

HOW HEAVY ARE PROBABILITY TAILS OF WET AND DRY DURATIONS IN REGIONALLY AVERAGED RAIN FIELDS ?

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The durations of rain events and drought over a given region provide important information about the water resources of the region. Such information facilitates efficient management of storage and consumption of water for the prevention of catastrophes. Of particular interest is the shape of upper tails of probability distributions of regional durations, on the basis of which the return period of extreme events such as drought or flooding may be assessed for the region of interest. Recent research on multiscaling properties of sample tail quantiles of regional wet and dry durations suggests that the underlying probability distributions have heavy tails of hyperbolic type, across a wide range of regional scales from 2 Km to 120 Km. These findings are based on radar measurements of spatially averaged rain rate (SARR) over a tropical oceanic region. Using exactly the same data, the present work is concerned with formal statistical testing of hypotheses regarding tail heaviness and inference about the value of the associated Pareto tail-index. The approach taken is semi-parametric, using state of the art testing procedures developed recently in the literature as well as more classical ones based on the Hill estimator. The obtained results shall be discussed, comparing between the new and the classical methodology, but also between formal semi-parametric testing and inference based on multiscaling.