Exploration of Buried Li Brine Resources in Andean Salars, an Environmental-friendly Option for the Long-term Sustainable Production of Lithium Brine Resources

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The extraordinary global demand of Lithium has led many exploration mining companies to set their eyes on the salt lake brine Andean Plateau of Argentina, Chile and Bolivia. All these countries conform the famous Lithium triangle, that holds more than half of the total Lithium global resources. Exploration in the last decade in the Andean salars focused mainly on shallow lithium brine aquifers, which were associated with low-exploration expenditures. However, shallow brine aquifers are frequently surrounded by alluvial sediments that contain fresh and brackish water and conform breakable systems where the lithium brine body is usually in contact with fresh and brackish aquifers. The lack of effective control over the exploitation of shallow aquifers could lead to over-pumping with a risk of dilution of the lithium reservoir, provoking the affectation of the freshwater resources and sensitive ecosystems located on the margin of the salars.

Evidence from exploration works in Andean salars show deep Li brine reservoirs that include the deeper zones of the alluvial fans saturated with brine. In these areas, the mixing and freshwater zones, characteristic of shallow domains, are absent. Thus, deep reservoirs are more favorable for long-term exploitation, since the problems linked to the saline interface in the margin of the salar and its sensitive ecosystems are avoided.