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CLIVAR-SPAIN contributions: Spatial and temporal daily rainfall regime in Catalonia (NE Spain) derived from four precipitation indices, years 1950-2000

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Annual rainfall amount, P, number of rainy days per year, N, average daily intensity in a year, I , and relevance, R, of the contribution of a rainfall class interval to the annual amount are used as pluviometric indices to deeply analyse the description of the complex behaviour of the daily rainfall regime of Catalonia (NE Spain). For this analysis, daily amounts of rainfall from 75 rain gauges for the period 1950-2000 have been considered. Indices N and I are analysed by distinguishing five percentiles (25th, 50th, 75th, 90th and 95th) of the daily rainfall amounts. Index R is evaluated taking into account <25%, 25-50%, 50-75%, 75-90%, °›90% and °›95% class intervals. All these indices are described by their mean annual values, standard deviations and consecutive temporal irregularities. Besides the complex orography of the country, effects of the influence of the Mediterranean regime and remoteness of the Iberian Peninsula to the Atlantic coast are detected in the diversity of spatial patterns of the indices. The influence of the Atlantic regime is also found at some places in the Pyrenees, especially those north-faced. All these features are described through a Principal Component Analysis (PCA), which is applied to average annual values of the pluviometric indices, and the subsequent clustering process. Additionally, time trends of the annual indices are analysed for a selected set of 39 rain gauges with an optimum recording continuity. Trends are derived from linear regression, and local statistical significances at the 95% confidence level are established using the Mann-Kendall test. Field significant trends are investigated by means of Monte Carlo simulations. It is worthy of mention that field significant trends have been detected in the number of rainy days for percentiles up to the 75th, all local trends being negative. Field significant trends are also detected in daily intensity, whatever the threshold level, with positive and negative local trends. The relevance index R depicts field significant trends for the first three class intervals, with a predominance of positive local trends in the first two, thus indicating an increasing contribution of light and moderate daily episodes to the annual amounts. Keywords: CLIVAR-SPAIN, CLIMATE VARIABILITY AND CHANGE, SOUTHWESTERN EUROPE