A physically-based multivariate-regression approach is developed to downscale NEXRAD precipitation.

**Abstract**

An integrated interdisciplinary study of environmental changes in the Gulf Coast region has been funded by NASA interdisciplinary Science Program. The final results will be a suite of models that link the upland and estuarine ecosystems into a single model framework that will allow simulating, reproducing, and projecting natural and anthropogenic impacts in a comprehensive manner.

**Objectives**

Improve our understanding of how linked upland and estuarine ecosystems respond to combined changes in the hydrological and nutrient cycles that result from changes in climate and land use/land cover (LULC). Integrate research expertise from a diversity of fields: includes climate modeling, remote sensing analysis, biogeochemical cycling in watersheds, surface hydrology and estuary ecology.

**Key Science Questions**

1. What is the relationship between global climate forcing and seasonal-to-interannual climate variability and extreme storm events over the Gulf Coast region? (Yang/Niu/Xie)
2. What are the spatial patterns in LULC as defined by satellite data in the Gulf Coast region? (Yang/Xu/Xie)
3. How does riverine nutrient export to Gulf Coast estuaries vary with LULC patterns and hydrologic conditions? (McClelland/Maidment)
4. What is the relationship between the frequency and magnitude of extreme events in the hydrologic and nutrient cycles and the mean productivity and the resiliency of productivity in Gulf Coast estuaries? (Montagna/McClelland)
5. Can we use the answers to the questions above or based on those results to predict the response of Gulf Coast estuaries to future climate perturbations? (Xu)

**References**

