



Climatic patterns and extreme rainfalls on coastal areas in Central Italy

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In this paper we focus on the extreme values analysis to estimate the rainfall return levels for some Adriatic and Tyrrhenian coastal areas in central Italy. Two approaches are mainly considered: the first one is based on the maximum annual daily rainfall series (1-day, 2-day and 3-day) for which suitable probability distributions are fitted, whereas the second one is based on the series of peaks over annual thresholds (POT) for which the best fitting Generalized Pareto distribution is identified. Spectral analysis and appropriate tests for stationarity and homogeneity are run in order to verify the hypothesis under which the analysis performed is valid. From the density plots and the parameter estimates of the fitted distributions to the various annual maximum rainfall series we can conclude that there is a different pattern in the occurrence of extreme events for the western coast with respect to the eastern coast. Specifically, on the Tyrrhenian side extreme rainfalls are more likely to happen in correspondence of longer time spans (i.e. 3-day series) as the effect of cumulated stable rainfalls over time. On the opposite, for the Adriatic coast extremes are more frequent in shorter time spans (1-day). A vector autoregressive model is then estimated and through a causal ordering the identifying restrictions are set. The impulse response analysis shows a lag in the transmission of rainfall shocks of the central Adriatic coast to the Tyrrhenian one.

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