# Single-Valued Forecasts in an Ensemble World

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Although full and poor-man's ensemble approaches open the potential for weather services driven by rich probabilistic information, there will remain demand for single-valued weather forecast information, as a simple and familiar communication device. There are various approaches that can be used to provide a single-valued forecast service. These range from outputs of a single Numerical Weather Prediction model to forecasts derived from a consensus of different models.

We consider how the value to users of forecasts from different approaches is related to the error characteristics of the forecasts by combining the idealized concepts of Relative Economic Value (Richardson, 2000) and a Linear Gaussian Error Model (Tian *et al.*, 2016). When unconditional biases are removed, single-valued forecasts built from the mean of a consensus of Numerical Weather Prediction models benefit users interested in decisions near the climatological mean. This is due to their reduced spread of errors compared to the constituent models. Deterministic Numerical Weather Prediction forecast systems may provide benefits for users sensitive to extreme events if the forecasts have smaller conditional biases and hence better resolution of such events.

We conclude that where single-valued forecast services are used, basing them on a consensus is the best approach for routine decision making. However, there is a strong need to provide services which are more explicitly probabilistic, for extreme events and associated warning services.

# References

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