



Insight into eruptive cyclic behavior of Mount Etna during 2011: geophysical and geochemical constraints

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The period 2009-2011 at Mt. Etna was characterized by a gradual intensification of volcanic activity. In particular, after the end of the 2008-2009 eruption a resting phase took place and lasted up to the first months of 2010. In 2010 several episodes of minor explosions, taking place at the summit craters and accompanied by mild ash emissions, testified the ongoing recharging phase started at the end of 2009 suggested by ground deformation GPS data. During 2011 volcanic activity culminated with a series of 18 lava fountains, occurring at the new South-East crater. A multiparametric approach, consisting in collecting and comparing volcanological, geophysical and geochemical data, was applied to investigate the volcano dynamics during 2009-2011. In particular, temporal and/or spatial variations of volcanic tremor, long period events, very long period events, soil deformation (GPS and tiltmeter data), SO₂ flux, SO₂/CO₂ ratio were studied. Further, on the basis of such data FEM models were developed to follow the evolution of intrusive and eruptive processes. In conclusion, new insights into the geometry of the magma plumbing system feeding the fountaining activities, as well as into the processes of magma discharge and recharge, were obtained.