Geophysical Research Abstracts
Vol. 16, EGU2014-3530, 2014
EGU General Assembly 2014

Modelling framework developed for managing and forecasting the El Hierro 2011-2014 unrest processes based on the analysis of the seismicity and deformation data rate.

Alicia Garcia (1), Alberto Fernandez-Ros (2), Manuel Berrocoso (2), Jose Manuel Marrero (3), Gonçalo Prates (2,4), Servando De la Cruz-Reyna (5), and Ramon Ortiz (1)

(1) IGEO-CSIC, Spain (aliciag@mncn.csic.es), (2) LAG-UCA, Spain, (3) Volcanic Hazard and Risk Consultant, Tenerife, Canary Islands, Spain , (4) Universidade do Algarve, Faro, Portugal , (5) Instituto de Geofisica, UNAM, Mexico D.F.

In July 2011 at El Hierro (Canary Islands, Spain), a volcanic unrest was detected, with significant deformations followed by increased seismicity. A submarine eruption started on 10 October 2011 and ceased on 5 March 2012, after the volcanic tremor signals persistently weakened through February 2012. However, the seismic activity did not end when the eruption, as several other seismic crises followed since. The seismic episodes presented a characteristic pattern: over a few days the number and magnitude of seismic event increased persistently, culminating in seismic events severe enough to be felt all over the island. In all cases the seismic activity was preceded by significant deformations measured on the island's surface that continued during the whole episode. Analysis of the available GNSS-GPS and seismic data suggests that several magma injection processes occurred at depth from the beginning of the unrest. A model combining the geometry of the magma injection process and the variations in seismic energy released has allowed successful forecasting of the new-vent opening. The model presented here places special emphasis on phenomena associated to moderate eruptions, as well as on volcano-tectonic earthquakes and landslides, which in some cases, as in El Hierro, may be more destructive than an eruption itself.