

Orientation Studies to Develop Geochemical and Mineralogical Procedures for Soil Sampling Li-mica Deposits in SW England, a Legacy Mining Area

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The effective application of soil sampling as a tool for greenfield Li exploration in geographical regions characterised by poor rock exposure and extensive superficial overburden (such as Southwest England) relies upon a detailed understanding of the target deposit and, following careful orientation studies, the nature of the sampled soils. A combination of geochemical and mineral imaging techniques was applied to two well-described Li occurrences in SW England: the Tregonning Granite, a Li-mica granite, and the Li-mica and petalite bearing Meldon Aplite. Both localities showed that Li concentrations are prominent in the B-horizon and that the most effective grain size fraction for Li anomaly identification matches the grain-size range of Li-bearing minerals recorded in outcrop hand-specimens. A third site was sampled, overlying a tourmaline rich granite to act as a comparative dataset for Li and multielement geochemical plots.

Based on multielement geochemistry, supported by mineral imaging techniques (QEMSCAN® and Raman spectroscopy), prospectivity plots of U/Th vs Li and Cs-Ga-Li are presented. These allow for the clear distinction between Li-bearing rock types, surrounding metasedimentary country rock and other granite types, confirming the suitability of this approach. This study demonstrates the need to develop soil sampling methodologies that are specific to the exploration target rather than a 'one size fits all' approach commonly practised during regional and target scale surveys.