Geophysical Research Abstracts
Vol. 16, EGU2014-10382-1, 2014
EGU General Assembly 2014

A Unified Air-Sea Interface in Fully Coupled Atmosphere-Wave-Ocean Models for Data Assimilation and Ensemble Prediction

Shuyi Chen (1), Milan Curcic (1), Mark Donelan (1), Tim Campbell (2), Travis Smith (2), Sue Chen (2), Rick Allard (2), and John Michalakes (3)

(1) University of Miami, RSMAS, Miami, FL, United States (schen@rsmas.miami.edu), (2) Naval Research Lab, (3) NOAA

The goals of this study are to 1) better understand the physical processes controlling air-sea interaction and their impact on coastal marine and storm predictions, 2) explore the use of coupled atmosphere-ocean observations in model verification and data assimilation, and 3) develop a physically based and computationally efficient coupling at the air-sea interface that is flexible for use in a multi-model system and portable for transition to the next generation research and operational coupled atmosphere-wave-ocean-land models. We have developed a unified air-sea interface module that couples multiple atmosphere, wave, and ocean models using the Earth System Modeling Framework (ESMF). This standardized coupling framework allows researchers to develop and test air-sea coupling parameterizations and coupled data assimilation, and to better facilitate research-to-operation activities. It also allows for future ensemble forecasts using coupled models that can be used for coupled data assimilation and assessment of uncertainties in coupled model predictions. The current component models include two atmospheric models (WRF and COAMPS), two ocean models (HYCOM and NCOM), and two wave models (UMWM and SWAN). The coupled modeling systems have been tested and evaluated using the coupled air-sea observations (e.g., GPS dropsondes and AXBTs, drifters and floats) collected in recent field campaigns in the Gulf of Mexico and tropical cyclones in the Atlantic and Pacific basins. This talk will provide an overview of the unified air-sea interface model and fully coupled atmosphere-wave-ocean model predictions over various coastal regions and tropical cyclones in the Pacific and Atlantic basins including an example from coupled ensemble prediction of Superstorm Sandy (2012).