Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile
'Understanding volcanoes and society: the key for risk mitigation'

Using ambient seismic noise tomography to image the deep structure in Llaima volcano

Luis Franco[1],[2], T. Dylan Mikesell[3], José Palma[2] and Jeffrey B. Jonhson[3]

[1] National Geological Survey, Chile (luis.franco@sernageomin.cl)
[2] Concepción University, Earth Sience Departament, Chile
[3] Boise State University, USA

Many tools are used to extract information about the position and dimension of magmatic chambers below active volcanoes. Seismic tomography is a technique based on the measured phase arrivals times from earthquakes recorded at different seismic stations. Traditional seismic tomography uses earthquakes or explosions in order to make inferences about Earth´s interior, but these sources are expensive or not located where we need them most. Contrastingly, background seismic waves (caused by ocean-crust interactions or anthropogenic activity) represent an important energy source called ambient seismic noise. The seismic ambient noise tomography (ANT) method has become an important tool to image crustal structures and magmatic bodies at volcanoes. The frequency band of ambient noise provides complimentary data and added resolution to the deeper volcanic structures when compared to traditional tomography based on local earthquakes. The Llaima volcano is a stratovolcano of basaltic-andesitic composition, located in the South Volcanic Zone (ZVS) of the Andes (38.7° S and 71.7° W, Chile) and is listed as one of the most active volcanoes in South America. In summer 2015, a temporal seismic array was deployed on Llaima to complement the permanent seismic network to extract information from continuous seismic records. We present our tomography results and our first geologic interpretations of Llaima volcanic structure from ANT, highlighting two low velocity zones. The methodology employed here is an important way to approach imaging models related to volcano interiors.