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Etna Volcano Erupts Again on 13 May 2008: and Magnetic Field Monitoring is a Key Part of Picture

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Remarkable changes in the local magnetic field were observed during the onset of 2008 volcanic crisis at Mt Etna. On the morning of 13th May, significant local magnetic field changes marked the resumption of the eruptive activity characterized by the opening of a 800 m wide fracture field on the northern flank, and an eruptive fissure in the Valle del Bove. The near-real time magnetic data provided a continuous updating of the volcano activity state on the northern flank. Magnetic variations, with amplitude ranging between 1.8 nT and -6.5 nT, are consistent with those calculated from piezomagnetic models, where stress-induced changes in rock magnetization are produced by the magmatic intrusion. We associated the significant magnetic changes only to the northward propagation of the magmatic intrusion. Further evidence supporting this hypothesis is the presence of rapid coseismic magnetic changes with amplitudes from 0.5 nT to 1 nT clearly identified at the northern stations in correspondence of 4 most energetic seismic events. In agreement with the northward propagation of seismic events, magnetic signals at 5 stations in the summit area revealed a nearly NNW-SSE oriented magmatic intrusion, which at about 9:00 GMT was rapidly injected from the central conduit and laterally propagated along the northern flank for about 2 km producing a NNW-SSE fracture field. Intrusion stopped at 14:00 GMT before reaching the North-East Rift structures and no lava emission occurred. The effusive activity from fissures in the Valle del Bove could have drained magma reducing the magma pressure of the northern intrusion. The magnetic data gave hints about the spatio-temporal evolution of the magmatic intrusion on the northern flank. On the basis of the past activity, this scenario alerted the scientific community for the volcanic and seismic hazard related to the northern flank of the volcano.