



The structure of short-term rainfall: trends in variability studied with data from Portugal

M.I.P. de Lima (1,2), M.F.E.S. Coelho (3), S.C.P. Carvalho (1), J.L.M.P. de Lima (1,4)

(1) Institute of Marine Research, (2) Department of Forestry, ESAC/Polytechnic Institute of Coimbra, Portugal
(iplima@esac.pt), (3) Institute of Meteorology, Portugal, (4) Department of Civil Engineering, University of Coimbra, Portugal

The very important impact of rain on society (e.g. urban drainage), economic activities (e.g. agriculture), land use, water resources and ecosystems justifies the continued exploration of the variability in this process. Increased rainfall variability in recent years has already been reported by different studies, in particular on the basis on annual and monthly point data, and for different geographical locations. However, for some engineering applications, the behaviour of rainfall at different scales is essential for using many hydrological models and hydraulic design approaches that rely on the characterization of rain at specific (smaller) temporal scales.

This work investigates recent trends in the temporal structure of rainfall using short-term point data from Portugal. The data set includes a significant number of stations scattered over the territory. Several rainfall indices and other parameters are analysed with statistical methods that allow determining the statistical significance of the results; these include the study of partial trends. In order to take into account seasonality and serial correlation, the different months of the year were analysed separately. The analyses lead to a characterization of changes in the properties of short-term rainfall over time, particularly within the year. There are also differences over the territory. Both are strengthening the well-known strong seasonal and regional character of rain in Portugal. The relevant factors affecting rain variability, in time and space, can lead to contrasting statistics which should be carefully taken into account in design procedures and decision making processes. This is particularly relevant in regions where the rainfall climate exhibits non-homogeneous structure.

This work has been carried out under research project PTDC/GEO/73114/2006, funded by the Portuguese Foundation for Science and Technology.