



Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile



'Understanding volcanoes and society: the key for risk mitigation'

Diffuse volcanic degassing and thermal energy release 2015 surveys from the summit cone of Teide volcano, Tenerife (Canary Islands, Spain)

Marta García-Merino^{1,2}, Gladys V. Melián^{1,2,3}, María Asensio-Ramos¹, Germán Padilla^{1,2}, Mar Alonso¹, Fátima Rodríguez¹, Pedro A. Hernández^{1,2,3}, Eleazar Padrón^{1,2,3}, José Barrancos^{1,2}, and Nemesio M. Pérez^{1,2,3}

¹Instituto Volcanológico de Canarias, S/C Tenerife, Canary Islands, Spain

²Agencia Insular de la Energía de Tenerife, Granadilla de Abona, S/C Tenerife, Canary Islands, Spain

³Instituto Tecnológico y de Energías Renovable, Granadilla de Abona, S/C Tenerife, Canary Islands, Spain

Keywords: Canary Islands, diffuse CO₂ emission, Teide Volcano, heat flow.

Teide volcano (Spain) is characterized by the presence of a weak fumarolic system, steamy ground, and high rates of diffuse CO₂ degassing all around this area. The temperature of the fumaroles (83°C) corresponds to the boiling point of water at discharge conditions. Water is the major component of these fumarolic gas emissions, followed by CO₂, N₂, H₂, H₂S, HCl, Ar, CH₄, He and CO, a composition typical of hydrothermal fluids. Previous diffuse CO₂ surveys have shown to be an important tool to detect early warnings of possible impending volcanic unrests at Tenerife Island (Melián et al., 2012; Pérez et al., 2013). In July 2016, a soil and fumarole gas survey was undertaken in order to estimate the diffuse volcanic degassing and thermal energy release from the summit cone of Teide volcano. A diffuse CO₂ emission survey was performed selecting 170 observation sites according to the accumulation chamber method. Soil CO₂ efflux values range from non-detectable ($\sim 0.5 \text{ gm}^{-2}\text{d}^{-1}$) up to $10,650 \text{ gm}^{-2}\text{d}^{-1}$ (average value of $879 \text{ gm}^{-2}\text{d}^{-1}$). Measurement of soil CO₂ efflux allowed an estimation of $211 \pm 20 \text{ td}^{-1}$ of deep seated derived CO₂. To calculate the steam discharge associated with this volcanic/hydrothermal CO₂ output, we used the H₂O/CO₂ mass ratio equal to 1.25. The resulting estimate of the steam flow associated with the gas flux is equal to 263 td^{-1} . The condensation of this steam results in a thermal energy release of $6.8 \times 10^{11} \text{ Jd}^{-1}$ for Teide volcano or a total heat flow of 8 MWt. The diffuse gas emissions and thermal energy released from the summit of Teide volcano are comparable to those observed at other volcanoes. Sustained surveillance using these methods will be valuable for monitoring the activity of Teide volcano.

References:

Melián et al., 2012. Bull. Volcanol.; Pérez et al., 2013. J. Geol. Soc.

Con formato: Fuente: (Predeterminada) Times New Roman, Español (España)