Origin, Distribution, and Biogeochemistry of Arsenic in the Altiplano-Puna plateau of South America

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In South America, the second highest plateau on Earth referred to as the "Altiplano-Puna", which encompasses areas of Argentina, Bolivia, Chile, and Perú, exhibits high arsenic (As) concentrations in water that could be affecting 3 million inhabitants [1].

The most important sources of As in this region correspond to mineral deposits, hot springs, and volcanic rocks, whereas anthropogenic sources are mining and acid mine drainage (AMD). As is found in all water types of the Altiplano-Puna over a wide range of concentrations (0.01 mg/L < As in water > 10 mg/L) which in decreasing order correspond to: AMD, brines, saline waters, hot springs, rivers affected by AMD, rivers and lakes, and groundwater. As mobility is highly susceptible to the influence of dry and wet seasons. Few studies report As speciation, in which As appears mostly in its oxidized form (As(V)).

As adaptation and efficient metabolism has been detected in some aboriginal communities. However, the inefficient methylation of inorganic As in women might lead to adverse health effects such as cancer. Despite the health risks in this As-rich environment not all of the Altiplano-Puna is properly characterized and there exists a lack of information regarding the basic geochemistry of As in the region.

An international and interdisciplinary collaborative research supported by the IGCP-UNESCO PROJECT 707 will investigate specific sites within the Altiplano-Puna to better understand (i) the origin of As, (ii) its geochemistry and mobility, (iii) its distribution in the environment, and (iv) its effects in the local community and unusual biodiversity. Human health, the environment, as well as scientific insight will benefit from this research.

[1] Tapia, J., et al., **2019**. *Sci. Total Environ*. (678), 309–325. doi.org/10.1016/j.scitotenv.2019.04.084.