



Shallow dyke emplacement and related hazard during the 2007 Stromboli eruption

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On 27 February 2007, a lava flow erupted from the northern base of the North-East Crater of Stromboli. In few minutes, an eruptive fissure propagated downslope along a NE-SW alignment, feeding abundant effusive lava flow emission at 650-600 m a.s.l. Then, the fissure propagated further downslope, varying its strike to NW-SE and becoming parallel to the northern rim of the Sciara del Fuoco (SdF) collapse depression, reaching a minimum elevation of about 400 m asl where a new eruptive vent opened. This propagation was associated with the development of surface fractures, arranged with a horseshoe-like shape. After few hours, the 650-600 m vent stopped its activity. Contemporary to the propagation of the fissure, the uppermost fracture system collapsed, forming a NE-SW trending graben-like feature ~130 m wide and >30 m deep, showing a component of translation towards NW, i.e. seaward. The opening of the 400 m vent drained the magma from the central conduit, causing the progressive foundering of its internal walls and the enlargement of the summit craters area. On 8 March, the 400 m vent interrupted its activity. At the same time, a progressive, significant inflation of the upper portion of SdF was registered by the Stromboli monitoring network. On 9 March, vent 2 reactivated and, in addition, a new eruptive vent opened at ~500 m a.s.l. Immediately after, the inflation monitored within SdF started to fade. The 500 m vent ceased to erupt after about one day, whereas the 400 m vent continued its effusive activity. An explosion at the summit craters was observed on 15 March. The eruption ended in the night between 2 and 3 of April, following the progressive decrease of magma output from the 400 m vent. The eruption lasted 35 days, emitting $\sim 9 \times 10^6$ m³ of magma. The 2007 Stromboli eruption showed similarities and

differences in the eruptive behaviour and the deformation pattern, with the 2002-2003 eruption, which foremost was characterized by the triggering of a large landslide and a consequent tsunami. The position of the two 2007 effusive vents is remarkably similar to those of the 2002-2003 eruption. On the other hand, the 2007 eruptive activity was not followed by the dramatic mass-wasting events of the 2002-2003 eruption, confining the deformation to the magmatic feeder system itself. This suggests that their triggering also depends on other factors, (i.e. magmatic pressure).