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Mapping drought hazard in West Africa

ABSTRACT

To assess drought hazard, most studies rely on the standardized precipitation index and a classification of drought intensity established from the cumulative standard normal distribution function. This method imposes to each climatic region the same set of thresholds for drought severity classification, and results in a loss of information on rare events, in the distribution tails, which are precisely the most important to catch in risk analysis. In this paper, we propose an alternative method to drought hazard estimation based on extreme value theory. We consider droughts as extreme rainfall events, which occurrence probability is specific to each geographical location. Then, the drought thresholds are estimated using an extreme value mixture model with a normal distribution for the bulk, and a Generalized Pareto distribution for both the upper and lower tails. An application to the West Africa region highlights hot spots of drought hazard and gives estimate of the potential agricultural production loss.

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