Evaluation of high resolution WRF-ARW model simulations for Singapore region

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High resolution meteorological conditions from a NWP model provide valuable input to variety of air quality models and other urban planing applications. In this context, we are customizing the WRF-ARW community based model for highly urbanized region of Singapore. The model is configured with four two-way nested domains of 27-9-3-1 km grid resolution. A total number of 43 vertical sigma layers are used, with first 15 layers below 1km to better resolve the boundary layer. The initial and boundary conditions are derived from the GFS model. In the model improvement efforts we have ingested the 15″ resolution land use data from MODIS and the 1km resolution sea surface temperature data from NASA. Though the 15″ resolution land use data has fewer categories in comparison to the 30″ data, it has a better representation of the urban category. A notable lift is noticed in the model accuracy using the above mentioned high resolution data sets. We will present the evaluation results from our current modeling framework using the observations from a network of stations operated by the National Environmental Agency of Singapore. The evaluation is performed for historical dates (hindcast simulations) representative of different scenarios in the region. The model results are compared against surface observations: temperature, humidity, wind speed and direction, using a set of performance measures usually considered in the literature. The model development is on-going, and the future directions with focus on improving the representation of urban effects in the model will be discussed.