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Development of a high resolution wind forecast system based on the WRF model and a hybrid Bayesian-Kalman Filter postprocess.

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Regional microscale meteorological models have become a critical tool of forecast wind farm production, due to their capacity to resolve the local flow dynamics. The high demand for reliable forecasting tools in the energy industry was the motivation for the development of an integrated system that combines the WRF atmospheric model with a hybrid post process system based on Bayesian and Kalman filters.

This study is focused on the development of this combined system and its validation in a very dense wind farm cluster located in the Isthmus of Tehuantepec (Oaxaca, Mexico). For the needs of the study, one year of simulations are performed using the WRF model with 50 vertical levels and a maximum horizontal resolution of 1km. The model output is evaluated and corrected using the hybrid post process system. The later was tested for different training periods in order to achieve the optimum outcome.

The results are quite promising as the main statistical indices are significantly improved in a 24h forecasting horizon and even more in a nowcasting mode. This tool that can be potentially useful for a variety of applications in wind farm operations and energy markets.