



Short-term rainfall: its scaling properties over Portugal

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The characterization of rainfall at a variety of space- and time-scales demands usually that data from different origins and resolution are explored. Different tools and methodologies can be used for this purpose.

In regions where the spatial variation of rain is marked, the study of the scaling structure of rainfall can lead to a better understanding of the type of events affecting that specific area, which is essential for many engineering applications. 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.

One such region is Mainland Portugal; the territory is located in the transitional region between the sub-tropical anticyclone and the subpolar depression zones and is characterized by strong north-south and east-west rainfall gradients. The spatial distribution and seasonal variability of rain are particularly influenced by the characteristics of the global circulation. One specific feature is the Atlantic origin of many synoptic disturbances in the context of the regional geography (e.g. latitude, orography, oceanic and continental influences). Thus, aiming at investigating the statistical signature of rain events of different origins, resulting from the large number of mechanisms and factors affecting the rainfall climate over Portugal, scale-invariant analyses of the temporal structure of rain from several locations in mainland Portugal were conducted. The study used short-term rainfall time series. Relevant scaling ranges were identified and characterized that help clarifying the small-scale behaviour and statistics of this process.