**P25     Application of uncertainty quantification to wind energy: Sensitivity of hub-height wind to planetary boundary layer and surface layer parameters in WRF**

**Yang, Ben**, Yun Qian, Larry K. Berg, Po-Lun Ma, Huiping Yan, *Pacific Northwest National Laboratory (PNNL),* Sonia Wharton, Vera Bulaevskaya, *Lawrence Livermore National Laboratory*, and Will Shaw, *PNNL*

The goal of this work is to use the Uncertainty Quantification (UQ) approach to evaluate the sensitivity of hub-height wind speed in the Weather Research and Forecasting (WRF) model simulations to a number of different parameters used in the planetary boundary layer (PBL) and surface layer (SFL) schemes and to use this information to assist with the planning of the second Wind Forecast Improvement Project (WFIP 2). In this exploratory study, we select a domain that includes the area covered by the Department of Energy's Columbia Basin Wind Energy Study (CBWES). The results show that for the PBL and SFL parameterization used in this study there are a small number of parameters that contribute to the majority of the variance in the ensemble of simulations, including the turbulence kinetic energy (TKE) dissipation rate, the surface roughness ($z0$), the Prandtl (Pr) number, and the length scales used to represent the TKE, and the impacts of these parameters are found to exhibit large dependence on the terrain slope and atmospheric stabilities. Our results highlight the need for measurements that provide constraints for these quantities.