

# SEG 2022 Conference: Minerals For Our Future

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## Geochemistry and Critical Metal Enrichment of the Dinapigue Nickel Laterite Deposit, Isabela, Philippines

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Nickel laterite deposits are weathering products of mafic and ultramafic protoliths. In the Philippines, most of the laterite deposits form from the weathering of ophiolitic units. These deposits are commonly extracted for their Ni and Fe content, but more recent studies have looked into their potential to hold significant concentrations of critical metals such as Sc, Co, and rare earth elements (REEs). The Dinapigue nickel laterite deposit developed on top of the Isabela Ophiolite, an ophiolite with a mid-ocean ridge (MOR) signature. This is relatively unique with respect to the other studied laterite deposits in the Philippines which all developed from supra-subduction zone (SSZ) ophiolites.

The deposit is underlain by two types of peridotites: dunites and lherzolites. Laterite and bedrock samples were collected from drillcores and mining benches and subjected to petrography and whole rock geochemistry (XRF and ICPMS) analyses. The observed laterite profiles are divided into two parts: an upper, reddish brown, oxide-rich limonite layer; and a lower, greenish, silicate-rich saprolite layer. The results obtained show typical major element enrichment patterns for nickel laterite deposits. Elevated Fe and Al values (up to 75.46 and 8.63 wt.%, respectively) were observed in the limonite layer while Mg and Si are enriched (up to 33.06 and 40.29 wt.% respectively) in the saprolite. Ni tends to have higher concentrations in the saprolite (up to 2.4 wt%). Sc has a positive correlation with both Fe and Al and is more concentrated in the limonite. A field exposure of a Mn nodule was also subjected to bulk geochemical analysis and showed significantly higher concentrations of Co (1.4 wt%), and REEs, particularly Ce (92 ppm) and La (30 ppm). These results indicate that the Dinapigue nickel laterite deposit contains relatively significant amounts of critical metals.