Environmental Studies Program: Ongoing Study

Title	Improvements to the Oil Spill Risk Analysis (OSRA) Input Quality Assurance/Quality Control (QA/QC) and Validation (AK-20-05)
Administered by	Anchorage, Alaska Office
BOEM Contact(s)	TBD
Conducting Organizations(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2020–2021
Final Report Due	TBD
Date Revised	October 16, 2019
PICOC Summary	
Problem	General Circulation Model (GCM) inputs to the OSRA model do not have a standardized QA/QC check. Every contracted GCM is validated in a different way from the one previous. A need exists for standardized validation and QA/QC procedures.
Intervention	Model results need to be examined in detail for GCM quality and errors. Artifacts such as insufficiently radiative boundaries and grid issues need to be identified if present. Sea ice concentration, velocity and water velocity need to be examined for reasonable values and to determine that the GCM is performing well.
Comparison	Sea ice concentrations and velocities will be compared with available passive microwave public products such as Special Sensor Microwave Imager (SSMI) ice concentration and the Institut français de recherche pour l'exploitation de la mer (IFREMER) ice drift velocity products. Surface current velocities will be compared to Acoustic Doppler Current Profiler (ADCP) data BOEM has already collected in the Alaska Outer Continental Shelf (OCS), subject to temporal and geographic limitations.
Outcome	A product will be created to compare GCM output to passive microwave and in-situ ADCP data in a standardized way.
Context	Study products will be applicable to all Alaska OCS Planning Areas and may be extended to all OCS Planning Areas.

BOEM Information Need(s): Output from the OSRA model is used to drive National Environmental Policy Act (NEPA) analyses for OCS block sales. Refinements in GCM inputs are essential for keeping the OSRA model up to date. Understanding oil spill risk is essential to managing OCS resources.

Background: OSRA is a key component in driving NEPA analysis. Oil spill trajectories are essential when identifying impacts to important sociocultural, biological, and ecological resources. When offering up lease blocks for sale, it is vital that BOEM provides both the risk of an oil spill occurring and the chance a spill could contact these resources. GCM inputs are key in order to accurately forecast the chance of a spill contacting resources, thus it is pertinent to validate these data before input into the

OSRA model. Currently we have no formal validation of this data and would like to standardize this process. Standardization of this process will apply to every part of the Alaska OCS and all OSRA runs.

Objectives:

- Streamline QA/QC of OSRA GCM inputs.

- Provide additional ground-truthing of OSRA GCM inputs with real world data.

Methods: SSMI sea ice concentration will be downloaded from the National Snow and Ice Data Center (NSIDC) using National Aeronautics & Space Administration (NASA) algorithm 51 (Cavalieri *et al.*, 1996). This dataset will be processed into the appropriate time and space bins for GCM comparison. Correspondingly the IFREMER sea ice drift dataset (Girard-Ardhuin and Ezraty, 2012) will also be processed into the appropriate time and space bins for comparison to GCM output. An example of an ADCP dataset used to validate surface current vectors could come from OCS Study BOEM 2017-65 (Weingartner *et al.*, 2017). This dataset would also be processed into the appropriate time and space bins for comparison to the GCM. Other circulation studies would be used for various parts of the Alaska OCS. After processing into the appropriate time and space bins, statistics of fit will be performed by a linear regression for all three datasets.

Specific Research Question(s): How can validation of results from a GCM be standardized?

Current Status: Planned new start

Publications Completed: None

Affiliated WWW Sites: http://www.boem.gov/akstudies/

References:

Cavalieri, D. J., C. L. Parkinson, P. Gloersen, H. J. Zwally. 1996, updated yearly. Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I-SSMIS Passive Microwave Data, Version 1. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: https://doi.org/10.5067/8GQ8LZQVL0VL.

Girard-Ardhuin, F., R. Ezraty. 2012. Enhanced Arctic Sea Ice Drift Estimation Merging Radiometer and Scatterometer Data. IEEE Transactions on Geoscience and Remote Sensing. 50. 2639-2648. 10.1109/TGRS.2012.2184124.

Weingartner, T. J., R. Pickart, P. Winsor, *et al.* 2017. Characterization of the Circulation on the Continental Shelf Areas of the Northeast Chukchi and Western Beaufort Seas. Fairbanks, AK: U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-065. 221 p. https://marinecadastre.gov/espis/#/search/study/26869.