



Multi-disciplinary investigation on a lava fountain preceding a flank eruption: the 10 May 2008 Etna case

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A multidisciplinary approach integrating a wide dataset ranging from bulk rock compositions of the erupted products to volcanic tremor, LP events, tilt and gravity signals, is used to investigate the source depth and magma dynamics of the 10 May 2008 lava fountain at South-East crater (SEC) of Mt. Etna. The investigation was undertaken in the framework of the previous 2007 explosive activity as well as the subsequent effusive eruption beginning 13 May 2008 and lasting up to July 2009.

All the data concur in indicating that the 10 May lava fountain was generated by the fragmentation of a foam layer trapped at the top of a shallow reservoir, about 1500-1700 m below the summit of SEC. The shift from the episodic strombolian/lava fountains activity occurring in 2007 at SEC to the more powerful 10 May lava fountain the following year is explained by the intrusion of a new more primitive magma in the shallow reservoir.

Furthermore, the presented data allows inferring that an attempted magma intrusion east of the summit area occurred during the 10 May fire fountain. This event caused the fracturing and weakening of the surrounding rocks and created a preferential pathway for the penetration of the magma that, only three days later started to feed the 2008-2009 effusive eruption. Finally, we speculate that the 13 May 2008 eruption could have been triggered by the dynamic stress transfer from the M 7.9 earthquake that occurred on 12 May 2008 in Sichuan (China).