

# MARC

## MODELING AND ANALYSIS FOR COASTAL RESEARCH

Run numerical models and process satellite products for the benefit of the research community

## REALISTIC SIMULATIONS OF THE COASTAL OCEAN

MARC models are based on **MARS3D** model (circulation, biogeochemistry and sediment dynamics) and the **WAVEWATCH III** wave model.

Several configurations dedicated to French metropolitan coasts and to the global ocean for surface waves.

The main variables simulated are **currents, water levels, waves, temperature, salinity, turbidity, nutrients and plankton concentrations.**

## APPLICATIONS

Model and observation products are prevalent across a diverse array of **scientific projects** but also for **coastal applications.**

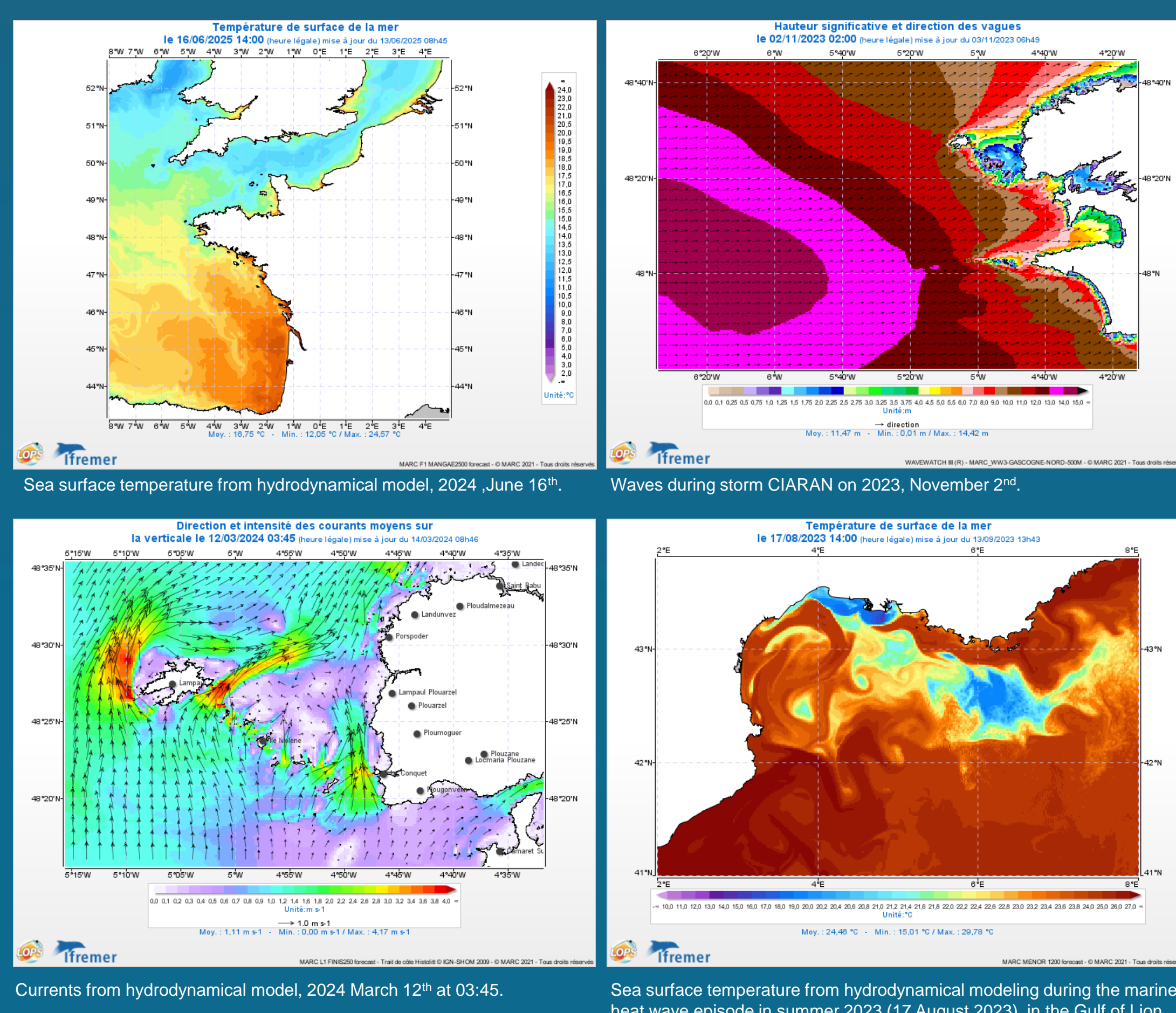
A variety of fields : **management of marine environments** (Marine Protected Areas, Water Agencies and the French Office for Biodiversity), **maritime safety** and **marine renewable energies.**

## NEWS AND DEVELOPMENTS

Towards better coastal resolution of 3D hydrodynamic variables.  
Migration to the **CROCO** model.

## PRODUCTS

Various **hindcasts** processed for surface waves and regional circulation.  
A **website** updated daily.



## COUPLED TO THE COPERNICUS MARINE SERVICE

MARC coastal models need boundary and initial conditions. They are coupled to the Copernicus/ modelling (Global Ocean Physics Analysis and Forecast, Mediterranean Sea Physics Analysis and Forecast). This allows a **seamless description of the ocean** from the **open sea** down to the **coastal zone.**

**MARS3D**: Petton, S., Garnier, et al.; Geosci. Model Dec., <https://doi.org/10.5194/gmd-16-1191-2023>, 2023; Lazure and Dumas, Adv. Water Resour., <https://doi.org/10.1016/J.ADVWATRES.2007.06.010>, 2008.

**WAVEWATCH III**: The WAVEWATCH III® Development Group (WW3DG), 2019: User manual and system documentation of WAVEWATCH III® version 6.07. Tech. Note 333, NOAA/NWS/NCEP/MMAB, College Park, MD, USA, 326 pp. + Appendices.

**CROCO**: <https://www.croco-ocean.org> - Auclair et al., Zenodo, 2024.