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Climate change indices for Andalucia, Southern Spain

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Climatic change scenarios identify the Mediterranean area as one of the most probably affected by global warming, with both increases in temperature values and loss of precipitation. This study presents the analysis of the evolution of three different meteorological variables – daily maximum and minimum temperature and daily precipitation – measured at 33 different observatories covering Andalucia (Southern Spain). This analysis confirms the existence of a trend toward higher temperature values, both for maximum and minimum temperature with a different behaviour over eastern and western Andalucia. Geographic differences have been found even for this relatively small area. Thus, difficulting the use of a single climatic change index for the whole region and stressing the necessity of the use of a local approach. The easternmost region shows more intense trends when maximum temperature series are analyzed, especially during winter and spring, while the western area is characterized by a more intense variation for minimum temperature and mostly during spring. Trends in summer and autumn series are not so intense and are not significant at many of the observatories. Finally, in order to identify the physical mechanisms responsible of the observed differences, several ad-hoc defined climatic indices accounting for extreme weather events (cold or warm extremes; or extreme precipitation events) have been defined and analyzed at a seasonal scale.