



Scale-invariant exploratory analysis of the structure of short-term rainfall over the Azores archipelago

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Typically, the North Atlantic Portuguese Islands that constitute the Azores archipelago have a small area and, in some islands, strong orographic amplitude. The archipelago is formed by 9 islands. There the rainfall regime is characterized by high variability in both the temporal and spatial domains: in particular, total annual precipitation varies greatly with geographical location.

In these islands the spatial variation of climatic conditions is large. The diversity of climate singularities is often explained by the orography which is responsible by high sensitivity to small variations in a synoptic situation. Previous studies on the rainfall climate in these islands focus on annual or monthly time scales. Knowledge about rainfall properties at smaller time scales is very limited. Nevertheless, this information can be useful for using hydrological models and hydraulic design approaches that rely on the characterization of rain at specific (smaller) temporal scales.

This work reports exploratory scale-invariant analyses of the temporal structure of short-term rainfall in the Azores archipelago based on ten point rainfall time series of 10-minute resolution. There is one measuring station located in each island, with the exception of the largest island where measurements are undertaken at two locations. The time series span periods between 3 and 8 years. The rainfall signature and the scaling range observed at the various locations are studied. The results have local and regional importance but are also interesting for the increased understanding of the mechanisms that generate rain under such conditions.