



ARCTIC COPEPODS

Mitigating the Damage to Arctic Copepods from Surface Oil Spills: When to Apply Dispersants

The objective of this project is to identify the current state-of-the-art Arctic maritime oil spill response modeling, potential integration of these models, and specific needs to be addressed to obtain models that will be functional and effective in the response time scale to advance the Federal On-Scene Coordinator's decision making during an incident. This will be accomplished through an Arctic Maritime Spill Response Modeling workshop focused on goals to provide a pathway towards a useful oil spill response model that will inform decision-makers during spills.

While dispersants are a highly efficient and proven tool for oil spill response in sub-Arctic and Arctic environments, there is concern about negative impacts on *Calanus* spp. copepods, which are critical zoo planktonic organisms in the Arctic food chain. This concern is based on laboratory experiments that place the animals in a homogenous solution of oil and dispersants. However, such an experimental design does not allow for the vertical movement of copepods and may overestimate the potential toxicity for the copepods. Investigators will conduct a series of laboratory experiments to allow research on the impacts of dispersed oil on vertically migrating copepods. The main hypothesis of this project is that in the ocean, Calanoid copepods can spatially separate themselves from surface oil spills during portions of their developmental cycle. Therefore, they might be exposed too much lower concentrations and for much less time than has been assumed based on previous laboratory studies.

The three main products of this project are

- 1- Technical Report: A report with all results of this research will be produced for USCG and DHS.
- 2- Three Peer-Reviewed Publications. We aim to produce three peer-reviewed scientific publications from this project, where all the results from this project will be described and discussed:
 - Do copepods avoid oil?
 - The toxicity of surface oil and dispersed oil on vertically mobile copepod.
 - The distribution of oil and dispersed oil in a stratified and un-stratified water column.
- 3- Produce Publicly Available Data: All data produced during this project will be made publicly available.

