AVVISO DI SEMINARIO
Martedì 22 Marzo, ore 9.00 – Aula A11 (DICCA)

An Ocean Waves Perspective on Atmosphere-Oceans Coupling in Numerical Weather Prediction

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The global analyses and medium range forecasts from the European Centre for Medium range Weather Forecasts rely on a state of the art atmospheric model. In order to best represent the momentum exchange at the surface of the oceans, it is tightly coupled to an ocean wave model. Recently, progress has been made to include an ocean model as part of the operational medium range forecasting system.
In this context, a first set of sea state (waves) effects on Upper Ocean mixing and dynamics was successfully added to the system. Impact of sea-state dependent momentum forcing, the Stokes-Coriolis force and the enhanced mixing by breaking ocean waves have been added. The first operational implementation of this system was with the ensemble prediction system where the impact of the ocean is known to be beneficial at longer forecast lead times. Work is ongoing to implement the same system into the operational high resolution suite. Tropical cyclone prediction with increased resolution has generally become quite reliable. Nevertheless, systematic intensity biases still exist. The benefit of adding the active coupling with the ocean will serve as an example of how coupling to the ocean can be quite beneficial even at short forecast lead times.
Because the feedback from the ocean can be significant, it is only in the fully coupled system that physical parameterisation should be revisited. For instance, experimental evidences point to a sea state/wind dependency of the heat and moisture fluxes. Following an extension of the wind wave generation theory, a sea state dependent parameterisation for the roughness length scales for heat and humidity was introduced. Furthermore, under very strong wind forcing, there are evidences that the present parameterisation of the sea state dependent momentum flux should be modified to respect physical constrains on the wave spectral steepness.

Coupled Modelling high resolutions of wind waves

Aron Roland, Luigi Cavaleri and Mathieu Dutour

In this seminar we show our latest research with respect to a fully coupled approach for wind, waves and flow. We show building blocks for a coupled ROMS-COMSO-WAM system and 1st applications using a fully unsutructured WWM-SCHISM model of the Med. Both Models are running in baroclinic mode, though, the advantage of SCHISM-WWM with its flexible mesh feature that is now also available in the WAM model. In the 2nd part of the presentation of we introduce the new implicit modelling concept of WWM, WAM and WW3.