Extending the Limits of Forecast Verification with the Minimum Spanning Tree

LA Smith & JA Hansen

Abstract

Uncertainty in the initial condition is one of the factors that limits the utility of single-model-run predictions of even deterministic nonlinear systems. In practice, an ensemble of initial conditions is often used to generate forecasts with the dual aims of 1) estimating the reliability of the forecasts and 2) estimating the probability distribution of the future state of the system. Current rank histogram ensemble verification techniques can only evaluate scalars drawn from ensembles and associated verification; a new method is presented that allows verification in high-dimensional spaces, including those of the verifications for 106 dimensional numerical weather prediction forecasts.

LSE