



## **Trend analysis of historical rainfall data and correlation with global scale climatic indicators: a case study in Southern Italy (Calabria).**

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In the last years many studies, focused on the climate of the Mediterranean area, have shown that a many environmental variables, such as air temperature, chemical composition of the atmosphere, rainfall and mean sea level, have been experiencing important changes.

Particularly the analysis of the spatial and temporal evolution of precipitations is fundamental to evaluate water resources availability, especially in areas with a marked orography like the Calabria region (Southern Italy). To this aim a lot of different parametric and non-parametric statistical tests can be used for exploratory analyses and detection of monotonic trends in time series data.

The use of global circulation model is allowing also to quantify the effects of planetary scale indicator on regional climatic conditions. Within this purview, some authors have drawn correlations between precipitation with indexes describing some well-known planetary-scale oscillations, like the North Atlantic Oscillation (NAO) and El Niño–southern oscillation.

The present study presents an investigation on the precipitation trends in Calabria using a database of the rain gauges with more than 50 years of observation, and with at least a 5-year observation period in the decade 1991-2000 and a 3-year observation period between 1996-2000. Statistical analyses were performed on precipitation

records (from 1916 to 2000) and the Mann Kendall non-parametric test was applied to the annual and monthly precipitations, detecting significant positive and negative trends at the 95 percent confidence level.

In order to characterize the spatial pattern of trend variability and to determine critical areas where the trend is more pronounced, Geostatistical methods were used to predict trend values at ungauged locations.

Further statistical analyses were performed on seasonal and six months precipitations related to the data series in which a positive or a negative trend at the 95 percent confidence level were detected.

The correlations between precipitation and such global scale climatic indicators were detected in order to find trend analogies.