

A multi-site hourly precipitation weather generator based on a frailty-contagion approach

Erwan Koch

IFSA Lyon university, Lyon, France erwan.koch@ensae.fr

Accurate stochastic simulations of hourly precipitation are needed for impact studies at local spatial scales. Statistically, hourly precipitation data represent a difficult challenge. They are non-negative, skewed, heavy tailed, contain a lot of zeros (no rainfall) and they have complex temporal structures (e.g., persistence of dry days). Inspired by frailty-contagion approaches used in finance and insurance, we propose a multi-site precipitation weather generator that can simultaneously handle dry events and heavy rainfall episodes. One advantage of our model is its conceptual simplicity in its dynamical structure. In addition, a common spatial factor based on appropriate covariates (temperatures, pressure, etc) is built in. Our inference approach is tested on simulated data and applied to measurements made in the northern part of French Brittany.

Key words : precipitations generator, common factor, contagion, spatial-temporal dependence