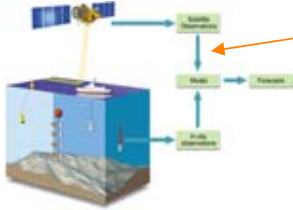


The MERCATOR Ocean real-time service for ocean monitoring and forecasting

V. Toumazou, P. Bahurel and the Mercator-Océan Team

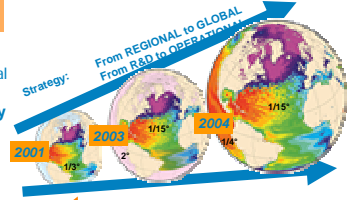
Address: MERCATOR-Ocean, 8-10 Rue Hermes, 31526 Ramonville, France Email: Vincent.Toumazou@mercator-ocean.fr, Pierre.Bahurel@mercator-ocean.fr

MERCATOR-Ocean : 3D Real time Ocean Forecasting



OBJECTIVE

1. Develop an operational oceanography system using three-dimensional simulation and a high-resolution primitive-equation model capable of assimilating satellite data (Jason-A, Envisat and GFO provided by SSALTO/DUACS) and in-situ ocean observation data (particularly those gathered by the CORIOLIS center).
2. Support applications for commercial shipping and naval forces, promote sustainable stewardship of the world's oceans, oceanographic research, safety at sea, environmental monitoring and conservation, and further knowledge of the ocean's role in climatic change.
3. Contribute to the international GODAE initiative (Global Ocean Data Assimilation Experiment) through routine real-time analysis and forecasting of global ocean conditions.



The first part of the objective was met on 17 January 2001 with the release of the first Mercator ocean bulletin, providing a two-week forecast for the entire North Atlantic. Two thousands new forecast charts are now added to the MERCATOR bulletin every week. Building on these successes, a dedicated operational oceanography Mercator-Ocean, was set up in 2002.

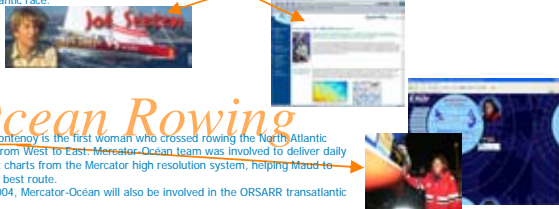
Mercator Ocean's mission is to deliver incremental improvements in the service provided by this new operational oceanography capability by increasing the resolution and the geographic coverage of the models used. The high-resolution model that is now on line offers 6 km grid resolution, and the first model offering a 2° global ocean coverage is now operated. Next year, a 1/4° global model will be started operationally.

International Programs

Mercator-Ocean is involved in three major international programs:

- The Global Ocean Data Assimilation Experiment (GODAE) will conduct its demonstration phase from 2003 to 2005. Operational and research institutions from Australia, Japan, United States, United Kingdom, France - with MERCATOR -, Norway, Italy, ect... will be performing global oceanic data assimilation and ocean forecasting in order to provide regular and comprehensive descriptions of ocean fields such as temperature, salinity and currents at high temporal and spatial resolution.
- MERSEA (Marine Environment and Security for the European Area) Strand 1 has been selected by the European Commission in the framework of the GMES program. European part of the international experiment GODAE, this project builds on the current European capabilities for development, implementation and operational use of : marine modeling and data assimilation systems, space born observations and in-situ observing networks and systems.
- ROSES is a project supported by the European Space Agency in the framework of the GMES program providing real-time ocean services for environmental monitoring.

Oceanographers at Mercator Ocean have developed a new version of their ocean bulletin for the 2002 edition of the Route du Rhum solo transatlantic yacht race and worked with the official race website to publish daily ocean current forecast charts. In addition, Mercator-Ocean provided a tailor-made service to Joe Seeten, who finished the race third in the 60' monohulls category, sending a daily analysis of ocean currents to a team at the Université du Littoral Côte d'Opale (ULCO), which coordinated routing for the French skipper. The operation has been renewed with Joe Seeten and other sailors. Recently, Mercator-Océan was involved in the Jacques Vabre transatlantic race.



Ocean Rowing

Maud Fontenay is the first woman who crossed rowing the North Atlantic Ocean from West to East. Mercator Ocean team was involved to deliver daily forecast charts from the Mercator high resolution system, helping Maud to find the best route. Early 2004, Mercator-Océan will also be involved in the ORSARR transatlantic race.

How to get the products ?

Data Policy

A dynamic access on MERCATOR Web site to 2000 predefined maps fully describing the ocean from surface to bottom (pre-defined depth-levels) is available. A list of all MERCATOR products and conditions for access and use can also be found on the Web site.

The numerical data can be downloaded from a dedicated Web server. They are available a in near real-time. They are supposed to be used in the framework of non-commercial applications only. However, partnerships between private companies and Mercator-Ocean can be considered.

For any request, please contact products@mercator-ocean.fr.

Numerical Files

- Numerical outputs available every Thursday for (partnerships) or Monday
- 3D fields : U, V, T, S and Kz
- 2D fields : 10 variables (forcing, ...)
- Mercator projection, netcdf format
- Atlantic : 1/3° or 1/6° (interpolated from our 1/15° model)
- Med sea : 1/8° Méditerranée (interpolated from our 1/15° model)
- Possible extractions operated by MERCATOR-Ocean people



Collaborations & Activities

Oil Spill

On 13 November 2002, the oil tanker Prestige suffered damage off Cape Finisterre, Spain. Six days later, it broke up and sank in 3,400 meters of water off the Galician coast with 50-60,000 tonnes of heavy fuel oil on board. Three-dimensional analysis and forecasting of the ocean conditions (temperature and currents) can help monitor pollution and plan protective action. Indeed, data about currents below the ocean surface can be crucial in determining where the oil may come ashore, especially as the wreck is lying in the Portugal current, where subsurface as well as surface turbulence is high. Mercator Ocean was contacted as soon as the catastrophe started to unfold, and since 20 November the team has been providing temperature and current forecast charts to Cedre, Météo France, Shom and Ifremer, all of which are playing a leading role in managing the crisis. Each Wednesday, Mercator generates forecast charts for the next two weeks from Psy2, its new high-resolution model (~6 km grid resolution). At the same time, statistical analysis of outputs from the Psy1 model, a medium-resolution model, has been operational since January 2001, is providing a better understanding of the currents around the sunken vessel.



Fishing

Mercator-Océan has a partnership with the CLS company for fishing activities. CLS has developed the Catsat system to:

- locate favorable fishing grounds ;
- reduce operating costs ;
- improve safety during fishing operations ;
- meet their quotas more efficiently.

The Catsat system uses Mercator forecast data to deliver value added products to fishermen.



<http://www.mercator-ocean.fr>

Pictures

Every week, 2000 predefined maps are available on the bulletin pages of our Web site providing regional zooms & vertical sections and profiles.

