
Generalised hyperbolic state space models with application to spatio-temporal heat wave prediction

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Résumé

As global warming progresses, it is increasingly important to monitor and analyse spatio-temporal patterns of heat waves and other extreme climate-related events that impact urban areas. In this work, we present a novel dynamic spatio-temporal model by combining a state space model (SSM) and a generalised hyperbolic distribution to flexibly describe a spatial-temporal profile of the tail behaviour, skewness and kurtosis of the local urban temperature distribution of the greater Tokyo metropolitan area. Such a model can be used to study local dynamics of temperature effects, specifically those that characterise extreme heat or cold. Beyond climate applications, this flexible framework and the associated Bayesian inference methodology could naturally be extended to other fields, such as ecology or the life sciences, where capturing complex distributional patterns is of interest. *Joint work with D. Murakami, G. W. Peters and T. Matsui*

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