

ENVIRONMENTAL CHARACTERIZATION AND DEVELOPMENT OF PLANETARY SCIENCE IN THE PUNA DE ATACAMA

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Content: The Puna is an ecoregion of the Central Andes, straddling four South American countries (Argentina, Bolivia, Chile and Peru), characterized by high altitudes (over 3, 500 meters above sea level [masl]), a cold climate and low precipitation. These environmental characteristics make this geographical region a potential analog related to the conditions experienced on Mars during its geological history [1] and, more generally, a natural laboratory for testing the limits of life on Earth [2]. However, it is often the Atacama Desert that is used as an analog and not directly the Puna.

The University of Atacama (UDA) located in the city of Copiapo (27°36 S / 70°33 W) in Chile aims to develop a multidisciplinary approach to characterize and enhance the extreme environment of the Atacama region, which includes part of the southernmost part of the Puna. In order to carry out this project, the UDA's objective is to use its current expertise in geosciences and to simultaneously use the data collected to develop a planetary analog component. In addition to the existing infrastructures, such as the mobile exploration laboratory, which allows scientific expeditions to be carried out in the Cordillera, a high-altitude laboratory will be built in 2021 at an altitude of 3,800 masl in the vicinity of the Salar de Maricunga (26°85 S / 69°03 W). After an initial period of prospecting estimated at 18 months, intended to determine scientific "hot-spots", new infrastructures should be deployed above 5200 masl.

To facilitate the development of the analog component, a link has been established with the EuroMoonMars program, an organization with expertise in the field of planetary analog [3]. In early 2021, a first itinerant field campaign was organized in the vicinity of the Ojos del Salado (27°11 S / 68°54 W), the highest active volcano on Earth (6893 masl), whose potential as a Martian analog has been highlighted in recent publications [4]. This scientific expedition, carried out within a glaciological framework, was however a first opportunity to

aggregate geochemical and biological protocols, physiological tests related to adaptation to high altitude as well as remote support by students involved in the EuroMoonMars program. The data and samples collected will be used both for the environmental characterization of the region and for the development of the analog component (referred to as ChileMoonMars [5])

These multidisciplinary expeditions will be repeated in the months and years to come, with local and international partners, so that this natural laboratory of the Puna de Atacama can be characterized, highlighted and protected.

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