



Temporal monitoring of radiative heat flux from the craters of Tendürek volcano (East Anatolia, Turkey) using ASTER satellite imagery

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Tendürek volcano is situated in the Eastern Anatolia near Turkish-Iranian border. It is one of the youngest volcanoes of Eastern Anatolia and it is a polygenetic, basaltic shield volcano formed by successive basalt flows. Tendürek is characterized by alkaline volcanism. Holocene and historical activity has been reported. Hydrothermal activity have been observed on the twin summit craters. Fumaroles, steam vents, steam/gas emission and zones of hot grounds have been reported. In order to quantify and to determine a base value for the current thermal state of the volcano, we used ASTER Thermal Infrared spectra. Four ASTER daytime and nighttime images have been used to calculate radiative heat flux from the craters. Heat flux calculations have been made using three nighttime images and a daytime image acquired in 2002, 2004, 2008 and 2012. Images have been atmospherically corrected, temperature and emissivity have been separated and Land Surface Temperature (LST) has been calculated from 5 thermal bands. LST images have been topographically corrected. Heat flux have been calculated using corrected surface temperature data, emissivity, vapor pressure and height-dependent air temperature values. Maximum temperature anomalies observed were 9.0 °C and 15.9 °C for the western and eastern craters respectively. Heat flux is estimated between 14.4 and 25.2 W/m² at the western crater and between 16.5 and 49.4 W/m² at the eastern crater. These values are well correlated with other known low-level activity volcanoes such as Yellowstone, Stromboli and Nisyros, whereas they are lower than that of observed at Vulcano.