



The seismicity of Tenerife (Canary islands) and its surroundings.

Germán D. Padilla (1,2), Patrick Bessell (3), Joshua Speck (4), Fiona Burns (1), Iván Cabrera (1), Luca D' Auria (1,2), Rubén García-Hernández (1), Cecilia Morales (1), Monika Przeor (1), Jean Soubestre (1), Nemesio Pérez (1,2,5)

(1) Instituto Volcanológico de Canarias (INVOLCAN), Puerto de la Cruz, Spain, (2) Instituto Tecnológico y de Energías Renovables (ITER), Granadilla de Abona, Spain, (3) Department of Earth Sciences, Royal Holloway, University of London, London, UK, (4) School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, UK, (5) Agencia Insular de la Energía de Tenerife (AIET), Granadilla de Abona, Spain

Tenerife is an active volcanic island which experienced several eruptions of moderate intensity in historical times, and a few explosive eruptions in the Holocene. The increasing population density and the consistent number of tourists are constantly raising the volcanic risk of the island. The island hosts at least 4 distinct volcanic systems: the Teide complex, the Abeque dorsal (North West), the Pedro Gil dorsal (North East) and the Adeje dorsal (North South). Since 2016 the island has shown evidence of ongoing unrest, with increased volcano-tectonic seismicity, occurrence of long-period events and marked changes in the diffuse gas emissions.

On 02/10/2016 the occurrence of a remarkable swarm of long-period events was interpreted as the effect of a transient massive fluid injection episode into the deep hydrothermal system of Teide volcano. Actually, since Oct. 2016, the hydrothermal system of the volcano underwent a progressive pressurization, testified by the marked variation of different geochemical parameters. The most striking observation is the increase in the diffuse CO₂ emission from the summit crater of Teide volcano which started increasing from a background value of about 20 tons/day and reaching a peak of 175 tons/day in Feb. 2017. The pressurization process has been accompanied by an increase in the volcano-tectonic seismicity of Teide volcano, recorded by the Red Sísmica Canaria, managed by Instituto Volcanológico de Canarias (INVOLCAN). The network began its full operability in Nov. 2016 and currently consists of 15 broadband seismic stations. Since Nov. 2016 the network detected more than 1000 small magnitude earthquakes, located beneath Teide volcano at depths usually ranging between 5 and 15 km. On January 6th 2017 a M=2.5 earthquake was recorded in the area, being one of the strongest ever recorded in decades. Most of the events show typical features of the microseismicity of hydrothermal systems: high spatial and temporal clustering and similar waveforms of individual events which are often overlapped.

We present the spatial and temporal distribution of the seismicity of Teide volcano since Nov. 2016, comparing it also with the past seismicity of the volcano. Furthermore we analyze the statistical properties of the numerous swarms recorded until now and the spatial and temporal variations of the Gutenberg-Richter b-value.