

A TWO-WAY COUPLING OF THE ADRIATIC SEA CIRCULATION AND WAVE MODELS

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The atmosphere and the sea form a coupled system, exchanging momentum, heat and water at their interface. In that exchange an important role is played by the surface waves and their interaction with surface currents. In this study an implementation of the Regional Ocean Modelling System (ROMS) coupled with the WWMII (Wind Wave Model II) model is used as the computational platform for exploration of related issues. We have designed our own coupling library that allows to efficiently couple MPI based model based on finite difference or finite elements. We have implemented the Arduin formulation (Arduin et al, journal, year- please substitute as necessary) for the effect of waves in the circulation model which is based on the use of Stokes drift. We also proposed the use of surface stress obtained from the wave model as opposed to bulk flux formulation. The coupled model has been applied in realistic situation in January-February 2003 in the Adriatic for which an extensive data set is available. The model output is compared with ADCP measurements of the surface currents; when all contributions are accounted for the RMSE is decreased by 13% at all ADCPs and the mean error disappear. The results also indicate that an important aspect of effective modeling is the use of integral formula for the computation of the Stokes drift.