



Analysis of surface deformation during the eruptive process of El Hierro Island (Canary Islands, Spain): Detection, Evolution and Forecasting.

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The surface deformation has been an essential parameter for the onset and evolution of the eruptive process of the island of El Hierro (October 2011) as well as for forecasting changes in seismic and volcanic activity during the crisis period. From GNSS-GPS observations the reactivation is early detected by analyzing the change in the deformation of the El Hierro Island regional geodynamics. It is found that the surface deformation changes are detected before the occurrence of seismic activity using the station FRON (GRAFCAN).

The evolution of the process has been studied by the analysis of time series of topocentric coordinates and the variation of the distance between stations on the island of El Hierro (GRAFCAN station; IGN network; and UCA-CSIC points) and LPAL-IGS station on the island of La Palma. In this work the main methodologies and their results are shown:

- The location (and its changes) of the lithospheric pressure source obtained by applying the Mogi model.
- Kalman filtering technique for high frequency time series, used to make the forecasts issued for volcanic emergency management.
- Correlations between deformation of the different GPS stations and their relationship with seismovolcanic settings.