



Modeling of groundwater and hydrothermal fluid circulation at Las Cañadas caldera, Tenerife

M. Todesco (1) and J. Martí (2)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Bologna, Italy, (2) Institute of Earth Sciences "Jaume Almera" (CSIC), Barcelona, Spain (todesco@bo.ingv.it)

Groundwater and hydrothermal fluid circulation at Las Cañadas caldera are characterized by two distinctive elements: fumaroles on the top of Pico del Teide volcano, discharging water at the boiling point temperature, and a shallow, cold aquifer beneath the caldera floor. Geological, volcanological, and geophysical data provide information on geometry and depth of the aquifer, and on the location and nature of the source feeding fumaroles. Based on these information, numerical simulations of multi-phase and multi-component heat and fluid flow have been performed to achieve a satisfactory representation of groundwater and hydrothermal fluid circulation, as observed today at Las Cañadas. Comparison of modeling results with available information allowed a first order definition of rock permeability distribution at Las Cañadas. Starting from these simulated system conditions, the model can be applied to study the effects of possible system perturbations, associated with the evolution of the volcanic system. Different scenarios can be considered, involving different boundary conditions along the base of the computational domain, or changes in rock properties. Modeling results provide interesting insights on the kind of observables that can be expected within each specific scenario.