**IMPACT OF INTERACTIVE VEGETATION ON PREDICTIONS OF THE NORTH AMERICAN MONSOON**

NOAA

2002-2005

Under GCIP support, the Regional Atmospheric Modeling System (RAMS) and CENTURY Ecological Model have been coupled and the resulting coupled model successfully applied in the central U.S. to study regional-scale, two-way interactions between the atmosphere and vegetation. In this proposal, we will extend the use of that dynamically coupled RAMS/CENTURY model to the southwestern U.S. and Mexico to examine how land-atmosphere interactions influence the spatial and temporal variability of the North American Monsoon (NAM). The proposed work is motivated by recognition of the difficulties in numerically simulating the NAM. One significant feature of the NAM is its sudden onset and the accompanying rapid greenness of vegetation cover. Atmospheric processes, including mesoscale circulations and the formation of clouds and precipitating systems, can be highly dependent on surface heat and moisture fluxes which are, in turn, strongly influenced by the presence of live and dead vegetation, snow cover, and soil-moisture storage. Realistic representation of the vegetation’s response (i.e., the change in live biomass) to atmospheric and hydrologic influences is currently lacking in the land-surface parameterizations used in the NAM numerical studies. Thus, we proposed to use our state-of-the-art atmosphere-vegetation two-way interactive modeling system (the coupled RAMS/CENTURY model) that is capable of realistically representing the biospheric responses to atmospheric and hydrologic conditions to improve the climate modeling of NAM at seasonal-to-interannual time scales. Our model results will be compared and evaluated against observational data in three years selected as having “average”, “wet”, and “dry” NAM precipitation. Studies will also include investigation of how the simulation of interactive vegetation influences the relative importance of local versus advected moisture sources, and the relative importance for prediction of adjacent sea surface temperatures (SST) versus the land-surface memory processes.

Full Proposal

Final Report

Publications

Students