to imaging the rocks that make up the Earth down to the atomic scale, starting with space-borne instruments, progressing to land-based field-based technologies, and then ultimately using laboratory-based techniques that can unlock the secrets of petrogenesis that are so important for the complete understanding of ore-forming processes. This so-called bridging-of-scales-of-observation approach is a powerful tool for the development of geometallurgical practises, whereby mineralogical, textural, and geochemical information can be integrated to solve, predict, or troubleshoot challenges in exploration, mining, mineral processing, product traceability, and rehabilitation of ore deposits and associated mines. Such workflows are practiced routinely at the Geological Survey of Finland, and this talk will highlight some cases where this approach has led not only to the discovery of new deposits, but also enabled a fresh look at the formation of orebodies once they have been found and delineated, as well as an improved understanding of sustainable mineral extraction.