



The 2014 eruption of Fogo volcano investigated by InSAR, modelling and field observations

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After 20 years of quiescence, Fogo volcano (Cape Verdes) initiated an eruption on 23 November 2014. The eruption had significant precursors, such as degassing and seismicity, and occurred at a similar location as in 1995. Lava flows rapidly propagated to inhabited regions, a significant part of the Islands' population has been replaced in the towns of Portela and Bangaeira. In an attempt to better understand the physics of this eruption, here we detail on ground deformation that is investigated using the synthetic aperture radar interferometry method. The data comes from the Sentinel-1 satellite, a new platform of the European Space Agency. Data acquired in ascending and descending orbit before and during the eruption, reveal significant displacements in the Cha das Caldeiras region. By using a Boundary Element Method we are able to model the data by applying a dike striking NE-SW, steeply dipping to the southeast. As the satellite data was acquired at different time increments we are furthermore able to image the location of the active dike changing in time and space. To explain this geometry, we compare the parameters of the dike to the topographic stress field and also discuss a possible reactivation of pre-existing structures. Field data allows to quantify the volume of the lava flow, which we then compare to the initial dike volume. This work demonstrates a scenario where a magma pathway is reused in two consecutive eruptions that are 20 years apart, with important implications of the general volcano-tectonic framework and stress field of the island.