Efficient Tools for Marine Operational Forecast and Oil Spill Tracking

M Marta-Almeida 1 M Ruiz-Villarreal 2 J Pereira 3,5 P Otero 2 M Cirano 4,5 X Zhang 4,5 R D Hetland 4

This work has been published in June 2013, Marine Pollution Bulletin, 71 (1-2), 139-151. http://dx.doi.org/10.1016/j.marpolbul.2013.03.022

1 Rede de Modelagem e Observação Oceánografica, Brazil
2 Instituto Español de Oceanografía, C. O. A Coruña, Galicia, Spain
3 Grupo de Oceanografía Tropical, Instituto de Física, Universidade Federal da Bahia, Brazil
4 Department of Oceanography, Texas A&M University, College Station, TX, USA
5 State Key Lab. of Satellite Ocean Environ. Dynamics, Second Inst. of Oceanography, Hangzhou, China

Abstract:
Ocean forecasting and oil spill modeling and tracking are complex activities requiring specialized institutions. In this work we present a lighter solution based on the Operational Ocean Forecast Python Engine (OOF) and the oil spill model General NOAA Operational Modeling Environment (GNOME)

OOFs and GNOME are proved to be valuable, efficient and low cost tools and can be seen as an intermediate stage towards more complex operational implementations of ocean forecasting and oil spill modeling strategies

Tools:
- Ocean Model ROMS - Regional Ocean Modeling System
- Oil spill model GNOME - General NOAA Operational Modeling Environment
- Python tools:
  - Operational Engine (OOFs)
  - Base tools (OKEAN)

Keywords:
- Open source
- Robust
- Relocatable
- Efficient
- Automatic
- One environment/all the tasks

REMO Forecast System:
(Re Rede de Modelagem e Observação Oceánografica)
- Mesoscale, shelf and tidal circulation
- Support activities of oil industry

Forecast trajectories for the Campos Basin:
- Main offshore oil extraction site along Brazilian coast
- Hypothetical oil spill accidents using the location of 6 platforms
- Instantaneous release in 3 transects
- Continuous release at the center of each transect
- 5 days forecast

Texas-Louisiana Forecast System:
- Mississippi-Atchafalaya river plumes
- Shelf/slope circulation
- Land-sea breeze
- Oil leaks are frequent in Northern Gulf of Mexico
- Passage of 1.2 billion barrels per year
- More than 900 accidents per year!