Architecture of aquifers: Chile's Atacama Desert

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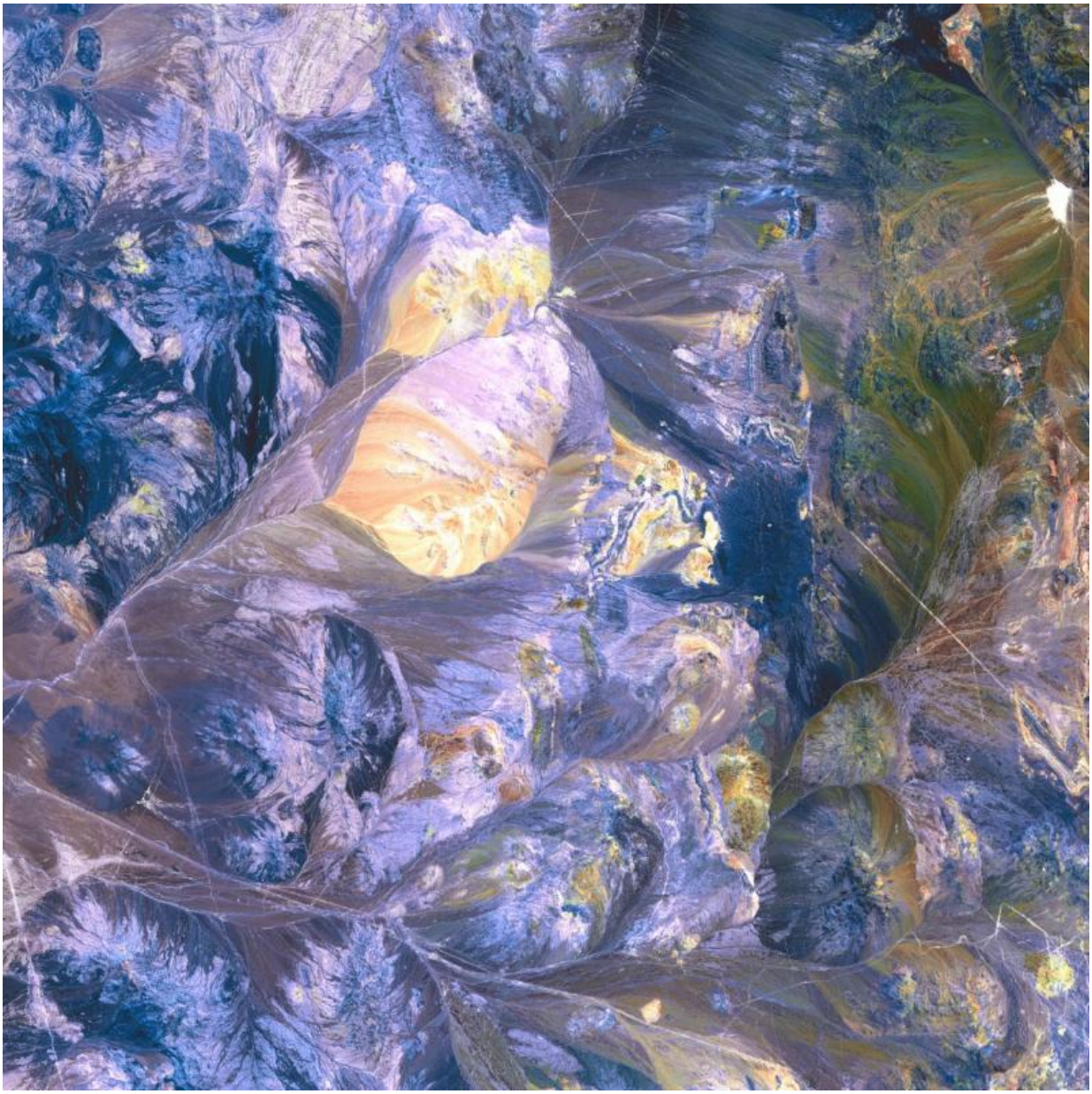

Chile's Atacama Desert captured via the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on NASA's Terra satellite on 28 Oct. 2001. Credit: NASA, USGS

The Loa River water system of northern Chile's Atacama Desert, in the Antofagasta region, exemplifies the high stakes involved in sustainable management of scarce water resources. The Loa surface and groundwater system supplies the great majority of water used in the region, and meets much of the municipal and agricultural demands. It is vital to regional copper mining, which constitutes ~50% of Chile's copper production, which in turn supplies one-third of the world's copper needs. However, a key property of the Loa system is the scarcity of surface water.

The aridity of the region sharply restricts the number of human inhabitants and the extent of native plants or animals. However, under different climate states during the past few millennia the water flux was greater than now; this leads to great uncertainty in estimations of how much of the current water flow is renewable versus fossil.

This study of the aquifers in the Calama Valley is motivated by the challenge of sustainable long-term management of the Loa coupled with the natural-human resource system. Authors Teresa Jordan and colleagues clarify the spatial distribution of the Cenozoic sedimentary rocks with properties favorable to function as aquifers and the distribution of water through those rocks. Their results identify where deeply buried aquifers likely exchange water with shallow aquifers or discharge to the surface water system.

More information: Architecture of the aquifers of the Calama Basin, Loa catchment basin, northern Chile, Teresa Jordan et al., Dept. of Earth

& Atmospheric Sciences and Atkinson Center for a Sustainable Future, Cornell University, Ithaca, New York, USA; Published online ahead of print on 5 Aug. 2015; http://dx.doi.org/10.1130/GES01176.1. This article is OPEN ACCESS.