IMPLEMENTATION OF MULTI-SCALE AIR POLLUTION MODELING FOR MISSISSIPPI GULFPORT

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Abstract: This is a study of atmospheric dispersion in the coastal zone using regional ensemble models and multi-model ensemble systems to develop the meteorological fields necessary to predict the movement and dispersal of pollutant plumes in the coastal environment. The goal in this effort is to construct a dispersion forecasting capability tailored for application in the Gulf Coast region. The model system includes several meteorological and air pollution models capable of operating for different applications at different spatial scales – ranging from mesoscale to urban background scales to urban street scale. The model development is based on several air quality and meteorological models namely WRF/WRF-CHEM/CMAQ/HYSPLIT/AERMOD and SMOKE. The main focus is on the development of ensemble methods, validation of the models with ambient measurements, satellite derived data products, Mesonet observations besides coastal boundary layer experimental data and data assimilation experiments. A three-dimensional numerical weather forecast model, WRF is implemented with the initial conditions taken from meteorological analysis data obtained from a global circulation model, run at the National Centers for Environmental Prediction, NCEP, USA. The spatial resolution of the weather forecast model is e.g. 36 km x 36 km over the coarse grid and 4 km x 4 km on a sub-domain centered at Mississippi Gulfport. The paper highlights the results of our ongoing integrated model development system for Multiscale air pollution dispersion studies in Mississippi Gulfport area.

Keywords: Multi-scale, air pollution, Mississippi Gulfport