

UNDERSTANDING VOLCANIC UNREST: LESSONS LEARNED FROM THE 2011-2012 EL HIERRO ERUPTION

J. Martí (1), C. López(2), M. Tárraga(1), A. Geyer(1), A. Villaseñor(1)

(1) Group of Volcanology, SIMGEO (CSIC-UB), Institute of Earth Sciences Jaume Almera, CSIC, Barcelona, Spain

(2) Observatorio Central. Instituto Geográfico Nacional (IGN), Madrid, Spain

Forecasting volcanic eruptions based on the analysis of precursory activity recorded by monitoring systems is possible, as it has been demonstrated in a number of recent eruptions which have been successfully anticipated. Also, there exist older cases that illustrate how the knowledge of local people on volcanic activity and its effects, even much earlier than having monitoring systems, permitted them to anticipate volcanic eruptions and to escape to their effects. However, the history of predicting volcanic eruptions also includes an important number of failed forecasts with a number of false alarms and wrong interpretations of what had to happen.

The recent eruption at El Hierro has demonstrated that magma migration in monogenetic volcanism is strongly dependent on stress barriers defined by structural and rheological discontinuities. In El Hierro eruption, the location of initial seismicity (i.e., magma accumulation) in the northern side of the island and the presence of recent volcanism (Tanganasoga) in the same area and on the neighbouring western rift zone, led us to think that the eruption could occur there. However, the final outcome showed how far off our assumed scenario was from the actual eruption location, thus demonstrating once again that forecasting volcanic eruptions must rely on a good understanding of the monitoring signals but also on a good knowledge of the local 3D geology and geophysics.