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An Algorithm Combining for Objective Prediction with Subjective Forecast Information

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As direct or post-processed output from numerical weather prediction (NWP) models has begun to show acceptable performance compared with the predictions of human forecasters, many national weather centers have become interested in automatic forecasting systems based on NWP products alone, without intervention from human forecasters. The Korea Meteorological Administration (KMA) is now developing an automatic forecasting system for dry variables. The forecasts are automatically generated from NWP predictions using a post processing model (MOS). However, MOS cannot always produce acceptable predictions, and sometimes its predictions are rejected by human forecasters. In such cases, a human forecaster should manually modify the prediction consistently at points surrounding their corrections, using some kind of smart tool to incorporate the forecaster's opinion.

This study introduces an algorithm to revise MOS predictions by adding a forecaster's subjective forecast information at neighbouring points. A statistical relation between two forecast points - a neighbouring point and a dependent point - was derived for the difference between a MOS prediction and that of a human forecaster. If the MOS prediction at a neighbouring point is updated by a human forecaster, the value at a dependent point is modified using a statistical relationship based on linear regression, with parameters obtained from a one-year dataset of MOS predictions and official forecast data issued by KMA. The best sets of neighbouring points and dependent point are statistically selected. According to verification, the RMSE of temperature predictions produced by the new algorithm was slightly lower than that of the original MOS predictions, and close to the RMSE of subjective forecasts. For wind speed and relative humidity, the new algorithm outperformed human forecasters.