

Potential sources of lithium in the Salar de Atacama: a geochemical and isotopic approach

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The Atacama region in northern Chile hosts the driest desert on Earth and is the world's second lithium (Li) production province, where the occurrence of elevated lithium concentration is restricted to brines deposits, such as the Salar de Atacama. Despite the potential relevance of this commodity for the Chilean economy, little is known about the origin and distribution of lithium in Atacama.

The presence of lithium in brine deposits is enigmatic and has been seriously overlooked over the years. Little information is available about the source(s) of lithium in the Atacama region, and only a few studies have reported data about the geochemistry and isotopic composition of lithium in these deposits.

In this study, we analyze new geochemical and isotopic data of natural waters in the Atacama Desert, including geothermal fluids, groundwater, meteoric water, brines and salt lakes.

To the north of the study area, reported preliminary lithium isotopic data ($\delta^7\text{Li}$) indicate that the isotopic signature of this element is consistent with the presence of at least two sources: volcanic fluids and saline waters. Moreover, through lithium isotopic data from the Western Cordillera a relationship between recent volcanism and geothermal processes has been established. Based on these data we propose a multi-source origin for lithium in the Salar de Atacama. In the light of these new evidences, more data about alternative source(s) for lithium in the Atacama Desert is necessary.

The preliminary results presented here will contribute to a better understanding of the geology and geochemistry of this overlooked element in Atacama and