



The Mediterranean Decision Support System for Marine Safety dedicated to oil slicks predictions



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ARTICLE INFO

Available online 27 July 2016

Keywords:

Oil spill models
Network data repository
User interface

ABSTRACT

In the Mediterranean sea the risk from oil spill pollution is high due to the heavy traffic of merchant vessels for transporting oil and gas, especially after the recent enlargement of the Suez canal and to the increasing coastal and offshore installations related to the oil industry in general. The basic response to major oil spills includes different measures and equipment. However, in order to strengthen the maritime safety related to oil spill pollution in the Mediterranean and to assist the response agencies, a multi-model oil spill prediction service has been set up, known as MEDESS-4MS (Mediterranean Decision Support System for Marine Safety). The concept behind the MEDESS-4MS service is the integration of the existing national ocean forecasting systems in the region with the Copernicus Marine Environmental Monitoring Service (CMEMS) and their interconnection, through a dedicated network data repository, facilitating access to all these data and to the data from the oil spill monitoring platforms, including the satellite data ones, with the well established oil spill models in the region. The MEDESS-4MS offer a range of service scenarios, multi-model data access and interactive capabilities to suite the needs of REMPEC (Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea) and EMSA-CSN (European Maritime Safety Agency-CleanseaNet).

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1. Introduction

Traditional shipping and oil transportation routes are more exposed to the impacts of oil-polluted discharges from tankers and other vessels than other areas. Oil discharges may be accidental or

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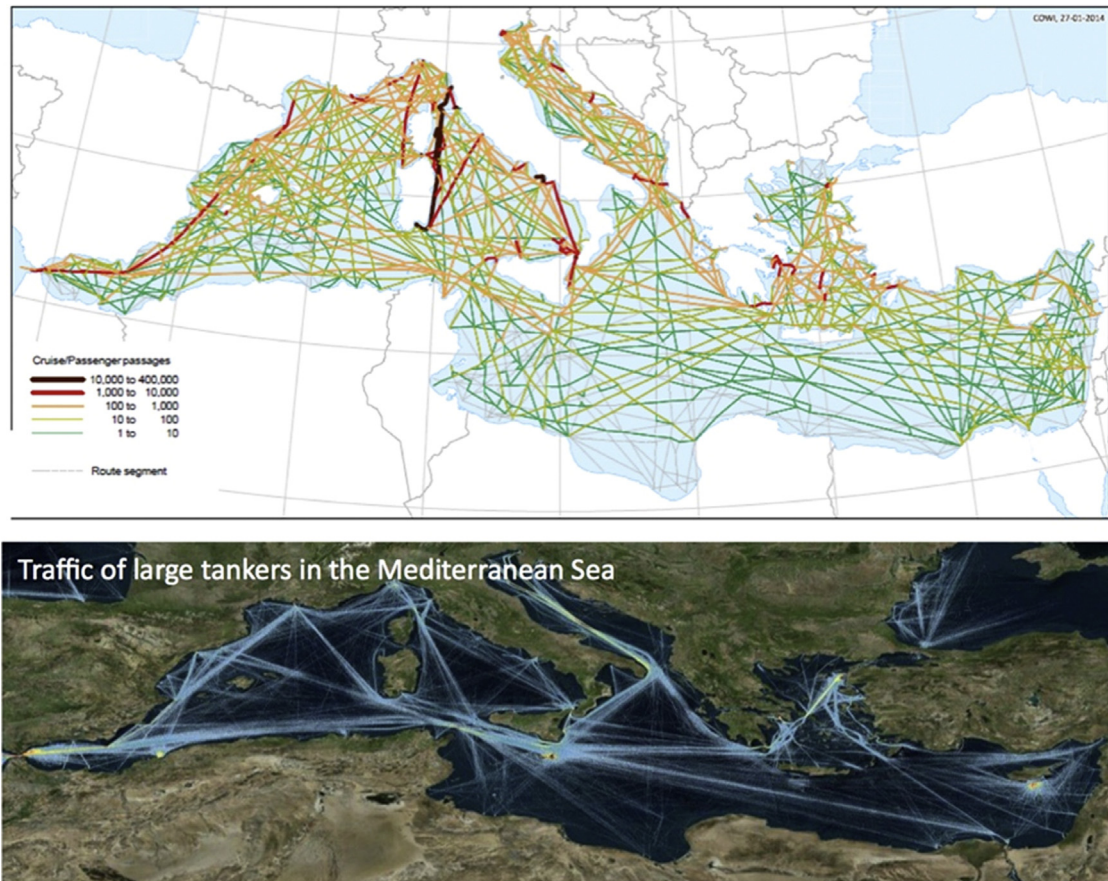


Fig. 1. Ship traffic density in the Mediterranean Sea (a and b; COWI 27/1/2014).

in many instances vessels intentionally discharge illegal wastes despite foreign and domestic regulation prohibiting such actions. The risk from oil spill pollution in the Mediterranean is high due to the heavy ship traffic (Fig. 1a), and in particular of merchant vessels for transporting oil and gas (Fig. 1b) and to the increasing coastal and offshore installations related to the oil industry in general.

Oil spills in the ocean, particularly in offshore and coastal waters are a matter of concern due to the damaging effect they can have on various resources and industrial installations and the marine vegetation and wildlife in general. To mitigate such damages as much as possible, it is common to combat a spill by deploying equipment such as booms and skimmers or to spray chemical dispersants. In order to make optimal use of such devices and to assist the response agencies and the decision makers, it is recommended to employ dedicated numerical models to predict where the spill will most likely move to, in particular which resources are threatened, and how soon it will get there. Such models often also predict the expected state of the oil when it arrives, that is, how much will have evaporated, the degree of emulsification of the remainder, how much will remain on the surface and how much will be dispersed as fine droplets throughout the water column, and so on. The oil spill models require the location and the time of the observed oil slick, the type of oil and its characteristic, the wind fields, the sea state, the sea surface temperature and the sea currents as input data. Therefore, in order to assist the response agencies to protect the marine environment from oil spill accidents, it is necessary to offer an efficient estimate of the oil spill predictions, using quality controlled forecasting data, such as those provided by the Copernicus marine service and the downscaled ocean forecasting systems of

MONGOOS (Mediterranean Oceanographic Network for Global Ocean Observing System). The Copernicus marine service provides the regional Med-MFC (Mediterranean Monitoring and Forecasting Centre) forecasting data at a lower spatial and temporal resolution, while the downscaled ocean forecasting systems of MONGOOS provide a variety of high spatial and temporal resolution at sub-regional and coastal domains.

1. Integration of the different well established oil spill models in the Mediterranean with the ocean data provided by the low spatial resolution Copernicus Med-MFC (Mediterranean Monitoring and Forecasting Centre) and the high spatial resolution downscaled national ocean forecasting systems of MONGOOS (Mediterranean Oceanographic Network for Global Ocean Observing System) network (Table 1a; www.mongoos.eu);
2. Connection of the existing oil spill monitoring platforms in the region, such as EMSA-CSN (European Maritime Safety Agency-CleanSeaNet) and REMPEC (Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea) to the integrated multi-model oil spill prediction system of MEDESS-4MS (Mediterranean Decision Support System for Marine Safety); and
3. Allow the backward predictions of the oil slicks, in order to assist the response agencies to implement the EC Directive 2005/35 facilitating the identification of the ship that has potentially originated the spill.

The Mediterranean decision support system for marine safety project was aiming to fulfill the above main requirements and to set up an integrated multi-model operational oil spill prediction service for the entire Mediterranean, dedicated to the EU members

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