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

Quarterly Report (Y5Q1 – Oct 1-Dec 31, 2020)
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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

No tangible progress was achieved this quarter due to two technical issues: i) Porting of model and analysis codes to new HPC machines installed in October 2020, and ii) The sensitivity climate-forecasting simulation shows drift in the model. While the porting of codes, as it applies to all related projects, was completed during this quarter, the drift in the model has not been fixed nor its source identified. The issue is suggestive that data assimilation is masking numerical drift, thus a few techniques to constrain the drift will be tested next. Without containing the drift, climate projection runs will not be useful, so this will be a priority next quarter.

2. PROBLEMS

Due to the pandemic and teleworking environment, there are still significant productivity issues when working with the large amounts of data required in this project. It is expected that another NCE will be required to properly complete this project.

3. PLANNED ACTIONS FOR NEXT QUARTER

Find an approach to contain the numerical drift found in the non-assimilative runs. Continue building and identifying material suitable for publication.

4. BUDGET

$390K (full project amount) was received (Y1:$80K, Y2:$80K, Y3:$120K, Y4:$110).
Expenditures to date: ~$254K.