



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

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



Evidence of structural boundaries inferred by self-potential and CO₂ flux measurements on San Salvador volcano, El Salvador

J.E. Benitez¹, A. Finizola², R. Gusset², B. Henriquez¹, V. Mendoza¹

¹Departamento de Física, Facultad Multidisciplinaria de Occidente, Universidad de El Salvador.

²Laboratoire GéoSciences Réunion, Universidad de La Reunión, Institut de Physique du Globe de Paris, Sorbonne Paris-Cité, UMR 7154 CNRS, Saint-Denis, Francia

Key words: San Salvador volcano, hydrothermal system, fault, Self potential, CO₂ flux.

San Salvador volcano (1867 masl), is a strato-volcano whose summit crater is located just 8 km far away from the center of the city of San Salvador, 2 million inhabitants with its conurbation, and capital of El Salvador. The last eruption occurred in 1917, was characterized by lava emission on the northwestern flank and strombolian activity inside the summit crater. Between November and December 2015, a study was conducted on this volcano, coupling self-potential (SP) technique with soil diffuse degassing (CO₂ flux). The aim of this survey was to highlight areas with preferential fluid flow, both hydrothermal (H₂O) and magmatic (CO₂). The location of these areas of higher permeability is of first importance, because it allows us to evidence the areas of highest mechanical weaknesses inside the volcanic edifice. Such information must be then taken into account for the elaboration of hazard maps and also for monitoring. Three profiles of SP and CO₂ flux, interconnected between them, with a step of measurement of 20 m, were performed on San Salvador volcano; (1) a 6 km circular profile around the summit crater rim, (2) a profile 10 km long, on the southern side of the volcano and (3) a profile also 10 km long, on the northern side. At the North of the summit crater rim, a very sharp decrease of SP (more than 300 mV in 40 meters) have been evidenced in relation with a preferential rainwater infiltration along a fault system, while the highest soil CO₂ degassing (a maximum of 225 g/m².d) was measured on the southeastern part of the crater rim. On each side of the volcano, one area of preferential hydrothermal and magmatic fluid rising system has been also detected.