

## Geochemical analysis of gem-bearing gravels from Eheliyagoda, Sri Lanka as a potential source of rare earth elements

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The group of rare earth elements (REEs) is made up of 17 chemical elements including 15 lanthanides, Yttrium (Y), and Scandium (Sc). REEs have become significant in cutting-edge technologies due to their specific characteristics. The market demand for REEs has expanded drastically in recent decades thus, the potential scarcity of REEs is currently at the forefront of global concern. Several previous studies have revealed that gem-bearing gravels in Sri Lanka are rich in REEs, particularly light rare earth elements (LREEs). The gem trade in Sri Lanka has a long history of fame for its gems and has traditionally been centred in Rathnapura. Eheliyagoda which geologically falls within the Highland Complex, is one of the significant alluvial gem deposits in Rathnapura. The scope of the study is to qualitatively and quantitatively investigate the REEs in the gem-bearing gravels in Eheliyagoda, Sri Lanka. Twenty soil samples from gem-bearing layers of 20 mines from the Eheliyagoda region were analysed to identify and quantify the REEs compositions mainly using an inductively coupled plasma mass spectrometer (ICP-MS). The results obtained revealed that some sediments were significantly enriched in specific REEs like Cerium, Neodymium, and Lanthanum. The average concentrations of the three elements were determined to be 155.89 mg L<sup>-1</sup>, 75.629 mg L<sup>-1</sup> and 73.3776 mg L<sup>-1</sup> respectively. Results indicate that when compared to the published international data of certain REEs mining regions in China, the biggest REEs producer in the global market, the gem-bearing gravels in Eheliyagoda, Sri Lanka consist of comparable quantities of REEs, particularly of LREEs.

**Keywords:** ICP-MS analysis, light rare earth elements, REEs, sediments, Sri Lankan gems