Hierarchical Spatio-Temporal Models For Environmental Processes

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Abstract

The processes governing environmental systems are often complex, involving different interacting scales of variability in space and time. The complexities and often high dimensionality of such spatio-temporal processes can be effectively addressed using a hierarchical modeling framework where a complex problem is decomposed into a series of simpler problems that are linked through rules of probability. In this dissertation, hierarchical spatio-temporal models are developed and utilized for environmental processes. The methods discussed in this dissertation include a wide scope of problems related to the modeling of spatio-temporal environmental processes. Specifically, methods are described for efficient modeling of spatio-temporal environmental processes using both discrete- and continuous-valued data.