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Integrating technologies for oil spill response in the SW Iberian Coast

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Abstract

An operational oil spill modelling system developed for the SW Iberia Coast is used to investigate the relative importance of the different components and technologies integrating an oil spill monitoring and response structure. A backtrack of a CleanSeaNet oil detection in the region is used to demonstrate the concept. Taking advantage of regional operational products available, the system provides the necessary resolution to go from regional to coastal scales using a downscalling approach, while a multi-grid methodology allows the based oil spill model to span across model domains taking full advantage of the increasing resolution between the model grids. An extensive validation procedure using a multiplicity of sensors, with good spatial and temporal coverage, strengthens the operational system ability to accurately solve coastal scale processes. The model is validated using available trajectories from satellite-tracked drifters. Finally, a methodology is proposed to identifying potential origins for the CleanSeaNet oil detection, by combining model backtrack results with ship trajectories supplied by AIS was developed, including the error estimations found in the backtrack validation.

Keywords: Oil spills; operational modelling; backtracking; emergency response; pollution monitoring; South Iberian coast.

1. Introduction

Operational Ocean modelling has witnessed a very rapid evolution in recent years. Large scale models covering the major ocean basins have improved their resolution and a new layer of high resolution regional and coastal operational models is now arising, based on those larger models. This evolution is mainly due to improvements in numerical methods and computer performance, motivated by the need of accurate forecasts for research, to support economic activities and for safety and security. The applications of such high-resolution operational models in the field of oil spill pollution are obvious, helping in prevention and during contention, clean-up and recovery phases (e.g. Sotillo et al. 2008; Broström et al. 2011; Janeiro et al. 2014).

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