MARINE MODELLING AND OPERATIONAL OCEANOGRAPHY AS TOOLS OF ENVIRONMENTAL MANAGEMENT

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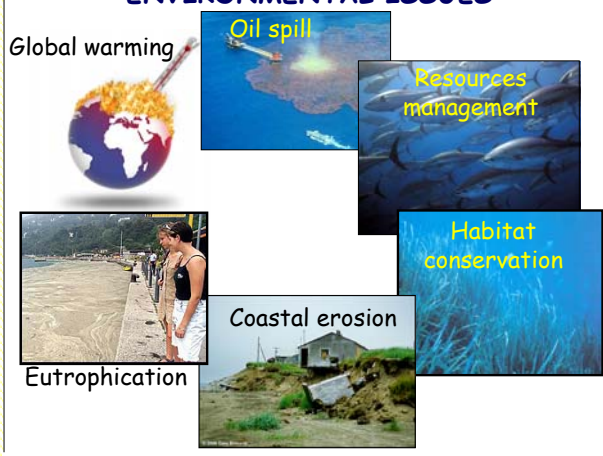
MODELLING THE SEA

The marine modelling activity of IAMC-CNR of Oristano (Italy), in the framework of the Mediterranean Operational Oceanography Network (MOON), is conducted over several domains and at various scales through a **series of nested high resolution models**. The activities include the **forecast/analysis of the main oceanographic parameters**, the **calibration/validation** of the models (by means of remotely sensed and in situ data), their interpretation, the production of **scientific papers**, the **dissemination of the products** in near real time. Forecasts/analysis of hydrodynamics over the Western Mediterranean sea, the Sicily Channel and the Gulf of Oristano (Western Sardinia) are provided daily through web portals.

Other modelling tools, like **ecological** and **oil spill** modelling, are not still fully developed and implemented in the operational systems, but are essential to face the questions raised by the present **environmental issues**. Data **assimilation** of remotely sensed and in situ data (SLA and SST, temperature and salinity profiles, but also Chl data for ecological models) in the analyses are needed to substantially improve the initialization of models and in general the modelling system.

ENVIRONMENTAL ISSUES

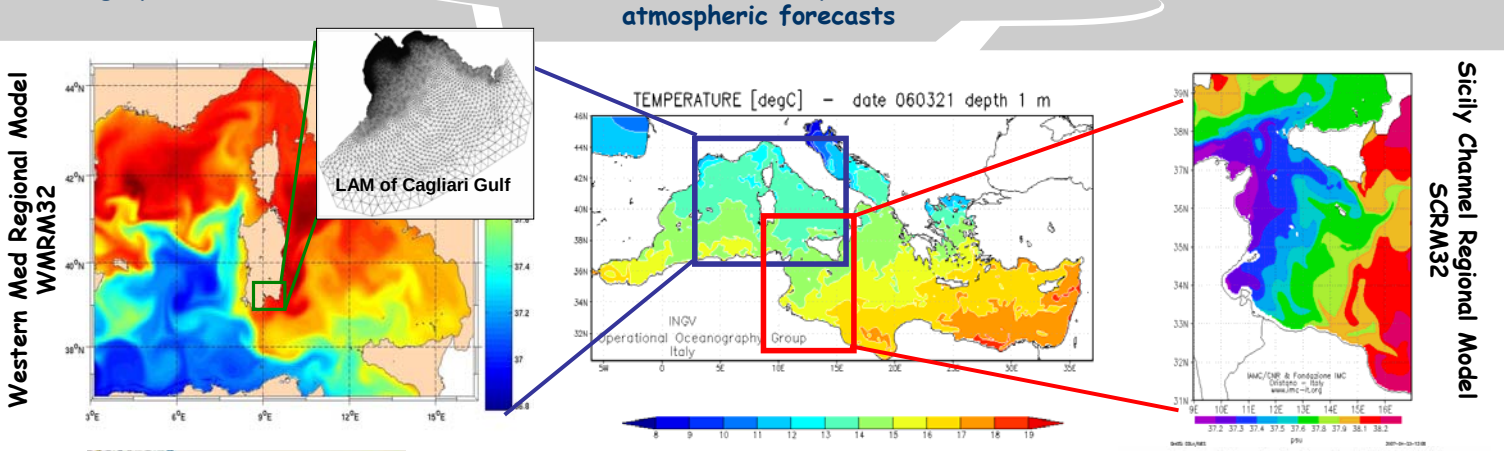


THE OPERATIONAL SYSTEM

Multi-platform and multi-parametric observing system

Nested models forced by hi-resolution atmospheric forecasts

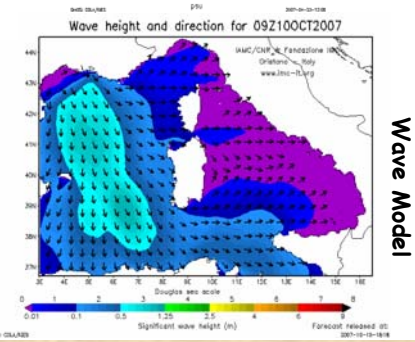
Data Assimilation Tools for improved initial conditions



To be fully developed and implemented

Data assimilation tecniques and tools

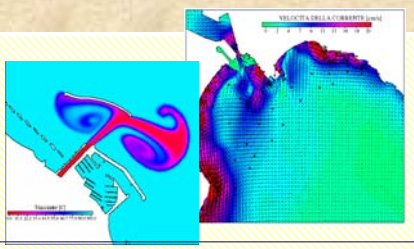
Ecological models coupled with hydrodynamics



SERVICES

MARINE FORECASTING

- Daily forecasts of hydrodynamics and waves over the Western Mediterranean
- Daily forecastes of hydrodinamics over the Sicily Channel
- Daily forecasts of hydrodynamics in the Oristano Gulf



DECISION SUPPORT APPLICATIONS

- Oil spill
- Water quality in Coastal Zones and Lagoons
- Rescue & Recovery
- Weatherrouting
- Impact of Marine Infrastructures
- Sediment Transport

References

Demirov E., Pinardi, N., Fratianni, C., Tonani,, M., Giacomelli, L., De Mey, P., Assimilation scheme of the Mediterranean Forecasting System: operational implementation. *Annales Geophysicae*, 21: 189-204, 2003.

Gaberšek, S., Sorgente, R., Natale, S., Ribotti, A., Olita, A., Astraldi, M. and Borghini, M., The Sicily Channel Regional Model forecasting system: initial boundary conditions sensitivity and case study evaluation, *Ocean Sci.*, 3, 31-41, 2007.

Olita, A., Sorgente, R., Natale, S., Gaberšek, S., Ribotti, A., Bonanno, A. and Patti, B., Effects of the 2003 European heatwave on the Central Mediterranean Sea: surface fluxes and the dynamical response, *Ocean Sci.*, 3, 273-289, 2007.

Sorgente, R., Drago, A. F. and Ribotti, A., Seasonal variability in the Central Mediterranean Sea circulation. *Annales Geophysicae*, 21, 299-322, 2003.

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