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New Lithium Search Spaces – A Mineral Systems Approach

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Lithium, a critical mineral for the future of energy storage, is forecast to experience a 40-fold demand increase by 2040 by the International Energy Agency in their Sustainable Development Scenario. The increased pressure to discover new lithium deposits will increase commensurately. In this presentation we lay out how global data sets and sophisticated analytics can be applied in concert to discover new and covered search spaces to provide currently unknown exploration targets for future lithium supply.

Lithium can be extracted from brines or salars, pegmatites, and sedimentary deposits. Exploration for lithium traditionally employs direct detection of lithium and is well established. Common techniques for exploration of pegmatite deposits include remote sensing, airborne geophysics, geological mapping, soil geochemistry, and drilling. For brines and salars, data such as water geochemistry and geothermal plant locations are commonly employed. Sedimentary lithium deposits, though under cover and less energy intensive than pegmatite deposits and higher grade than brines and intrusive deposits, are less well known and explored for less frequently.

New lithium exploration search spaces require a fresh approach to predictive exploration technology. Specialists at Getech have identified several genetic factors which, when present at the same time in the same location, provide compelling sedimentary lithium exploration targets. These genetic factors comprise criteria such as felsic volcanic and volcanoclastics as a source of lithium, regularly recharged groundwaters to leach lithium in a long-lived endorheic basin, evaporation and precipitation required to produce a brine/evaporitic accumulation, tectonic activity for upwelling of lithium-rich fluids, minimal runoff to encourage surface leaching, rivers eroding igneous source rocks into the basin, and basinward wind from an igneous source to allow lithium-rich ashfall tuff to enrich basin fluids.

We present results from analysing the criteria above or their proxies to produce play maps that generate new regional targets for lithium exploration.