

Oil Spill Modeling Workshop

Oil Spill Modeling: Physical Transport

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Mission

The main hypothesis is that no theoretical development is needed on this topic, rather parameterizations that are more physically based than those in existing oil spill models. In addition, effort should be focused on identifying the parameterizations that are relatively accurate and easy to implement, in terms of data requirements and/or theoretical proficiency of users. For example, a method that evaluates the small scale diffusion coefficient based on a turbulence closure model should be discarded in favor of one that evaluates it based on the significant wave height and the dominant wave period at sea.

The tasks of this group are (or should be):

- 1) Conduct a literature review on existing parameterization of hydrodynamic processes.
- 2) Conduct a literature review on Meteorology and Oceanography of the following processes:
 - a) Meteorology (prediction of winds, currents and wave properties).
 - b) Waves
 - i) Nonbreaking and breaking, two dimensional
 - ii) Three dimensional, i.e., Langmuir effects.
 - c) Mixed layer dynamics
 - i) Changes in mixed layer depth
 - ii) Parameterizations of mixing (e.g. Langmuir) for droplets and dissolved chemicals.
 - iii) Papers (Overstreet, Spill Science special issue)
 - d) Ice (Need input on what to look for)
 - i) Measurement and prediction of surface distribution and concentration
 - ii) Interactions between oil and ice in horizontal transport
 - iii) Freezing / thawing cycle and effects of oil
 - A) Surface
 - B) Subsurface
 - iv) Oil transport through brine channels
 - e) Rivers – fresh and salt water
 - f) Tidal and water mass convergence / frontal zones.
 - g) Coastal circulation and larger scale currents.
 - i) Processes that are important
 - ii) Important models (POM, ROMS, FVCOM)
 - h) Deepwater circulation processes
 - i) Beaching / refloating and hydraulics
 - i) Cozoil model
- 3) Propose a conceptual framework to incorporate these processes in oil spill models.
 - a) Review of models to put them in context (please add more)
 - i) Cozoil
 - ii) GNOME
 - iii) OilMap
 - iv) TAP
- 4) Develop algorithms cast in modular forms, and make them available to the oil spill community.
- 5) Data Management and Communications
Mention netCDF CF standards; NOAA / Navy subset; USCG EDS

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