

Project information

Project title

Oil in ice

Year

2011/2012

Project leader

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Participants

- Lionel Camus, Akvaplan-niva
- Gro Harlaug Olsen, Akvaplan-niva
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Flagship

Arctic ocean

Funding Source

Fram Centre

Summary of Results

This work concerns a literature review to analyse the gaps of knowledge on the fate of oil in ice, the biological effects on the fauna and the technology for detecting oil in ice using remote sensing. The knowledge gaps have been used to identify research priorities for the Fram Centre for the coming years. The following research subjects have been included in the research program:

Workpackage 1 – Biological effects of oil on organisms and ecosystems:

1. Effects of oil and dispersants on Arctic organisms
 - a. Protocols for toxicity testing
 - b. Studies of chronic effects
 - c. Recovery after oil/dispersant exposure
 - d. Effects of UV-radiation on toxicity of bunker oil
2. Mesocosms experiments
3. Baseline studies
 - a. Mapping and modelling of vulnerable areas
 - b. Baseline levels of biomarkers

Workpackage 2 – Fate and weathering of oil:

1. Biodegradation in cold water
2. Fate of oil encapsulated in ice during freeze up and when it is released during thawing period
3. Weathering of different oil types in different ice conditions and concentrations
4. Improvement of trajectory models for simulation of oil drift
 - a. Utilize data from real-time ice monitoring (remote sensing)
 - b. Include local turbulence in order to predict the behaviour of oil droplets in the water column.
 - c. Algorithm development.

Workpackage 3 – Remote sensing:

1. SAR
2. Airborne sensors
3. Airborne cameras
4. Biological sensors

Published Results/Planned Publications

The literature review on "effects" has been written as a scientific article and will be submitted to an international peer reviewed journal.

Communicated Results

The literature review was presented to a workshop organized by the main authors. The workshop was funded by Incentive funding from the Fram Centre. The workshop took place in January 2012 for 2 days. About 80 participants joined the workshop. Participants from Norway, Sweden, Denmark, Holland, France, USA, Russia

and Canada included researchers, regulators, and 6 different oil companies (Statoil, Shell, Conoco Phillips, Exxon Mobil, Total, North Energy).

Interdisciplinary Cooperation

Researchers from several research fields, i.e. ecotoxicology, chemistry, physics (remote sensing), participated in the literature review. This made it possible to develop a multidisciplinary research program.

Budget in accordance to results

The project was fully funded by the Fram Centre. The research program will be the basis for future projects where external funding will be the goal.

If Yes

The oil industry may be interested in financing amore in depth literature review, for instance, a data extraction from the identified papers.

Conclusions

This literature review will provide a basis for developing proposal that addresses the knowledge gaps identified to generate research projects.