



Statistical distributions of daily rainfall regime in Europe for the period 1951-2000

August Burgueño (1), Maria Dolors Martinez (2), Carina Serra (3), and Xavier Lana (3)

(1) Universitat de Barcelona, Dept. Astronomia i Meteorologia (auburguen@gmail.com), (2) Universitat Politècnica de Catalunya, Dept. de Física Aplicada, Barcelona, Spain (dolors.martinez@upc.edu), (3) Universitat Politècnica de Catalunya, Dept. de Física i Enginyeria Nuclear, Barcelona, Spain (carina.serra@upc.edu, francisco.javier.lana@upc.edu)

Amount and time distributions, X and Y , of daily rain amounts in Europe along the second half of 20th century have been studied from 267 rain gauge records. The largest daily percentiles of amount and time distributions are reached at latitudes south of 50°N and in south-western Norway. The amount distribution, X , is well modelled by the exponential function, with parameters derived from probability graphs. Time distributions, Y , are well fitted by Pearson type III (Gamma) and Weibull models, their parameters being estimated by L-moments. Normalised rainfall curves, NRC, have been modelled by the analytical function , with b and c parameters depicting spatial variability. Alternatively, the beta distribution also describes quite well the empirical NRCs, with parameters estimated by statistical moments. The coordinates of the average daily amount (X_r , Y_r) and the values of X^* and Y^* , which are defined as the fraction of rain amount for a half of rainy days and the fraction of number of rainy days accounting for a half of total rain amount respectively, depict very similar spatial distribution throughout Europe. Finally, the Average Linkage algorithm applied to the coordinates X_r , Y_r , X^* and Y^* characterising every one of the 267 NRCs permits to group the rain gauges into several spatial clusters, each of them related to a different normalized daily pluviometric regime.