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Heat flux measurements at Teide Volcano, Tenerife, Canary Islands, by means of thermal imaging

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Nowadays, scientific surveys to evaluate the thermal energy release from volcanoes are very tedious and involve performing numerous measure points to determine the heat flux of a specific area. This study tests a new method to calculate the heat flux from Teide inner crater using thermal images without the need for on-site heat flow campaigns. So far, panoramic infrared images of the study area and infrared images of thermal anomaly zones at a distance of 1 meter have been carried out in a monthly basis with a FLIR T660 thermal camera. Soil temperature of study area was also measured with a K-type thermocouple in order to compare the results between the temperature measured with the thermocouple and the one obtained by the thermal camera. The method developed in Marotta et al. 2019 to determine the heat flux from thermal images will be adapted to the peculiarities of the Teide stratovolcano, such as the topography of the inner crater. To check the reliability of the method, values obtained with a heat flux sensor, by means of the temperature gradient and those resulting from the application of the developed method are compared. Finally, the error associated to the use of thermography at a greater distance to calculate heat flux is analysed by comparing the results obtained when applying the method with thermographic images taken at 1 meter with the results obtained when applying it with the panoramic thermal images of the crater, taken at approximately 50 metres.