Exploring Regolith-Hosted Rare Earth Element Deposits: A Practical Methodology for Mineral Exploration

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The global demand for rare earth elements (REEs)—especially the heavy REEs (HREEs)—continues to grow each year, driven by the increasing production of electronic devices and the accelerating green transition. In 1985, global production was just 50,000 metric tons of REE oxides; today, it stands at around 300,000 metric tons, and demand is expected to exceed that figure by 2030. Nowadays, China dominates the REE supply chain, accounting for approximately 65% of global production and 85% of global processing, a situation with geopolitical implications. This highlights the urgent need for new stakeholders to enter the market, which requires effective mineral exploration strategies. This study presents a practical methodology for exploring regolith-hosted REE deposits (RH-REED) in tectonically active zones. By integrating multiple data layers—including climate conditions, lithology, structural geology, whole-rock geochemistry, and spectral imagery—it is possible to identify promising target areas for field-based exploration. Applying these techniques can support the discovery of new prospects for the future extraction of REEs from RH-REED.