



The initial phases of the 2008-2009 Mt. Etna eruption: a multi-disciplinary approach for hazard assessment

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Between 2007 and early 2008, the INGV monitoring networks on Etna volcano recorded a recharging phase that climaxed with a new effusive eruption on 13 May 2008, and lasted about 14 months. A dike-forming intrusion was accompanied by a violent seismic swarm, with more than 230 events recorded in the first six hours, the largest being $ML = 3.9$. In the meanwhile, marked ground deformation was recorded by the permanent tilt and GPS networks, and sudden changes in the summit area were detected by five continuously recording magnetic stations. Poor weather conditions did not allow direct observation of the eruptive events, but important information was provided by infrared satellite images that detected the start of lava fountains from the eruptive fissure, feeding a lava flow. This flow spread within the Valle del Bove depression, covering 6.4 km on the south-eastern flank of the volcano in a few hours. The seismicity and deformation pattern indicated that the dike-forming intrusion was propagating northwards. It produced a dry fracture field, which generated concern for the possibility that the eruptive fissures could expand downslope towards populated areas. Monitoring and modeling of the multi-disciplinary data, together with the simulations of ash dispersal and lava flows, allowed us both to infer the eruptive mechanisms and provide a correct interpretation of the ongoing phenomena, furnishing useful information for civil defense purposes. We describe how this approach of feedback between monitoring and research provides critical support to risk evaluation.