



Variability of rainfall in the Azores archipelago: its multifractal nature studied with high-resolution data

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The Azores archipelago (Portugal) is located in the North Atlantic Ocean, about 1400 km from Mainland Europe. It is formed by 9 islands, subdivided in 3 groups: Oriental (S. Miguel and Santa Maria Islands), Central (Terceira, Graciosa, S. Jorge, Pico and Faial Islands) and Occidental (Flores and Corvo Islands). The archipelago is situated in the subtropical zone of North Hemisphere Highs, being the meteorological conditions in the archipelago dominated by the Azores High.

Typically the islands have a small area: total area is approximately 2330 km²; the area of the islands range from 17 km² to 747 km². Their topography plays a crucial role in the local precipitation regime (the highest altitude is 2351 m in Pico Island, with an area of 447 km²). In certain cases the complexity of the topography creates numerous microclimatic conditions which are reflected in both the temperature and the precipitation variability. In particular, total annual precipitation varies greatly with geographical location within the archipelago. This has a strong local impact.

The purpose of this work was to contribute to a better understanding of the variability of precipitation in the Azores archipelago by investigating its temporal structure with multifractal methods. The multifractal properties in the local rainfall climate show that the dynamics of precipitation in the different islands is distinct. This should be carefully integrated in water resources management decisions and engineering design of hydraulic structures and systems (e.g. urban drainage systems), in particular because of the implications regarding extreme events in areas extremely sensitive to water is-

sues in relation to societal and ecological sustainability.