

Ensemble forecasts and the representation of model uncertainties

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Abstract:

Ensemble forecasts are a computationally feasible method to predict forecast uncertainties depending on the meteorological situation of the day. The individual forecasts in an ensemble differ due to the representations of initial uncertainties and model uncertainties. At the European Centre for Medium-Range Weather Forecasts (ECMWF), model uncertainties are represented stochastically. The talk will begin with an overview of the current methodology of stochastic model uncertainty representations used at ECMWF. Recent progress and challenges associated with the representations will be described.

Then, future directions for the representation of model uncertainties in ECMWF ensembles will be summarized. The coming years are likely to see a further increase in the use of ensemble methods in forecasts and assimilation. This will put increasing demands on the methods used to perturb the forecast model. An area that is receiving greater attention than 5 to 10 years ago is the physical consistency of the perturbations. Other areas where future efforts will be directed are the expansion of uncertainty representations to the dynamical core and to other components of the Earth system as well as the overall computational efficiency of representing model uncertainty.