



## Trends of dry spells in Europe (1951-2000)

Carina Serra de Larrocha (1), M. Dolors Martínez Santafé (2), Xavier Lana Pons (1), and Augusto Burgueño Rivero (3)

(1) Departament de Fisica i Enginyeria Nuclear, UPC, Barcelona (carina.serra@upc.edu), (2) Departament de Fisica Aplicada, UPC, Barcelona, (3) Departament d'Astronomia i Meteorologia, UB, Barcelona

Series of dry spells in Europe have been calculated for four different thresholds (0.1, 1.0, 5.0 and 10.0 mm/day) at annual scale and winter, spring, summer and autumn seasons. Daily rain records pertaining to the period 1951-2000 are most of them complete. Database, consisting of 267 rain gauge records, has been obtained from the European Climate Assessment and Dataset (<http://eca.knmi.nl>) and the Agencia Española de Meteorología of the Spanish Government (<http://www.aemet.es/>). First, some indices related to dry spells have been calculated: the number of dry spells per year, N; the longest dry spell per year, Lmax; and the average dry spell length per year, L. Second, the mean values of these three indices are spatially plotted for the different thresholds and at annual and seasonal scales. And third, time trends of these variables are derived by means of the Kendall-Tau algorithm and statistical significances at 95% confidence level are assessed by using the Mann-Kendall test. Most of significant trends for N are negative for all thresholds and seasons. Summer and winter are the seasons with more stations with significant negative trends. As an example, for 1.0 mm/day, 67 stations for summer and 53 for winter are characterised by significant negative trends. In summer they are located in Western Europe for latitudes ranging 40° N to 60° N and longitudes 10° E to 20° W. In winter they are distributed along a fringe extending toward the eastern regions, from 40° N to 50° N and from 0° E to 35° E, with average negative trends representing a decrease of dry spells per decade ranging from 3.5 to 4.0%. Positive trends on L are dominant at annual scale and the winter season for 0.1 mm/day and in the summer season for 0.1 and 1.0 mm/day. These time trends on L represent an increase on the number of days per decade varying within the interval 6,0-8,0%. Spring and autumn seasons are characterised by their numerous negative trends for L and 10 mm/day, with average trends of 4,5% per decade. Stations with negative significant trends are spread across Europe, except the Mediterranean coast, which is free of these negative trends on L. Lmax depicts a nucleus of positive trends in summer for all thresholds, which is delimited by 45°N – 55°N and 0° E - 10° E. These positive trends represent outstanding increases on Lmax close to 10% per decade.