

**P36** Automatic model calibration for improving WRF model forecasting.

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Automatic model calibration refers to the process in which the parameters of a dynamical model are tuned using mathematical optimization methods to minimize the aggregated difference between model predictions and corresponding observations. This approach is not widely practiced so far in numerical weather predictions because of difficulties related to model complexities such as high-dimensionalities of model parameters and model outputs, and the extraordinary demand of computational resources. This paper presents a platform called Uncertainty Quantification Python Laboratory (UQ-PyL) to perform automatic calibration of WRF model. The key functions of UQ-PyL include design of experiment (DoE), uncertainty analysis, global sensitivity analysis, surrogate modeling, and multi-objective optimization. We intend to demonstrate how UQ-PyL can be used to improve the predictive skill of the WRF model with a case study involving 5-day weather forecasting in the Greater Beijing region. Through numerous calibration and validation experiments, we found that automatic model calibration can improve predictive skill of the WRF model significantly according to numerous skill metrics.