BOEM
Bureau of Ocean Energy Management

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Upgrading Air Quality Modeling in the Gulf of Mexico: Integrating Local and Remote Emissions with Photochemical Models

SDP Page Number	Discipline	Regional Ranking	Study Title
73	AQ	17	Upgrading Air Quality Modeling in the Gulf of Mexico: Integrating Local and Remote Emissions with Photochemical Models

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BOEM Information Need:

Recent research has revealed that external sources, i.e., seasonal dust, can have a significant impact on local and regional air quality (AQ) (Bozlaker et al., 2013). The information sought will support environmental reviews in NEPA documents and evaluation of post-lease activities. BOEM needs to address this external source to properly assess the impact of air pollutant emissions from oil and gas (O&G) sources on onshore areas of the Gulf of Mexico.

Date Information is Required:

The Gulf of Mexico OCS Region needs this information by the next 5-year cycle to complete its regional air quality assessment and its NEPA and post-lease assessments.

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Background:

A) Relationship with Previous Work/Efforts

1. **MMS/BOEM has completed AQ studies to estimate the contribution of OCS emissions to onshore nonattainment areas that focused on ozone. These studies have not examined other regulated pollutants in detail.**
2. **EPA has been requesting that BOEM improves its AQ modeling and analytical tools to asses impacts at pre-lease and post-lease documents.**
3. **Concurrently, BOEM has been conducting emissions inventories of OCS facilities, but our inventories have missed remote sources such as the Saharan dust plumes which are seasonal and not insignificant sources of particulate matter with health, climate, and oceanographic effects.**

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Background:

B) Relationship with Concurrent/Future Efforts

1. **This proposed study will interact with our ongoing WRF Modeling study to acquire the meteorological input for the photochemical models.**
2. **It will interact with ongoing studies of local authorities such as Texas, which are examining the impacts of Saharan dust on local areas.**
3. **It will enhance our future emission inventories by acquiring data of remote sources as well as better coastal data on pollutants and will help improve photochemical modeling.**
4. **It will deploy two new stations for observing air quality and meteorology variables along coastal areas.**
5. **It will improve the impact assessments at pre-lease and post-lease documents.**

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Study's Objectives:

1. **Configure CMAQ and/or WRF-Chem photochemical modeling systems to analyze criteria pollutants concentration and transport in the Gulf of Mexico region.**
2. **Regionally survey contributing pollutants considering conventional receptors data, new data sources including satellite information, air quality PM analyzers at New Orleans and Lake Charles, and global model transport results.**
3. **Evaluate photochemical models using complementary emission products (emission inventories and satellite) and compare predicted concentrations to newly installed receptor data in areas with high population density.**
4. **Prepare at least three peer-review publications.**

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Study's Methods:

1. The study will involve numerical modeling of photochemical and meteorological processes. BOEM will also explore collaborations with State and Federal agencies interested in this problem.

2. Compiling new and existent field data of receptors related to air quality-regulated pollutants emphasizing particulate matter.

3. Reformat and prepare satellite imagery, transport model outputs and emission inventories as input information for AQ photochemical models.

4. Perform simulations to determine time and spatial distribution of pollutants in the region and at local scales employing model nested domains.

5. Analyze results, complete assessments, and publish outcomes.

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