Sensitivity Analysis of High Resolution Regional Climate Model Outputs to 1993-2006 Changes in Land Surface Characteristics: Central Florida Case study

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Abstract
This is an ongoing investigation to analyze the sensitivity of near surface climate parameters to land use change (LUC) during a decadal period, 1993-2006 in Central Florida. LUC has been evaluated, using GIS data from Southwest Florida Water Management. We use a regional model set at 9km, 3km and 1km resolutions under different physical configurations with a fine lower atmospheric description. After model validation, we inspect changes in the patterns of atmospheric circulation close to the land surface and the energy budget at a daily time scale. Particular attention is given to stations surrounded by urban areas exhibiting major land management changes during the studied period, like those on the Gulf of Mexico coastal side, as well as stations on the Atlantic coast. Temperature, precipitation and wind are studied for all stations.

Results: Observational data
Observed precipitation shows superior monthly accumulation and frequency of Prcp≥10mm over larger urban areas (Tampa, Orlando).

Results: Model simulations and evaluation

Preliminary results
- Urban and agriculture areas are dominant LUC categories over west central Florida. Noticeable transformation from agriculture to urbanization is observed during last decade.
- Under the coastal urban areas included in this study, the atmospheric vertical structure is more complex than in inland counterparts and land-sea breeze processes in general dominates their climate variability. Our investigation is focusing now in developing sensitivity and statistical analysis (spatial and temporal) to separate different processes and signals for an objective evaluation. Decadal land surface change effects are difficult to examine.

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