



## **A database on flood and debris-flow processes in alluvial fans: a preliminary analysis aimed at evaluation of the damage**

Carmela Vennari (1,2), Nicoletta Santangelo (2), Antonio Santo (2), and Mario Parise (1)

(1) IRPI-CNR, Italy (c.vennari@ba.irpi.cnr.it), (2) Università di Napoli Federico II, Naples, Italy

Debris-flow and flood events cause yearly wide damages to buildings and infrastructures, and produce many casualties and fatalities. These processes are very common in Italy, affecting mainly torrential stream basins with different geological and morphological settings: in the Alpine mountain areas they are quite well analysed, whilst much less attention is generally paid in contexts such as those of the Apennines mostly due to the minor frequency of the events. Nevertheless, debris-flows and flood processes occur along many alluvial fans, have greatly contributed to their building up, and are therefore worth to be studied. Along many areas of the Southern Apennines, coalescent alluvial fans are a widespread geomorphic unit, typically located at the foot of steep slopes. In most cases these areas correspond to the more highly urbanised sectors, generally considered to be safer than the bottom valley, as concerns the direct effects from flooding. During intense storms, villages and towns built on alluvial fans may be affected by flooding and/or debris flow processes originated in the above catchment, and rapidly transferred downslope due to the steep slopes and the torrential character of the streams. This creates a very high hazard to the population and is at the origin of the severe and recurrent damage to urban settlements.

Starting from the above considerations, we compiled a catalogue of flood and debris-flow events occurred in Campania Region, southern Italy, by consulting very different information sources: national and local newspapers and journals, regional historical archives, scientific literature, internet blogs. More than 350 events, occurred in Campania from 1700 to present, were collected.

Information on time of occurrence and location are available for each event, with different level of accuracy, that is typically lower going back to the oldest events for which only the year or the month of occurrence of the event was identified; nevertheless, for more than 75 % of the collected data, the complete date of occurrence is known. All the provinces of Campania are affected by debris-flow and flood processes, but the most interested appear to be Naples and Salerno. Debris flows and flood produced in the Region more than 2400 fatalities, about 200 injured people, and about 100 missing people, with more than 6000 homeless. Very harmful were the events occurred in 1581, 1841, 1910, 1924, 1954, 1998; each of these caused more than 100 fatalities. With regard to homeless, the most damaging event took place in the area of Salerno, causing more than 5000 homeless.

Buildings and infrastructures were also involved by the events dealt with here. A third of the processes included in the catalogue caused the total destruction of private buildings, and serious damage to communication routes (roads and railways), pipelines, factories and architectural structures. The most disastrous season, as concerns the damage to infrastructures and humans, is the autumn.

The catalogue is still in progress, being continually updated for new events, but, at the same time, continuing to perform archive and literature scrutiny as regards the past events. Further, another important part of the research is the investigation of the link with the triggering events (rainfall): at this aim, daily (or hourly, when available) pluviometric data are being analysed. Our final goal is to provide a method to estimate hazard assessment in alluvial basins torrents, that might be exportable in similar geological-geomorphological contexts. In such an effort, the first and mandatory step is the collection of historical data.