Eruptive history of La Poruna scoria cone, Central Andes, Northern Chile

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Abstract

New stratigraphic, lithological and petrographic analyses of La Poruna scoria cone (21 degrees 53 ' S-68 degrees 30 ' W, Central Andes, northern Chile) allow the reconstruction of the eruptive sequence of this monogenetic cone. Petrographic and lithological characteristics allow us to identify three main lithostratigraphic units at La Poruna scoria cone. The first unit consists of agglutinated lapilli, spatter beds, and clastogenic lavas that are related to the construction of the cone. The other two units are associated with a lava flow field and consist of flow of andesitic composition, which differ both in their degree of weathering and in their development of channel, surface, and internal structures (e.g., levees, ogives, and joints). With these lithostratigraphic analyses, we interpret that the construction of La Poruna occurred during four main eruption phases involving Strombolian, Hawaiian, and transitional eruptive styles. Furthermore, differences in the degree of erosion, alteration, and weathering of the lithostratigraphic units in the lava field of La Poruna suggest that this flow field was formed during two eruptive events. The excellent outcrop conditions and preservation state of the volcanic products of La Poruna allow new stratigraphic insights that advance the wider and more general understanding and the dynamics of this important type of volcanism and the potential hazards of a scoria cone eruption. The polycyclic style of the eruption needs to be included in the hazards assessment of these centers type, especially when the cone is associated with structures that can be reactivated. This process could correspond to a second phase of activity, involving ash fall, bomb, and lava emission.

Palabras clave

Palabras clave de autor: Monogenetic scoria cone; Eruptive styles; Lava flow; Lithostratigraphic units; Volcanic hazards
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