

Loss function approaches to predict a spatial quantile and its exceedance region

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Abstract

In geostatistics we commonly predict a spatial exceedance and its exceedance region. This is scientifically important since unusual events tend to strongly impact the environment. We use classes of loss functions based on image metrics (e.g., Baddeley's loss function) to predict the spatial-exceedance region. We then propose a joint loss to predict a spatial quantile and its exceedance region. The optimal predictor is obtained by minimizing the posterior expected loss given the process parameters, which we achieve by simulated annealing. Various predictors are compared through simulation. This methodology is applied to a spatial dataset of temperature change over the Americas.