Geophysical Research Abstracts
Vol. 13, EGU2011-8724, 2011
EGU General Assembly 2011

Improving Mercator operational configurations for drift modelling applications

Stéphane Law Chune (1), Yann Drillet (1), Pierre Daniel (2), and Pierre De Mey (3)

(1) Mercator-Ocean, Toulouse, France (slaw@mercator-ocean.fr), (2) Météo-France, Toulouse, France, (3) LEGOS/ CNRS, Toulouse, France

Nowadays, many authorities in charge of rescue-at-sea operations lean on operational oceanography products to outline research perimeters. Moreover, current fields estimated with sophisticated ocean forecasting systems can be used as input data for oil spill/ adrift object fate models. This emphases the necessity of an accurate sea state forecast, with a mastered level of reliability.

This work focuses on the issues inherent to drift modelling, dealing in the first place with several aspects in the estimation of the oceanic current field. For that purpose, benchmarked drift scenarios were set up from real surface drifters data collected in the Mediterranean sea and off the coasts of Angola. The idea is to generate series of current fields of different qualities (i.e. with different modelling options or physical processes) and then assess them in term of drift prediction efficiency.

For the ocean prediction, we used some oceanic configurations based on the NEMO 2.3 code with some regional improvements, nested into Mercator 1/12° operational system. Drift forecasts were computed offline with two particles fate models: Mothy (Météo-France oil spill system) and Ariane (B. Blanke, 1997). The use of these software give us two different approaches. In the first one, an extraction of the current in depth is used as background of the one computed by Mothy, which describes precisely the mixed layer vertical profile in response to local wind and pressure. With regard to Ariane, surface currents are used directly to assess the modeling of surface processes in our oceanic configurations.

Previous studies showed that meso-scale features and high frequency processes have a strong contribution in the oceanic Lagrangian predictability. We were therefore particularly interested in the impact of the horizontal resolution, the vertical mixing, the atmospheric forcing frequency and other physical processes relevant for the oceanic drift like the tide. Time and space scales that we focus on are about 72h forecasts (typical forecast period in crisis), for final distance errors of a few dozen of km (acceptable for reconnaissance by aircrafts).

Results suggest that the effect of the wind and the control of meso-scale trough the resolution are of primary importance for drift applications in the Mediterranean sea. Concerning the Angola scenario, complex oceanic features like the influence of the Congo river's plume and the fast reversal of costal currents, likely due to tropical waves, where studied. In addition, we where also interested in numerical dispersion experiments, and future works would deal with the relevancy of ensemble forecasts regarding deterministic predictions.