



Several statistical distributions for the analysis of extreme dry spells in Catalonia (NE Spain)

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Statistical distributions of annual extreme and long dry spells, referred to daily rain amount thresholds of 0.1, 1.0, 5.0 and 10.0 mm/day, are analysed from a database of 39 rain gauges in Catalonia (NE Spain) with a daily recording period extending from 1950 to 2000 and with a minor lack of data. By one hand, the generalised extreme value (GEV) and generalised Pareto (GP) distributions are considered to model the series of annual extreme dry spells (AES). On the other hand, the same distributions are assumed for the partial duration series (PDS), which are derived from dry spells exceeding the 95% percentile. In both cases, the three parameters of the GEV and GP distributions are estimated by means of the L-moments method, which offers a robust estimation of these parameters. Additionally, the fit between empirical data and theoretical distributions is evaluated in terms of the empirical and theoretical L-skewness and L-kurtosis. Even though AES are commonly well fitted by the GEV model, the GP model is a better option for some rain gauges. Similarly, in the case of the PDS, a very few cases are better modelled by the GEV distribution. From a more applied point of view, the spatial spreading of the parameters is extensively analysed by detecting common features with the complex orography of Catalonia. Additionally, the basis for climatic drought risk assessment in Catalonia is established given that dry spell lengths associated with return periods of 2, 5, 10 and 25 years are accurately revised by comparing results deduced from the GEV and GP models, both for the AES and PDS series.