

The economic value of ensemble-based ozone forecasts

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In summer 2004, seven air quality models provided forecasts of surface ozone concentrations over the eastern U.S.A. and southern Canada. Accuracy of these forecasts can be assessed against hourly ozone measurements at over 350 locations. The ensemble of the air quality models is used to issue probabilistic forecasts of maximum daily 8-hr and 1-hr average ozone concentrations. To remove the bias, the forecasts are calibrated. In parallel, deterministic forecasts for this ensemble of models are obtained as an average of model concentrations and using dynamic linear regression described by Pagowski et al. The economic value of forecasts, which is calculated using Richardson's cost-loss decision model, is assessed for both probabilistic and deterministic cases. It is shown that deterministic forecasts obtained with the ensemble of models provide a greater benefit for a decision maker than forecasts issued with individual models. Probabilistic forecasts demonstrate similar advantage over the deterministic forecasts. Benefits of calibration of the probabilistic forecasts using dynamic linear regression are limited to frequent events.