

CHARACTERIZATION OF LANDSLIDE TRIGGERING IN THE CIRCUM –VESUVIAN AREA BASED ON GEOLOGICAL, MORPHOLOGICAL, HYDROLOGICAL AND MECHANICAL DATA

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Landslides kill between 25 and 50 people each year in the United States. The worldwide death toll per year is much higher. One of the most hazardous sites, is the densely populated area of Naples surrounding the Vesuvio volcano in southern Italy. Here the stability of the slope is a major concern, and landslides happen here with a very high frequency. An example is illustrated by the May 5, 1998, debris flow at Sarno, Siano, Quindici and Bracigliano, that killed more than 150 people, and caused several million Euros in damage.

Recently, a new site investigation approach has been developed to study the catastrophic 30 April 2006, debris flow on Ischia Island, off the coast of Naples. Light and portable equipment, was used to measure the topography in the landslide scar; to carry out penetrometric analyses, and to run permeability evaluation tests in several layers. Also laboratory tests on the pyroclastic soils were conducted to characterize physical-volumetric and index properties.

In my PhD research I will develop a new model that represents an improvement over existing models which are based on an infinite slope, due to the lack of topographic data. The new model will be based on reconnaissance of a rotational kinematics of the initial slides. The volumes of soils involved, as well as the pore pressure developed in the bulk will be estimated with a lower uncertainty, in the area where the slide was initiated. By means of back analysis, applied for several water flow conditions, it will be possible to obtain values of the pore pressures and finally of the rainfall height/intensity that leads to triggering of the debris slide.

To achieve a result that is as rigorous as possible, other elements will be considered:

1. The results obtained from back analysis will be compared with available data from rain gauges, taking into account the high spatial variability in rainfall (in this sense, reports from local folks can be a useful “empirical” component in the estimates)
2. Transfer the methodology developed for the Ischia landslide to other settings such as the Sarno area, or in other locations where the landslide topography is still evident.
3. Mechanical characterization of the soil involved in the slide will be undertaken using classical laboratory tests.