

BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

Region: Gulf of Mexico, OCS

Title: Enhancing the Capability of a New Meteorological Model for Air Quality and Other BOEM Applications in the Gulf of Mexico

Planning Area(s): Gulf of Mexico

Total Cost: \$ 500,000

Period of Performance: FY 2014-2016

Conducting Organization: The National Center for Atmospheric Research (NCAR)

BOEM Contact: Dr. Chester Huang

Description:

Background: Recently, the Bureau of Ocean Energy Management (BOEM) has funded a number of studies including air quality and meteorological modeling and the atmospheric boundary layer study (ABL) in the Gulf of Mexico, including a study for wind-wave measurements. The information and results obtained from these studies can be used to improve the WRF meteorological model for air quality application and other applications such as oil spill, oil and gas platform design, alternative energy, and hurricane forecast etc. The accuracy of the concentration estimates obtained from the air quality model is also dependent on the accuracy of the meteorological model output; this information is needed in the environmental impact statement. In recent years, EPA has set more stringent air quality standards. Therefore, BOEM needs to develop the improved air quality and meteorological model.

Objectives: The objectives of this study are to improve the capability of the WRF model for air quality applications over the ocean in the Gulf of Mexico and to leverage the state-of-science and up-to-date modeling information developed by the scientific community, and to produce a better working WRF model for the application to OCS. This information is also needed for obtaining the better concentration estimates obtained from an air quality model for environmental impact assessment and other BOEM applications.

Methods: This study will utilize the information and results obtained from the atmospheric boundary layer study and other BOEM studies, and leverage the NCAR studies for improving the meteorological model, improving the parameterization scheme for surface fluxes, providing better science in the areas of air-sea interaction and initial conditions, and performing three-dimensional data assimilation for the model. The WRF model will be used for this study. The BOEM-funded observational data will be used for model sensitivity study and verification.

Products: Final Report for the improved WRF model and satellite data assimilation.

Importance to BOEM: The National Center for Atmospheric Research (NCAR) has been developing a new and advanced meteorological model (The Weather Research and Forecasting Model (WRF)) to replace the existing MM5 meteorological model. BOEM uses air dispersion model as a tool to assess the impact of OCS sources on the onshore air quality, which is needed

in NEPA documents. Meteorological fields are required inputs for air-quality models. Therefore, the accuracy of meteorological modeling is critical to the air quality modeling. BOEM also needs to use the WRF model for air quality and other BOEM applications such as alternative energy, oil spill and climate change. WRF model is the only tool that can be used for assessing the impact of air quality on the environment.

Current Status: Ongoing

Final Report Due: September 2016

Publications: Data assimilation and diagnosis of bias for WRF over the Gulf of Mexico.
Presented at 95th AMS Annual Meeting, 4–8 January 2015. Phoenix, Arizona

Affiliated WWW Sites: <http://www.boem.gov/Environmental-Stewardship/GOMR>

Revised Date: January 2015

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