



## **Application of oil spill model to marine pollution and risk control problems**

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Oil transportation by sea induces challenging problems of environmental control. Millions of tonnes of oil are yearly released during routine ship operations, not to mention vast spills due to different accidents (e.g. tanker collisions, grounding, etc.). Oil pollution is dangerous to marine organisms such as plants, fish and mammals, leading to widespread damage to our planet. In turn, fishery and travel agencies can lose money and clients, and ship operators are obliged to pay huge penalties for environmental pollution.

In this work we present the method of accessing oil pollution of marine environment using recently developed oil spill model. The model describes basic processes of the oil slick evolution: oil transport due to currents, drift under the action of wind, spreading on the surface, evaporation, emulsification and dispersion. Such parameters as slick location, mass, density of oil, water content, viscosity and density of “water-in-oil” emulsion can be calculated. We demonstrate how to apply the model to damage calculation problems using a concept of average damage to particular marine area. We also formulate the problem of oil spill risk control, when some accident parameters are not known, but their probability distribution is given. We propose a new algorithm to solve such problems and show results of our model simulations. The work can be interesting to broad environmental, physics and mathematics community. The work is supported by Russian Foundation for Basic Research grant 16-31-00510.