



The February 28, 1868 Mt. Echia rockfall in the framework of the historical and present-day landslide activity at Naples, Italy

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Naples is one of the Italian cities most severely affected by different kinds of instabilities, all related to the peculiar geological and geomorphologic setting. The city in fact rests on a subsoil prevalingly made of pyroclastic deposits, altogether related to the explosive activity of the Phlegrean Fields; as a consequence, loose volcanoclastics lie on a welded tuff, the Neapolitan Yellow Tuff (NYT). From a geomorphologic standpoint, the city is characterised by a hilly landscape. Such hills, partly “conquered” by man in far historical times, have been intensely urbanised only after the World War II. Man began to cope with this setting since early historical times: the first evidence of human presence and activity in the Neapolitan urban area goes back to about 4500 yrs. BP. However, the first colony established by Greek refugees dates to 7th century BC (Parthenope), followed by a second, more important settlement dated about 470 BC (Neapolis). Consequently, many morphological features of the original landscape were deeply altered, as occurred to the streams which were filled or almost entirely covered by the urban network of buildings and infrastructures. On the other hand, many slopes were interested by human activity, such as open-pit quarry exploitation, or historical and recent-times large settlements. Notwithstanding the present-day dramatic urbanization (1 million people in about 110 km²), a slope morphodynamics is still active in Naples, especially along the steep slopes of the western area (Agnano, Camaldoli, Posillipo), unsuitable for an extensive utilization for urban purposes. In this context, linear and areal erosion, along with mass movements are responsible for the evolution of local slopes. The main channels of the area feed small-scale fans, still active as proved by flooding events occurred also in very recent times (e.g. January 1997, September 2001, December 2004, March 2005). These events gained a special

attention on mass movements from local and State governors. The most important slope-instability crisis, in particular, was that of January 1997, when about 300 shallow landslides, mostly of the soil slide-debris flow type, involved essentially the loose pyroclastics younger than 12,000 yrs. BP, causing severe damages to man-made structures. However, the worst event reported is antecedent to the period considered. It in fact occurred in 1868: on February 28, a huge volume of NYT fell from Mt. Echia (a small hill overhanging the Chiaia urban district), reaching, after a travel of some hundred metres, Castel dell'Ovo and blocking the whole area for several days. On that occasion, 60 victims and tens of injuries were registered. After the event, a legal suit went on for about 40 years, whose documents have been found and analysed during the present research. In this paper, the main features of the 1868 Mt. Echia rockfall are described, along with the local geological and geomorphologic setting. The peculiar slope instability occurred at Mt. Echia is also treated in comparison with urban landslides of Naples, which are known over a time span from the 19th century to the present, giving special attention to the related triggering factors.