Spatio-temporal issues in environmental risk assessment and modeling

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Risk is defined as the expected losses in economic terms or population death or injured, as a consequence of an extreme event or environmental hazard. The degree of loss or loss function is recognized as the vulnerability function. Vulnerability is the intrinsic capability of a population, ecosystem or community to suffer damage from an environmental hazard. Documentary information of damage from previous events is used to build this vulnerability function for a particular location and time period. The vulnerability function expresses the degree of loss as a function of the intensity of the environmental hazard and geophysical and social-economic variables explaining the observed loses. Main sources of uncertainty in the risk modeling process come from the uncertainty attached to the vulnerability function and the uncertainty attached to the environmental hazard. A spatial-temporal model of the environmental hazard and samples from its posterior predictive distribution can be used to estimate and map risk. This methodology is demonstrated with data from extreme rainfall events for Vargas state, Venezuela.

Keywords: environmental risk; vulnerability function; extreme events; risk mapping.