Geophysical Research Abstracts
Vol. 19, EGU2017-17378, 2017
EGU General Assembly 2017

Hydro-Geological Hazard Temporal Evolution during the last seven decades in the Solofrana River Basin—Southern Italy

Antonia Longobardi (1), Nazzareno Diodato (2), and Mirka Mobilia (1)

(1) Department of Civil Engineering, University of Salerno, Italy (alongobardi@unisa.it), (2) Met European Research Observatory, HyMex Mediterranean Experiment Network, Italy

Extremes precipitation events are frequently associated to natural disasters falling within the broad spectrum of multiple damaging hydrological events (MDHEs), defined as the simultaneously triggering of different types of phenomena, such as landslides and floods. The power of the rainfall (duration, magnitude, intensity), named storm erosivity, is an important environmental indicator of multiple damaging hydrological phenomena. At the global scale, research interest is actually devoted to the investigation of non-stationary features of extreme events, and consequently of MDHEs, which appear to be increasing in frequency and severity. The Mediterranean basin appears among the most vulnerable regions with an expected increase in occurring damages of about 100% by the end of the century. A high concentration of high magnitude and short duration rainfall events are, in fact, responsible for the largest rainfall erosivity and erosivity density values within Europe. The aim of the reported work is to investigate the relationship between the temporal evolution of severe geomorphological events and combined precipitation indices as a tool to improve understanding the hydro-geological hazard at the catchment scale. The case study is the Solofrana river basin, Southern Italy, which has been seriously and consistently in time affected by natural disasters. Data for about 45 MDH events, spanning on a decadal scale 1951–2014, have been collected and analyzed for this purpose. A preliminary monthly scale analysis of event occurrences highlights a pronounced seasonal characterization of the phenomenon, as about 60% of the total number of reported events take place during the period from September to November. Following, a statistical analysis clearly indicates a significant increase in the frequency of occurrences of MDHEs during the last decades. Such an increase appears to be related to non-stationary features of an average catchment scale rainfall-runoff erosivity index, which combines maximum monthly, maximum daily, and a proxy of maximum hourly precipitation data. The main findings of the reported study relate to the fact that climate evolving tendencies do not appear significant in most of the cases and that MDHEs occurred within the studied catchment also for rainfall events of very moderate intensity and/or severity. The illustrated results seems to indicate that climate variability has not assumed the main role in the large number of damaging event, and that the relative increase hazardous hydro-geological events in the last decade, is instead most likely caused by incorrect urban planning policies.