Colloquium

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Spatio-Temporal Exceedance Locations and Confidence Regions

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10:20 a.m. - 11:10 am
Refreshments 10:00 am
C405 Wells Hall

Abstract

An exceedance region is the set of locations in a spatial domain where a process exceeds some threshold. Examples of exceedance regions include areas where ozone concentrations exceed safety standards, there is high risk for tornadoes or floods, or heavy-metal levels are dangerously high. Identifying these regions in a spatial or spatio-temporal setting is an important responsibility in environmental monitoring. Exceedance regions are often estimated by finding the areas where predictions from a statistical model exceed some threshold. Even when estimation error is quantifiable at individual locations, the overall estimation error of the estimated exceedance region is still unknown. A method is presented for constructing a confidence region containing the true exceedance region of a spatio-temporal process at a certain time. The underlying latent process and any measurement error are assumed to be Gaussian. Conventional techniques are used to model the spatio-temporal data, and then conditional simulation is combined with hypothesis testing-like approach to create the desired confidence region. The methodology is used to compare climate models and assess climate change using climate models from the North American Regional Climate Change Assessment Program.

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