Geophysical Research Abstracts
Vol. 17, EGU2015-1924-3, 2015
EGU General Assembly 2015

Ocean Dynamics Simulation during an Extreme Bora Event using a Two-Way Coupled Atmosphere-Ocean Modeling System

Matjaz Licer (1), Peter Smerkol (1), Anja Fettich (1), Michalis Ravdas (3), Alexandros Papapostolou (3), Anneta Mantziafou (3), Jure Cedilnik (2), Benedikt Strajnar (2), Maja Jeromel (2), Neva Pristov (2), Jure Jerman (2), Saso Petan (2), Vlado Malacic (1), and Sarantis Sofianos (3)

(1) Marine Biology Station, National Institute of Biology, Slovenia, (3) Ocean Physics And Modelling Group, University of Athens, Greece, (2) Slovenian Environment Agency, Slovenia

The response of the Adriatic Sea to cold north-easterly Bora wind forcing has been modelled numerous times, but usually using one-way coupling techniques. One of the most significant events of the kind took place in February 2012, when hurricane force Bora was blowing over the Northern Adriatic almost continuously for over three weeks, causing extreme air-sea interactions leading to severe water cooling (below 4 degrees Celsius) and extensive dense water formation (with density anomalies above 30.5 kg/m^3). The intensity of the atmosphere-ocean interactions during such conditions calls for a two-way atmosphere-ocean coupling approach. We compare the performances of a) fully two-way coupled atmosphere-ocean modelling system and b) one way coupled ocean model (forced by the atmospheric model hourly output) to the available *in-situ* measurements (coastal buoy, CTD). The models used were ALADIN (4.4 km resolution) on the atmospheric side and POM ($1/30^\circ \times 1/30^\circ$ resolution) on the ocean side. The atmosphere-ocean coupling was implemented using the OASIS3-MCT model coupling toolkit. We show that the atmosphere-ocean two-way coupling significantly improves the simulated temperature and density response of the ocean since it represents short-termed transient features much better than the offline version of the ocean model.