



The December 2015 and May 2016 eruptions at Mt. Etna: insight into volcano plumbing system structure by a multidisciplinary approach

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The eruptions of December 2015 and May 2016 at Voragine crater were among the most explosive recorded during the last two decades at Mt. Etna volcano. Here, we present and analyzed data coming from geophysics (infrasound, LP, VLP, volcanic tremor, VT earthquakes, ground deformations) and petrology (textural and micro-analytical data on plagioclase and olivine crystals) in order to investigate the pre-eruptive magma storage and transfer dynamics leading to these exceptional explosive eruptions. Integration of all these data has led us to constrain chemically, physically and kinetically the environments where magmas were stored before the eruption, and how they have interacted during the transfer en-route to the surface. Although the evolution and behavior of volcanic phenomena at the surface was rather similar, we observed that the 2015 eruptions have been fed by magmas stored at shallow levels (that were pushed upward as a response of magma injections from more deep environments), whereas evidence of chemical interaction between shallow and deep magmatic environments becomes more prominent during the 2016 eruptions.