

MedCLIVAR: Mediterranean Climate Variability Extreme precipitation in the Mediterranean: statistical characterization and associated large-scale atmospheric circulation

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The Mediterranean region has been suffering an increasing vulnerability to climate extremes. These extremes have strong impacts on population and economy in terms of financial losses (e.g. damages to infrastructures) and fatalities. In order to reduce the impact of these events improving the development of adequate strategies of risk reduction, it is essential to achieve a reliable characterization (at a high resolution spatial scale) of climate extremes in terms of statistical features and associated dynamics. The statistical characterization of extreme precipitation (observed or simulated by a GCM/RCM) is a complex topic. Extreme precipitation events in the last years have been characterized with methods and procedures developed in the context of Extreme Value Theory. However, several aspects have not yet been fully addressed. In this framework, an analysis performed on a large data set of more than 400 series of quality controlled daily precipitation series, that mainly cover the last six decades, is presented. A novel procedure, that comprises of recently developed methods and is based on Peak Over Threshold approach, has been implemented and applied to each series. Results show remarkable sub-regional differences along the Mediterranean basin, with high return levels estimated at coastal sites. The associated large-scale atmospheric circulation highlights the contribution of several factors, acting at different spatial scales, and their interaction to the development of these events. Relevant common features, in terms of anomalies of geopotential height and subtropical/eddy driven jet streams, have been also identified and reported.