



Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile



'Understanding volcanoes and society: the key for risk mitigation'

Present crustal deformation at the Southern Andes: Is there a connection with the latest volcanic eruptions?

Francisco García, Andrés Tassara & Vicente Yáñez

¹Universidad de Concepción

Keywords: GPS, remote triggering, crustal structures, strain, geodesy

The Southern Andes is probably one of the best places on earth to study the link between tectonic and volcanism. Since 2007 (the older GPS data used in this study) has been at least seven clear eruptive events and one big megathrust earthquake (2010 Mw 8.8 Maule earthquake). The volcanic line in the study area (between the 36°-47° S) has a strong relation with the Liquiñe-Ofqui Fault Zone (LOFZ), a 1100 km long dextral system that accommodates the parallel to the margin component of convergence. These crustal structures controls first order characteristics of the different volcanic systems, like location and residence time of magmas in the crust that directly affects the composition of volcanoes. Volcanic eruptions can be triggered by variations in the strain fields around the volcanic system. These variations can be produced by megathrust earthquakes and also by activity of crustal faults near or under a volcano. Geodetic data, allow us to observe the superficial expression of this processes, and using geological information such as location of faults or volcanic systems is possible to evaluate the role of tectonic in the triggering of a specific eruption. This study uses continuous GPS data and trajectory models to calculate velocity and strain fields. In order to better understand how crustal deformation can induce volcanic eruptions, the time series were split in many time windows (TW). Using this TW, we are for the first time capable to study strain variations not only in latitude and longitude but also in time. The main focus of this study is to connect variations in the crustal deformation with volcanic eruptions. This not only allows to have a better understanding of the role that crustal structures plays on the triggering of volcanic eruptions, but also could be used as a strong tool for volcanic monitoring.