

**Venue: THORPEX 2004**

**How can we best combine forecasts for added value?**

This contribution considers mathematical methods for the extraction of reliable forecast information from the output of a collection of both ensemble forecast products and single model forecasts. The aim is to construct a forecast distribution from the combination of the various sources of weather information available, not to determine which single scheme is 'best' in isolation. This work presents a simple methodology for combining the output of multiple forecast schemes under a probabilistic framework. The result is an ensemble interpretation that can be tuned for a specific user's target variable(s). Using this approach we can investigate which combinations of forecast schemes, for a given user, have skill by comparing and evaluating ensemble interpretations using a range of skill scores.

Under a wide range of conditions, it has been proven that imperfect models are incapable of providing accountable (objective) probability forecasts (Judd and Smith, Physica D, 2004). Multi-model forecasts enable forecasters to explore model inadequacy and further their ability to communicate forecast uncertainty. Forecast evaluation in the context of THORPEX introduces a number of interesting issues of statistical good practice which are particularly important when evaluating weather forecasts; limits on the relevance of standard boot-strap resampling and cross-validation are noted. This work offers a potential framework within which the forecast products produced under THORPEX can be combined to achieve further value.