



Observed Changes In Extreme Precipitation In The North Eastern Side Of Sicily (Italy)

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In Italy, the occurrence of flash floods due to heavy storms, and related consequences on socio-economic activities, become more and more serious and worrying every year. Although, such natural disasters mainly depend on an intensive and usually unplanned soil exploitation, however there is a widespread belief that the effects of climate change plays a major role in worsening the current situation. In particular, many studies have shown that in the last century the average number of rainy days is decreased, whereas precipitation intensity is increased at the same time, as more and more heavy rainfall occur in shorter periods. In Sicily region, the province of Messina is the one with the largest number of sites under flash flood threatening, many of which are located along the Ionian side. As an example, on October 1, 2009, an heavy storm has produced landslides and floodings which have caused 37 victims and more than 2000 evacuated people, as well as severe damages to buildings, infrastructures and economic activities.

In this study, preliminary results of a research aimed at investigating the occurrence of changes in precipitation field over North Eastern side of Sicily (Italy), in recent decades are illustrated, with special reference to extreme values. In particular, daily precipitation series with at least 45 years of records starting from 1951 are selected among those observed at the meteorological stations located along the Ionian side of Messina province.

First, an analysis to assess the presence of trends in annual and seasonal precipitation amount, number of rainy days and average intensity is carried out based on the Sequential Mann-Kendall test for non linear trend detection. With respect to annual values, both the number of rainy days and rainfall amount series show a decreasing trend for all the investigated series. With regard to the average intensity, only the series corresponding to Ganzirri station show a significant decreasing trend. Such results are also confirmed by the trend analysis carried out on the six-monthly records from October to March, which is the period providing the most part of the contribution to the total annual precipitation (more than 75 % on average).

Then, in order to understand whether changes in precipitation are due to a change in the number of days with heavy precipitation or with light precipitation, an analysis of daily rainfall amounts belonging to specific classes defined by thresholds, corresponding to fixed percentiles of daily precipitation, has been carried out. Threshold values have been derived after fitting probability distributions to each station's wet day data for each month of the year.

Results show that the detected decrease in the number of rainy days cannot be ascribed to one class only, whereas decrease in rainfall amount is mainly due to the lower classes for all the stations, which implies a general reduction in the amount of light and moderate rain. No trends are identified for the average intensity. Further researches are ongoing to analyze the effect of detected trends on the assessment of the return period of critical events recently occurred along the investigated area.