‘Rare Earth Element and Scandium Geochemistry of Philippine Nickel Laterite Ores: Analytical Validation and Economic Implications

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The Philippines is one of the world’s largest nickel (Ni) sources from laterite soils, derived from the weathering of the mantle sections of various obducted ophiolite sheets. Most of these nickel ores are shipped directly abroad without processing, with payments only for nickel and iron. Other valuable elements such as Rare earth elements (REE) and Sc are not included in ore payments because these have not been quantified. This study attempts to quantify and establish protocols for accurate determination of Sc and REE in these ores. Using ICPMS analyses, the over-all REE (La-Lu) contents are very low when compared with conventional REE ore deposits. However, Sc can be found in several ppm levels and is strongly correlated with Fe in laterites. The limonite and saprolite samples show relative depletion of heavy rare earth elements (HREE) to light rare earth elements (LREE). Studies are ongoing to determine whether these REE signatures reflect the source and have survived the extensive weathering process. Potential benefits from this study are additional credits from Sc contents in the ores and assistance in REE recovery processes.