

Stability analysis of the Ischia Mt. Nuovo block, Italy, under extreme seismic shaking

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In this work we investigate the equilibrium conditions of the Mt. Nuovo block, a unit that is found on the northwestern flank of Mt. Epomeo in the Ischia Island, Italy, using the Minimum Lithostatic Deviation Method (Tinti and Manucci 2006, 2008; Paparo et al. 2013). The block, involved in a deep-seated gravitational slope deformation (DSGSD, Della Seta et al., 2012) process, forms an interesting scenario to study earthquake-induced instability because i) Ischia is a seismically active volcanic island; ii) the slopes of Mt. Epomeo are susceptible to mass movements; iii) there exist an abundant literature on historical local seismicity and on slope geology.

In our slope stability analysis, we account for seismic load by means of peak ground acceleration (PGA) values taken from Italian seismic hazard maps (Gruppo di Lavoro MPS, 2004), and integrated with estimates based on local seismicity and suitable (MCS) I – PGA regression laws. We find that the Mt Nuovo block could not be destabilised by the 1883 Casamicciola earthquake (that is the largest known historical earthquake in the island taking place on a fault to the north of the block), but we find also that if an earthquake of the same size occurred in the Mt. Nuovo zone, the block would be mobilised and therefore generate a tsunami (Zaniboni et al, 2013), with disastrous consequences not only for Ischia, but also for the surrounding region.

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