



Scientific management of Mediterranean coastal zone: a hybrid ocean forecasting system for oil spill and search and rescue operations

A. Jordi (1), M. I. Ferrer (1), G. Vizoso (1), A. Orfila (2), G. Basterretxea (1), B. Casas (1), A. Álvarez (1), D. Roig (1), B. Garau (1), M. Martínez (1), V. Fernández (1), A. Fornés (1), M. Ruiz (1), J. J. Fornós (3), P. Balaguer (1), C. M. Duarte (1), I. Rodríguez (4), E. Alvarez (4), R. Onken (5), J. Tintoré (1)

(1) IMEDEA (CSIC-UIB), Spain.

(2) School of Civil and Environmental Engineering, Cornell University, USA.

(3) Departament de Ciències de la Terra, UIB, Spain.

(4) Área del Medio Físico, Puertos del Estado, Spain.

(5) Institute of Coastal Research, GKSS Research Centre, Germany.

The oil spill from Prestige tanker showed the importance of scientifically based protocols to minimize the impacts on the environment. We describe a new forecasting system to predict oil spill trajectories and their potential impacts on the coastal zone. The system is composed of three main interconnected modules that address the different capabilities: (1) an operational circulation sub-system that includes nested models at different scales, data collection with near-real time assimilation, new tools for initialization or assimilation based on genetic algorithms and feature-oriented strategic sampling; (2) an oil spill coastal sub-system that allows simulation of the trajectories and fate of spilled oil together with evaluation of coastal zone vulnerability using environmental sensitivity indexes; (3) a risk management sub-system for decision support based on GIS technology. The system is applied to the Mediterranean Sea where surface currents are highly variable in space and time and interactions between local, sub-basin and basin scale forcing and circulations give rise to non linear interactions that need to be adequately resolved at each one of the intervening scales. This com-

plex reduced scale ocean represents a real scientific and technological challenge for operational oceanography and more specifically for oil spill response and search and rescue operations.