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Understanding volcanoes and society: the key for risk mitigation

Active tectonics along the Liquiñe-Ofqui Fault Zone and influence on Volcano distribution in Chile's Southern Volcanic Zone (SVZ)

Mario Persico¹ and Gregory De Pascale

¹Departamento de Geología, Facultad de Ciencias Físicas y Matemáticas (FCFM), Universidad de Chile, Plaza Ercilla 803, Santiago, Chile

²Centro de Excelencia en Geotermia de Los Andes (CEGA), Universidad de Chile, Plaza Ercilla 803, Santiago, Chile

The 1200-km-long Liquiñe-Ofqui Fault Zone (LOFZ) is a crustal system of dextral faults that appear to accommodate northward migration of the Chiloe Microplate (CM), and is associated with the Chilean Southern Volcanic Zone (SVZ), however little is known about the LOFZ's Holocene activity. Although major volcanoes are well-documented along the LOFZ, a number of smaller eruptive centres are not well documented due to the scale of regional geological and geomorphic mapping (oftentimes at 1:1,000,000). Here we map distribution of major (e.g. stratovolcanoes) and minor (e.g. monogenetic cones) along what appear to be active traces of the LOFZ. Our new mapping shows a coincidence of volcanic centres along the LOFZ and helps provide insight into active structural control on distribution of volcanic centres in the SVZ. Based on our new mapping a number of clearly post-glacial volcanic centres exhibit permanent deformation due to the active tectonics, which demonstrates that: a) LOFZ is active, b) the LOFZ is important source of seismic hazard, c) most monogenetic cones are located proximal to the LOFZ and decrease in frequency away from active traces of the fault zone, and d) the LOFZ is perhaps a local trigger (i.e. seismic triggering during large earthquakes) for SVZ eruptions and a major structural control on distribution of volcanic centres (e.g. with local pull-apart basins between strands of the fault facilitating monogenetic cone development). Further mapping and field investigations here will further unravel the interplay between active crustal tectonics in Southern Chile, earthquakes, and the SVZ.