



Biotechnical slope stabilization measures in the Phlegraean district (Italy)

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Landslides are, for the whole Italian territory, one of the main sources of geological hazards. Campania stands among the first Italian regions as regards the landslide susceptibility and hazard, having suffered, in the period 1918-1996, consequences from more than 3000 events (about 10% of the total number). This paper deals with a case-study located within the Campi Flegrei, one of the Campanian volcanic districts and, in particular, along the northern slope of the highest peak of the Phlegraean district, the Camaldoli hill (458 m a.s.l.). Here, loose pyroclastic terrains, ejected during several explosive eruptions, prevail in outcrop, resting over a bedrock made up of volcanic tuffs, the main of which is represented by the Neapolitan Yellow Tuff (12 ka). In the last decade, the Camaldoli hill has been repeatedly affected by rainfall-induced landslides which have represented a serious menace for the local population: in fact, some of the most densely inhabited districts of the city of Naples are located at the foot of the Camaldoli hill. Surficial soil slides (ranging from less than 0,5 to 1,5 m in depth), rarely evolving into channelized debris flows, are the dominating typology among mass movements, whose detachment area shows slope angles ranging between 30° and 60°, while the mobilized volumes only occasionally exceed some hundred cubic metres. Along the northern slope of the Camaldoli hill runs a road which connects Naples with the towns of Quarto and Marano. This road has been often interested by small-scale mass movements, which induced local authorities to commit a project devoted to the landslide hazard mitigation. Among the remedial measures adopted a major role was assigned to biotechnical slope stabilization works, such as vegetated timber walls and geogrids, contour wattling, brush layering and others. Having monitored the bioengineering works some years after their realization, some conclusive remarks are

referred to their effectiveness in the landslide hazard mitigation.