Modeling Non-Point Pollution and Erosion Into Gulf Coast Bays and Marshes

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Goals

Evaluate model performance using better precipitation data for the Nonpoint Source Pollution and Erosion Comparison Tool (N-SPECT) to generate more accurate outputs.

Project Overview

Non-point source pollution is a major contributor to the decline in water quality in coastal areas. This type of erosion cannot be traced to a single point outlet, but rather to an area. In the rapidly developing coastal areas the source of the pollution may come from development and land clearing, deforestation, agriculture, lawn fertilizers and farm practices. NOAA's GIS based spatially distributed Nonpoint Source Pollution and Erosion Comparison Tool (N-SPECT) model was designed to compare the effects of different land cover and land use practices on pollutant yields.

N-SPECT helps coastal managers and decision makers predict potential water quality impacts from non-point sources by predicting surface flow. Users must enter information about their area of interest such as a land use/land cover grid, digital elevation model, precipitation info, and a gridded soil map. The model uses variations of the Universal Soil Loss Equation (USLE) to predict surface runoff. Land cover change scenarios such as forest clearing or potential development may be simulated to predict the effect these changes may have.

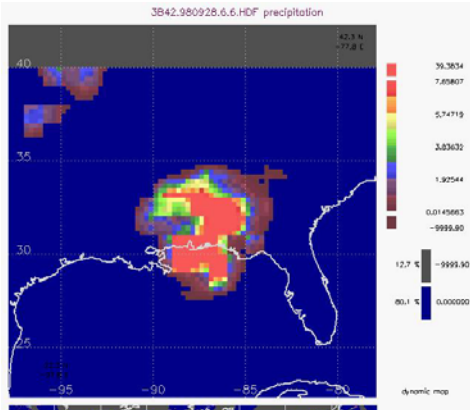

Figure 1. Hurricane Georges rainfall accumulation.

Precipitation is a very important model input and currently the model uses data derived from point estimates or modeled from local climate and rainfall data. In this project, the University of Mississippi will work with NOAA-CSC to integrate existing and next generation precipitation data streams into N-SPECT for testing on two estuaries in the Gulf of Mexico. The two estuaries will be St. Louis Bay and the Mississippi Sound at Pascagoula. Well documented rainfall events such as tropical storms or hurricanes will be used for comparison.

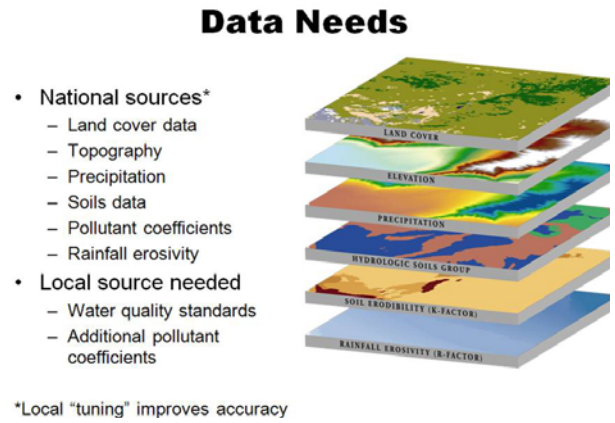

Figure 2. Data input for the N-SPECT model.

Approach

NASA's Global Precipitation Measurement Mission (GPM) planned for launch in 2013 may improve coastal water quality decisions by replacing the coarse resolution (4 km X 4 km) gridded data, derived from point sources, used in the N-SPECT model with much higher resolution (250 m and 500 m) gridded, georeferenced continuous precipitation measurements. The GMI sensor on GPM will provide improved spatial resolution compared to the TMI sensor on NASA' s Tropical Rainfall Measuring Mission (TRMM) which was launched in 1997 jointly by NASA and the Japan Aerospace Exploration Agency (JAXA). The TRMM mission has been providing precipitation data operationally since 1998 and is the only precipitation radar currently in orbit providing an alternative for comparisons of rainfall measurement in N-SPECT.

Expected Impacts

This project will compare N-SPECT results from traditional sources with simulated GPM sources derived from TRMM data and is expected to generate more accurate data outputs from the model with the increased resolutions.

Contact Information

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