



Tales from fissure eruptions at Somma-Vesuvio (Italy)

V. Acocella (1), M. Porreca (1), M. Neri (2), M. Mattei (1) R. Funicello (1)

(1) Dip. Scienze Geologiche Roma Tre, Italy, (2) INGV, Catania, Italy

Fissure eruptions may provide important information on the shallow propagation of magma at volcanoes. Somma-Vesuvio (Italy) consists of the active Vesuvio cone, bordered, to the N, by the remnants of the older Somma edifice. Historical chronicles are considered to define the development of the 37 fissure eruptions between 1631-1944. The 1631 fissure, which re-opened the magmatic conduit, migrated upwards and was the only one triggered by the subvertical propagation of a dike. Other 25 fissure eruptions migrated downwards, when the conduit was open, through the lateral propagation of radial dikes. An analytical solution, of general application, is provided to describe their emplacement. We suggest two scenarios for the development of the fissures. When the summit conduit is closed, the fissures are fed by vertically propagating dikes. When the summit conduit is open, the fissures are fed by laterally propagating dikes along the volcano slopes. Consistent behaviours are found at other large volcanoes, suggesting a general application to our model. At Vesuvio, the historical dataset and our scenarios are used to predict the consequences of the emplacement of fissures after the opening of the conduit. The results suggest that, even though the probability of opening of vents within the inhabited S and W slopes is negligible, the possibility that these are reached by a lava flow remains significant.