

Variance-covariance modeling and estimation for multi-resolution spatial models

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Abstract

The tree-structured multi-resolution spatial models (MRSMs) yield optimal and computationally feasible spatial smoothers of massive spatial data with nonstationary behavior. The nonstationary spatial correlation structure of MRSMs is the result of inhomogeneous stochastic parent-child relationships at adjacent resolutions. Likelihood-based methods are presented for the estimation and modeling of variance-covariance parameters associated with the parent-child relationships, resulting in data-adaptive, nonstationary covariance structure. An application of the MRSMs is given to total column ozone (TCO) data obtained from a polar-orbiting satellite.