



### **3D Attenuation Tomography at Villarrica volcano (Chile)**

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Villarrica volcano is the most active and hazardous volcano in the southern volcanic zone in the Chilean Andes. Most of the volcanic edifices in the Southern Volcanic Zone are emplaced along the arc-parallel 1000-km long Liquiñe-Ofqui Fault Zone (LOFZ). For Villarrica volcano, the emplacement falls at the intersection with the NW striking Villarrica-Quetripillán-Lamián lineament (VQL). This intersection generates a cluster of volcano-tectonic (VT) seismicity between 3 and 5 km depth, in an elongated structure striking NS as the LOFZ.

From this cluster, a set of VT events recorded on a 50 short-period stations network installed in March 2012, was visually re-selected and manually re-picked to obtain information from the waveforms that could be useful for attenuation studies. These events were later used as input for the MuRAT attenuation tomography code from De Siena, et al. (2014). These results from MuRAT method complements previous results from P-wave tomography, as it provides information outside the direct path of these body waves.

Results suggest the main conduit filled with magma or fluids at a section with high  $Q^{-1}$  in agreement with low  $V_p$  values. Results also suggest low  $Q^{-1}$  in areas surrounding the main edifice, which could indicate much older and compacted products. Frequency characterization and visual observation of the coda dispersion for events recorded around the volcanic edifice show a correspondence with lower velocity zones from previous P-wave tomography, as well as a geological correspondence to the groups of adventive cones to the East (Los Nevados) and South (Challupen) of the Villarrica volcano.