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Phase-shift Correction of Wind Field Forecast with Met-mast Observations for Wind Power Forecasting

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The accuracy of wind speed forecast has direct impact on wind power predictions. For a synoptic system, the forecast of Numerical Weather Prediction (NWP) may suffer a phase delay or phase advance. Therefore, a phase-shift correction is necessary for improvement of wind field forecasts. The ISET met mast wind measurements in the WMEP program in 2004 are used to evaluate the wind field forecast of DWD-LM(German Weather Service – Local Model). A cost function is defined to describe the phase shift of LM forecast against WMEP measurements. After optimization of cost function, a horizontal displacement vector is obtained and used to correct the forecast at next forecast time steps. The results show that it's important and possible to improve wind field forecasts using met mast measurements. These improved wind fields can be used for more precise shortest-term wind power forecasts to reduce the shares of expensive balancing power for save grid operation.