

Transition of the Coastal and Estuarine Storm Tide Model to an Operational Model for Forecasting Storm Surges

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We proposed to convert CEST into an operational model by working with NHC's Storm Surge Unit through the JHT program. During this period, we converted 30 SLOSH basins into corresponding CEST grids and associated SLOSH tracks into the CEST tracks which are in xml format by following the procedure developed for this project. Meanwhile, CEST was ported to the Linux platform in the High Performance Computing Center of Florida International University, which employs the compiler similar to the one used by NOAA's supercomputer. We have tested the CEST model over all grids by performing simulations using hypothetical hurricane tracks provided by NHC. There are about 10,000-70,000 hypothetical hurricanes with varying intensities, forward speeds, and incoming directions for each basin. The CEST model was robust for most cases without further adjustment and produced MEOWs and MOMs comparable to those created by the SLOSH model.

The comparison of inundation patterns, maximum MOM heights, and inundation areas shows that the CEST model produced comparable maximum MOM heights, but less inundation areas than SLOSH in most cases. We hypothesized that the difference in the treatment of the overland bottom friction due to the variation of land cover was the major reason to cause the different MOMs between SLOSH and CEST. In CEST, the effects of land cover on bottom friction are considered by introducing varying Manning coefficients based on the national land cover dataset (NLCD), while the land cover effect is not considered in SLOSH. This issue has been examined by applying CEST and SLOSH to generating MOMs in Apalachee Bay in northwest Florida and the storm surge along the southern Louisiana coast caused by Hurricane Rita in 2005. The computational results and the comparison with field observations verify our hypothesis. The storm surge unit at NHC will adjust the computation of overland flooding on the new Huston basin based on this finding.