

Statistical Analysis of Time Series of Precipitations

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Abstract

Accurate short-term forecasting of precipitation remains a central problem in hydrometeorology, owing to the complex interplay between local thermodynamic conditions and large-scale atmospheric circulation. Rainfall processes exhibit pronounced intermittency, nonlinear dependence on meteorological covariates, and strong spatial coherence driven by synoptic-scale weather systems. Traditional time-series approaches that rely solely on local autoregressive structure can fail to capture upstream influences that propagate through atmospheric dynamics, thereby limiting predictive performance, which serves as input for return level estimation using extreme value methods. This talk describes semi-parametric forecasting models for precipitation and then discusses the feasibility of spatial aggregation to produce more accurate return level estimates. This is collaborative research between teams in the Departments of Marine Science and Statistics.