



Spatial and statistical features of extreme residuals of daily maximum and minimum temperatures in Catalonia (NE Spain), years 1950-2004

C. Serra (1), M.D. Martínez (2), X. Lana (1), A. Burgueño (3)

(1) Departament de Física i Enginyeria Nuclear, Universitat Politècnica de Catalunya, Barcelona, Spain, (2) Departament de Física Aplicada, Universitat Politècnica de Catalunya, Barcelona, Spain, (3) Departament d'Astronomia i Meteorologia, Facultat de Física, Universitat de Barcelona, Barcelona, Spain (dolors.martinez@upc.edu / Fax: +34 934016090)

Extreme residuals of daily maximum and minimum temperatures are analysed for a set of 65 thermometric gauges in Catalonia (NE Spain) during the 1950-2004 recording period. The partial duration series (PDS) sampling strategy is chosen in preference to the annual extreme series (AES), due to its advantages. PDS are defined according to the mean excess plot procedure, instead of using a common percentile threshold for all gauges. In terms of the L-moments formulation, the extreme series are modelled by the Generalised Pareto (GP) distribution. Extreme residuals of daily maximum and minimum temperatures for all the gauges are deduced and represented for return periods ranging from 2 to 50 years. Two daily extreme scenarios belonging to a hot event in August and a cold event in February are simulated by considering the average maximum and minimum temperatures for a selected day of each of these months, their standard deviations and the return period values for 50 years. Both simulations are compared with outstanding real episodes corresponding to August 13th 2003 and February 11th 1956. Additionally, a regionalisation of Catalonia in terms of extreme residuals of maximum and minimum daily temperatures is achieved. Every thermometric gauge is characterized by its return period curve of extreme residuals and a principal component analysis (PCA) is then applied to this set of curves. Using the principal components as variables, a spatial regionalisation is obtained by the AL clustering algorithm. Finally, every cluster is characterised by its average extreme

residual curve for return periods ranging from 2 to 50 years.