

Detection of Trends and Break Points in Climatic Indices: The Case of Umbria Region in Italy

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Abstract : The increase of air surface temperature at global scale is a fact, with values around 0.85 °C since the late nineteen century, as well as a significant change in main features of rainfall regime. Nevertheless, the detected climatic changes are not equally distributed all over the world, but exhibit specific characteristics in different regions. Therefore, studying the evolution of climatic indices in different geographical areas with a prefixed standard approach becomes very useful in order to analyze the existence of climatic trend and compare results. In this work, a methodology to investigate the climatic change and its effects on a wide set of climatic indices is proposed and applied at regional scale in the case study of a Mediterranean area, Umbria region in Italy. From data of the available temperature stations, nine temperature indices have been obtained and the existence of trends has been checked by applying the non-parametric Mann-Kendall test, while the non-parametric Pettitt test and the parametric Standard Normal Homogeneity Test (SNHT) have been applied to detect the presence of break points. In addition, aimed to characterize the rainfall regime, data from 11 rainfall stations have been used and a trend analysis has been performed on cumulative annual rainfall depth, daily rainfall, rainy days, and dry periods length. The results show a general increase in any temperature indices, even if with a trend pattern dependent of indices and stations, and a general decrease of cumulative annual rainfall and average daily rainfall, with a time rainfall distribution over the year different from the past.

Keywords : climatic change, temperature, rainfall regime, trend analysis

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