Professor Lenny Smith: Abstract

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Betting on the Forecast: Methods for Risk Management, Information Identification, and Resource Allocation in an Ensemble Weather Prediction System

Interpreting the relative value of competing forecasting systems through risk neutral (Kelly) betting strategies provides intuitive measures of relative skill which reflect proper skill scores. In addition to direct application to risk management, which often benefit from NOT interpreting a probabilistic forecast as a probability forecast, this "weather roulette" approach also suggests insights on questions of meteorological interest and into operational decision support. How do we compare the information content of a singleton ensemble (say, one hi-res model run) with that of a larger ensemble of lower resolution model runs? Can we demonstrate that combining these two ensembles together has probabilistic skill against climatology at a lead time of 5 days? of 10? Does the weight assigned to the hi-res run at larger lead times justify its greater cost per realization? Does the information in current simulation justify forecasting "beyond the second moment"? How does a "Bayesian Update" strategy compare with ad hoc methods which focus on the information inputs currently available to the forecaster? After a brief introduction to the dangers merely evaluating the "ensemble mean", these questions are discussed in the context of the ECMWF forecast system, as evaluated on physical observations. The talk aims more to clarify the use and application these tools than to resolve any particular point of current operational practice.