BISP8

Eighth Workshop on
BAYESIAN INFERENCE IN STOCHASTIC PROCESSES

Seasonal marked point processes for hurricane occurrences and attributes

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We consider point processes for random events which are only observed in a given season. We develop a nonparametric Bayesian methodology to study the dynamic evolution of a seasonal marked point process intensity. We assume the point process is a non-homogeneous Poisson process, and propose a nonparametric mixture of Beta distributions for dynamically evolving temporal Poisson process intensities. Nonparametric dependence structure is built through a dependent Dirichlet process prior for the dynamically evolving mixing distributions. We extend the nonparametric model to incorporate time-varying marks resulting in flexible inference for both the seasonal point process intensity and for the conditional mark distribution. The motivating application involves the analysis of hurricane landfalls with reported damages along the U.S. Gulf and Atlantic coasts from 1900 to 2010. We describe the evolution of hurricane intensity, as well as the respective maximum winds speed and associated damages. Our results indicate an increase in the number of hurricane occurrences and a decrease in the median maximum wind speed at the peak of the season. Also, we found that there is no significant rising trend in standardized damages over time.

ABSTRACT BISP8.06
TYPE Invited lecturer Bruno Sansò