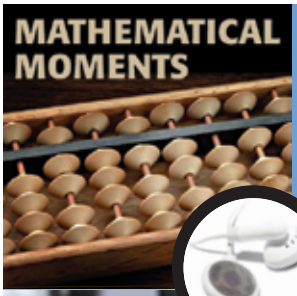

Predicting Storm Surge

AMS Podcast Series

Johannes Westerink,
University of Notre Dame

Storm surge is often the most devastating part of a hurricane. Mathematical models used to predict surge must incorporate the effects of winds, atmospheric pressure, tides, waves and river flows, as well as the geometry and topography of the coastal ocean and the adjacent floodplain. Equations from fluid dynamics describe the movement of water, but most often such huge systems of equations need to be solved by numerical analysis in order to better forecast where potential flooding will occur.

Much of the detailed geometry and topography on or near a coast require very fine precision to model, while other regions such as large open expanses of deep water can typically be solved with much coarser resolution. So using one scale throughout either has too much data to be feasible or is not very predictive in the area of greatest concern, the coastal floodplain. Researchers solve this problem by using an *unstructured grid size* that adapts to the relevant regions and allows for coupling of the information from the ocean to the coast and inland. The model was very accurate in tests of historical storms in southern Louisiana and is being used to design better and safer levees in the region and to evaluate the safety of all coastal regions.

For More Information: "A New Generation Hurricane Storm Surge Model for Southern Louisiana", by Joannes Westerink et al.

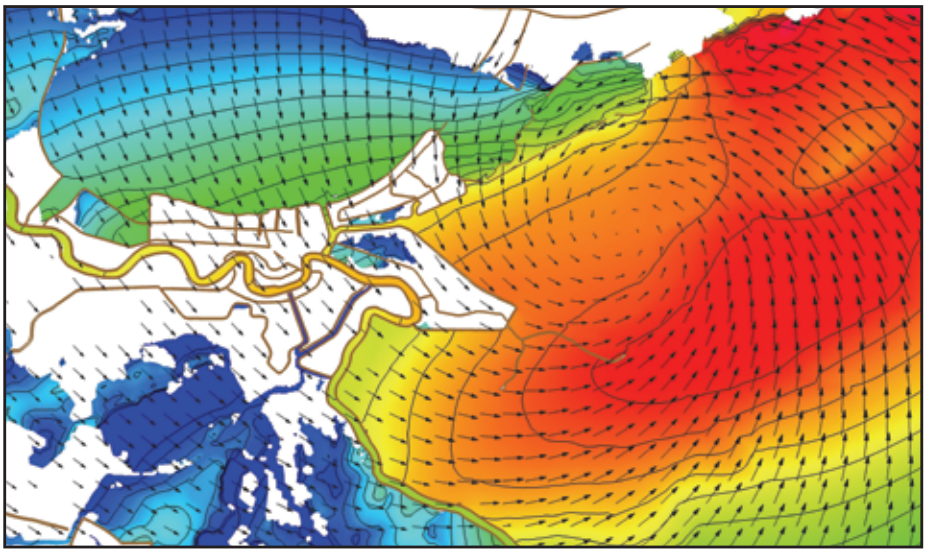

Image: Water surface elevation (blue is low, red is high) in the New Orleans area 9:00 a.m. 8/29/05 (arrows indicate wind velocity). Courtesy of Joannes J. Westerink.

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