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Short-term variations of diffuse thermal energy released from the summit crater of Teide volcano, Tenerife, Canary Islands

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Teide volcano (3,718 m.a.s.l.) is located in Tenerife, the largest island of the canarian archipelago. The most recent volcanic activity of Tenerife is represented, on the one hand, by many, mostly basaltic, volcanoes scattered throughout the island and, on the other hand, by the central Teide-Pico Viejo edifice, with basaltic and salic emissions (Ancochea at. al.,1990). The existence of a volcanic–hydrothermal system beneath Teide volcano is suggested by the occurrence of a weak 83ºC fumarolic system. As part of the volcanic monitoring program of INVOLCAN in Tenerife, 14 surveys were performed weekly during summer 2018 in order to evaluate the short term variations in the heat flux released from the summit crater of Teide. The heat flux was calculated using data from 38 sampling sites distributed inside the crater and covering and area of 6,972 m2, following the method described by Dawson (1964). Zones with highest heat flux values were characterized by a relatively high soil temperature (>60 ºC) and intense hydrothermal alteration. Sequential Gaussian simulation was used to construct spatial distribution maps to estimate the heat flux emission of the study area. During the study period heat flux values ranged from 0.505 MW to 0.755 MW, with an average value of 0.635 MW. In spite of the small changes observed during the study period, the range of values should be considered normal for a period of volcanic quiescence. The measurement of the total heat flux through the ground surface can provide valuable information about the changes in the energy balance of the volcanic system and also improve early warning system of the volcano.

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