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Volcanomagnetic monitoring in Tenerife (Canary Islands, Spain): MultiTeide Project in progress

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During October 2016, a network of five Overhauser magnetometers was deployed in the central part of Tenerife Island (Canary Islands, Spain), around the edifices of Teide and Pico Viejo stratovolcanoes. This volcanomagnetic network is a collaborative effort between the Instituto Geográfico Nacional (IGN) and the Instituto Geológico y Minero de España (IGME), the Spanish institutions in charge of volcanic monitoring and long-term geologic risk assessment, respectively. The network was set in the context of MultiTeide research project, whose main aim is the multiparametric study of the present level of activity in the central Tenerife volcanic complex. Until now, in addition to the magnetic network, MultiTeide has installed a seismic array, two self-potential (geoelectrical) continuous measuring stations, two heat-flux sensors and has performed four reiterative field campaigns to measure ground temperature, CO_2 diffuse flux and self-potential in selected areas of the upper-Teide hydrothermal field. The MultiTeide volcanomagnetic network has been operating now for more than one year, with four stations measuring the total geomagnetic field intensity (F) at a sampling rate of 1 minute and the fifth one at 10 s resolution. It is expected to operate at least until 2019, allowing us to obtain a baseline of observations long enough to characterize the typical annual, non-volcanic magnetic variation at each of the selected sites. The volcanomagnetic data are being continuously analyzed following the classical approach described by Zlotnicki and Le Mouel (1988) and Zlotnicki (1995), calculating daily averages of total geomagnetic field intensity differences (ΔF) between the network stations and a reference station farther away from the studied zone. As reference station we use Güímar Geomagnetic Observatory (Tenerife Island; IGN-INTERMAGNET) in order to reduce external ionospheric-magnetospheric variations. The temporal evolution of these daily averages is compared both with volcano-seismic proxies (when present) and with external geomagnetic indexes (always) to discriminate possible volcanomagnetic signals from geomagnetic external variations. During the period of operation of this network, Tenerife Island has experienced the occurrence of several small to very small seismic swarms, without any clear ground-deformation or geochemical associated signals. According to the preliminary analysis of the geomagnetic data presented here, we have not detected any clear magnetic signal associated with these small seismic swarms.