Modelling precipitation in Sweden

Jan Lennartsson

Chalmers University of Technology

Sweden

Abstract

I will to propose a random spatio-temporal field model for the precipitation in Sweden. First, we consider the case of each meteorological station separately, i.e we disregard any spatial dependence, and we model the derived precipitation process as a composite model with the one component modelling the occurrence process and the second component modelling the amount of precipitation. For the first component we fit a multiple order Markov chain, while for the second component, we suggest a transformed Gaussian process with marginals that are the composition of the empirical distribution below a threshold and a fitted generalized Pareto distribution for the excesses above that threshold. In other words, we model the temporal dependence between amounts of precipitation by means of a Gaussian copula. The derived model is then used to compute different weather indices. The derived distribution of these indices show good agreement with the corresponding empirical distributions which supports the choice of model.
Currently, I am working on possible extensions of this model to accommodate for the spatial dependence. I will finish this talk by discussing a few ideas regarding this.