Source to Sink Modelling of Salar-Hosted Lithium Brine Systems

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The integration of remote sensing-derived data sets and robust geological maps is a powerful predictive tool for the prospectivity modelling of salar-hosted lithium brine systems. Lithium in these systems is most likely sourced from ignimbrites through the process of devitrification and then transported in soluble form by surface and ground waters. Rivers, catchments, and basins, as well as a wide array of other slope and aspect derivatives, may be extracted from continental-scale, high-resolution Digital Elevation Models (DEMs) to provide accurate proxies for transportation and sink features.

Understanding the geographical extent, morphological geometry, and connectivity of these features linked to the suitability of lithium-bearing source rocks is a critical step towards understanding the mineralisation potential and dilution or enrichment factors of surface brine deposits. Similarly, working with these features in a palaeo-environmental context may indicate the presence of subsurface reservoirs in the form of palaeo-salar deposits.

Here we apply these geospatial relationships to a regional study of brine potential for lithium and associated minerals in a High Andean setting. Systematic calculations across a variety of input parameters and processed geospatial data sets have defined a ranked order of salar, and palaeo-salar, prospectivity of lithium and associated brine-related minerals by watershed. Holistic interpretation of the results may be used to inform critical exploration and investment decisions.