Forecast Ecosystem Conditions in Gulf of Mexico OCS Habitats Using Coupled Modeling and Climate Scenarios

Quarterly Report (Y6Q1 – Oct 1-Dec 31, 2021)
Jan 20, 2022

Sergio deRada
Naval Research Laboratory, Stennis Space Center, MS 39529

This quarterly report is filed per requirements of BOEM-NRL IAA # M16PG00027 with respect to our research project focused on climate-scale ocean model simulations for the Gulf of Mexico. The focus of this study is to forecast, through year 2050, marine ecosystem conditions in the Gulf of Mexico (GoM) using RCP climate scenarios prescribed by the NCAR CESM Large Ensemble (LE) atmospheric forcing.

1. WORK ACCOMPLISHED

October was spent preparing and delivering the project's overview presentation at the BOEM webinar series. During the quarter, there were also discussions with BOEM management about increasing the funding to have NCAR be more involved in the project. The funded extension proposal was prepared, submitted to and approved by NRL management. It was then submitted to BOEM for review and execution.

ERA5 data was prepared by NCAR, downloaded by NRL and the model forcing fluxes constructed and quality controlled fully from 1990-2020. The corresponding simulation was submitted. Its results will be evaluated by the time the simulation reaches year 2010. The thermal energy retention manuscript will be completed once this simulation is finished and the results evaluated.

Several meetings with BOEM and NCAR took place to discuss the results from the climate models and the GOM sensitivity analyses. It was decided that the final set of results will be based on the ERA5 baselines and the CESM 2.0 LE projections, which will now be based on the recent IPCC AR6 report and the Shared Socioeconomic Pathways scenarios.

2. PROBLEMS

Slowdowns were experienced during this quarter due to ongoing Covid-related issues and the holiday period.

3. PLANNED ACTIONS FOR NEXT QUARTER

Continue the ERA5 based simulation, which is expected to complete. Continue analysis and discussion of how to properly downscale climate and construct the forcing products for the projection simulations. Single-source procurement paperwork will be prepared to execute the NRL-NCAR subcontract and send the extension-funds to NCAR.

4. BUDGET

The project amount of $390K has been received in full.
Expenditures to date: ~$291K.