# Bayesian Processor of Output: A New Technique for Probabilistic Weather Forecasting

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A coherent set of theoretically-based techniques is being developed for probabilistic forecasting of weather variates. The basic technique, called Bayesian Processor of Output (BPO), will process output from a numerical weather prediction (NWP) model and optimally fuse it with climatic data in order to quantify uncertainty about a predictand. The extended technique, called Bayesian Processor of Ensemble (BPE), will process an ensemble of the NWP model output (or multiple models outputs).

Each technique, the BPO and the BPE, will be developed and tested in three versions, for (i) binary predictands (e.g., indicator of precipitation occurrence), (ii) multi-category predictands (e.g., indicator of precipitation type), and (iii) continuous predictands (e.g., precipitation amount conditional on occurrence, temperature, wind speed). The primary test will involve the production and verification of probabilistic quantitative precipitation forecasts (PQPFs) for up to 84-h ahead. The primary benchmark for evaluation of the new techniques will be the Model Output Statistics (MOS) technique used currently in operational forecasting by the U.S. National Weather Service.

This talk will give a tutorial introduction to the principles and procedures behind the BPO. Next, it will present the first version of the BPO. This version is being tested by producing probability of precipitation (PoP) occurrence forecasts for a set of climatically diverse stations in the contiguous U.S. For each station, the PoPs are produced for the same 6-h, 12-h, and 24-h periods up to 84-h ahead for which operational forecasts are produced by MOS. Comparative verification of the BPO forecasts and the MOS forecasts is in progress to determine the magnitude and the source of improvements expected of the BPO.