Geophysical Research Abstracts
Vol. 19, EGU2017-2231-1, 2017
EGU General Assembly 2017

Analysis of extreme hydrological phenomena in southern Italy (Calabria region)

Tommaso Caloiero (1), Luigi Aceto (2), A. Aurora Pasqua (2), and Olga Petrucci (2)

(1) National Research Council – Institute for Agricultural and Forest Systems in Mediterranean (CNR-ISAFOM), (2) National Research Council – Research Institute for Geo-Hydrological Protection (CNR-IRPI)

Calabria (southern Italy) is a region exposed to the effects of contrasting climatic and hydrological phenomena. In fact, due to its oblong shape, to its position in the middle of the Mediterranean Basin, and for its mountainous nature, Calabria shows a high spatial variability of the climatic features and of related phenomena such as floods and drought.
The present paper is based on the historical database ASICal (Historically flooded areas in Calabria), a catalogue of effects of floods and rain-related landslides that occurred in the region since the XIX Century. The catalogue has been built using the typical historical data sources as chronicles, diaries, historical books, local and regional agencies, press archives, scientific papers, and documents of civil protection offices. From these sources, we selected information on damage caused by rain related phenomena at a municipal scale and chronologically sorted by year, month and day. The analysis of the entire catalogue allows highlighting the regional Damaging Hydrogeological Events (DHE), defined as periods of intense rain causing damage on regional sectors conventionally selected as larger than 30% of the entire regional territory. For each event, as a measure of the magnitude of rainfall, the return period of the daily rainfall recorded during the event has been evaluated.
In addition, we recently carried out a similar historical research to identify the main drought events affecting the region. In this case, due to the spatial and temporal characteristics of drought, data are collected both at municipal and regional scale, and the temporal scale is generally monthly or annual. For each event, we used as climatic descriptors a drought index for monitoring drought phenomena. Among drought indices, we used the Standardized Precipitation Index (SPI) which can be considered the most robust and effective, since it can be calculated for different time-scales and can be used to analyse different drought categories. Moreover, the SPI is easier to calculate than complex indices, as it is based on precipitation alone, and allows comparing drought conditions among different periods and regions.
Both the series have been analysed jointly, in order to obtain the general trend of extreme rain and drought, characterised by mean of descriptive climatic features and damage caused. The results supply a glance in the past climatic history of the region that can be used to project to future and be prepared for ongoing changes related to climate changes. In fact, the identification of the most floods and drought prone areas can be useful for both civil protection mitigation strategies and water resources management (water used for home, industrial, and agricultural purposes).