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An exceptional volcanic geodiversity in the Andean Central Volcanic Zone in Chile: the proposed Ollagüe Volcanic Geopark

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Volcanic geoheritage research in Latin America is still in its infantry stage in spite of the great variety of volcano types and volcano-sedimentary basins present in the region mostly along the Andean volcanic arc. Beside the current active arc, at least four stages of arc development have been distinguished since the early Mesozoic time, providing a rich and ready to utilize geological environment for geoeducation, geotourism that need to be framed in effective geoconservation programs, including various level of geopark establishments. Recent active volcanological research on the many of Northern Chile's active stratovolcanoes provided an abundant scientific information on the modern volcanic history of these volcanoes, which are currently channelized to explore, define and characterise the volcanic geoheritage of the region. As recently defined, the scientific value in one hand is the major and fundamental values of any geoheritage from western perspective, the study areas of Northern Chile can also provide an alternative view of volcanic geoheritage that is based on the indigenous cultural aspects and largely part of the general Andean Cosmovision. Ollagüe (21°18′S, 68°11′W, Central Volcanic Zone of the Andes along the Chile-Bolivia border) the center of the volcanic geoheritage research area, is an active, andesite-dacite, composite volcano. It had developed on a regionally significant NW-striking fault that run through the modern volcanic edifice. Ollagüe went through multiple deformation and lateral collapse events leaving behind collapse scars and extensive, mappable and well-preserved hummocky surfaces. The volcano is inferred to be effected by major climate-forced collapse events associated with base level changes and sudden water level drop and rise of surrounding salar basins such as the Salar de Carcote (also called Salar de San Martin). In addition, the region is also a part of a recently defined monogenetic volcanic field fed by mafic, deep sourced magmas providing a significant addition to the volcanic geodiversity of the region. The exceptionally high geodiversity of volcanic landforms, processes and their interaction to the high altitude arid climatic sedimentary environment gives a full justification to the proposal of the Ollagüe Volcanic Geopark project initiated in 2018. The region also demonstrates high cultural values due to its early industrial heritage of sulphur mining as well as being the place where the "copper railway" runs through that is the source of wealth of modern Chile. Here we demonstrate the high geodiversity of this volcanic wonderland and provide clear outline to the ideal scenario to link western scientific knowledge to indigenous worldviews.