The Influence of Assimilating Land Surface Parameters on the Simulation Performance of Warm Season Convective Systems

A. Papadopoulos (1), E. Serpetzoglou (1), E.N. Anagnostou (1,2)

(1) Institute of Inland Waters, Hellenic Centre for Marine Research, Greece (2) Department of Civil and Environmental Engineering, University of Connecticut, USA (tpapa@ath.hcmr.gr)

In this study, we examine the impact of data forced land surface conditions (soil moisture and temperature) on the simulation of thunderstorm development in warm-season environment over Continental USA. The study is facilitated by the POSEIDON weather forecasting system that uses a modified version of the NCEP/Eta model. We consider two modes of atmospheric model operations: coupled and uncoupled with the land surface model (LSM). In the coupled mode, for the definition of the initial soil state (soil moisture and temperature distributions) we use (a) the global ECMWF analysis dataset and (b) the output obtained from a land surface data assimilation system. The system uses hourly gauge-calibrated radar rainfall fields, satellite radiation forcing fields, and other near surface atmospheric parameters (winds, temperature, pressure and relative humidity) obtained from the global ECMWF analysis dataset to force the NCAR Community Land Model version 3.0 (CLM3) for simulating the evolution of land surface parameters. In the uncoupled mode, the CLM3 soil moisture and temperature fields are used to dynamically update the Eta land surface boundary conditions during model simulations. Results from the numerical experiments are evaluated against measured radar rainfall fields and in-situ observations of soil moisture from two continental regions (US and Central Europe).