Assessment of an Approach to Integrate ADCIRC Data via CERA into the Hazus-MH Coastal Flood Model.

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COASTAL RESILIENCE CENTER

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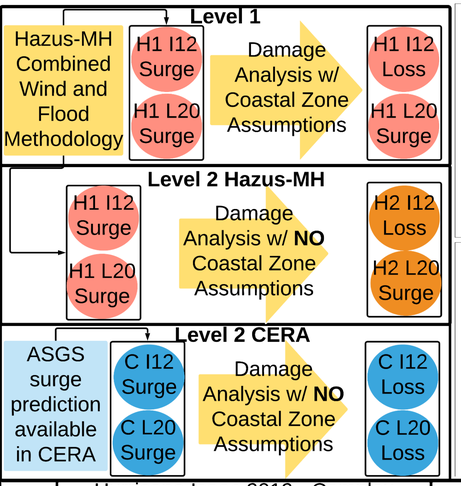
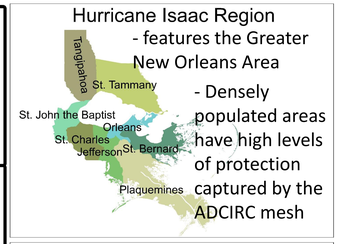
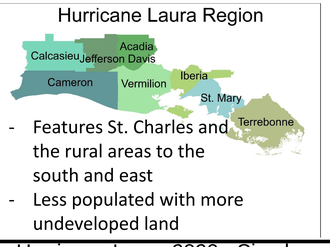
Homeland Security Challenge

- Coastal Emergency Risks Assessment (CERA) is successful in visualizing storm surge (modeled by the ADCIRC Surge Guidance System) threat in an efficient manner that is trusted by many decision making officials in real-time events, as well as in everyday planning purposes. CERA would like to extend its services into surge related damage estimates.
- To do so, CERA has begun to provide surge inundation geoTIFFs that can be used in the DHS funded FEMA's Hazus-MH planning tool so that precise hydraulic modeling results can be easily used by Hazus-MH users
- This work focuses on how these CERA geoTIFFS can improve Hazus-MH damage estimates relative to the standard Hazus-MH approach

Approach / Methodology

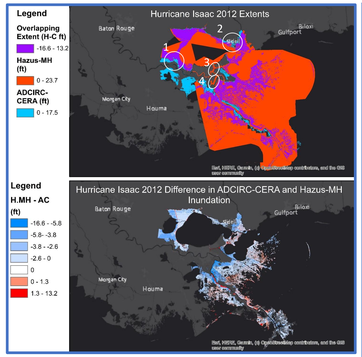


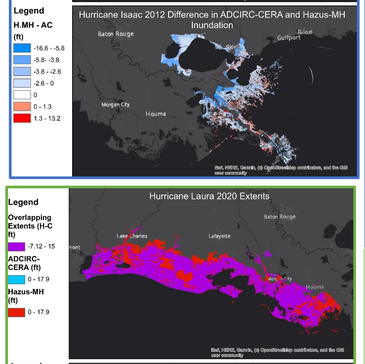


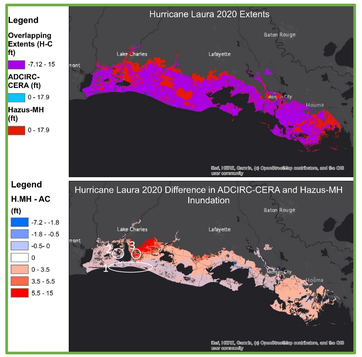


	Hurricane Isaac 2012 - Complex Landscape						Hurricane Laura 2020 - Simple Landscape					
Surge Comp	H1 I12 Surge	vs	C I12 Surge				H1 L20 Surge	vs	C L20 Surge			
Losses Comp	H1 I12 Loss	vs	C I12 Loss	H2 I12 Loss	vs	C I12 Loss	H1 L20 Surge	vs	C L20 Loss	H2 L20 Surge	vs	C L20 Loss

Outcomes / Results

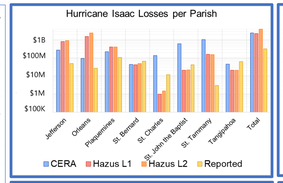


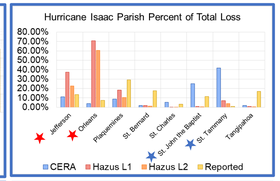


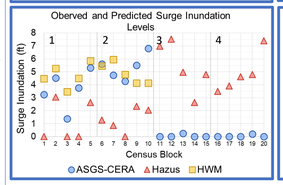


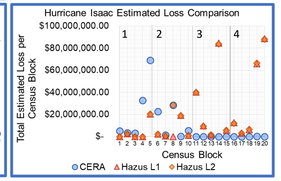
Despite predicting a mostly larger extent and deeper depths in Hurricane Isaac, CERA predicts less than Hazus L2 overall. This is because Hazus predicts extents outside of CERA in densely populated areas in Jefferson and Orleans parish (sites 3 and 4). These areas were protected and likely had no flooding. CERA predicts much more flooding than Hazus in St. John and St. Tammany parishes (sites 1 and 2). This flooding matches HWM supplied by USGS, yet in losses St. Tammany matches Hazus predictions better. This could be related to insurance or the larger extent as the HWMs were more available in the coastal area.

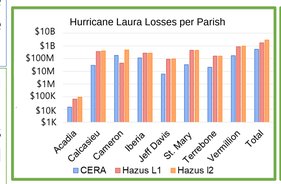
In Hurricane Laura, Hazus predicted larger extents and deeper depths. Consequently, the damages in Hazus were overwhelmingly higher in all parishes except for Cameron in the L1 and in Iberia when looking at the Parish Percent of Total Loss. All 3 sites are in Cameron parish due to data availability. The depth predictions are very similar, and the associated differences in loss estimation seem to come mostly from analysis type (L1 or L2).

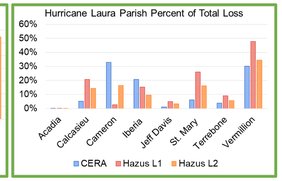


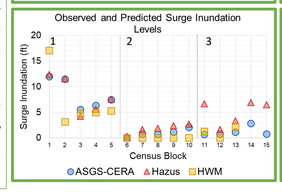


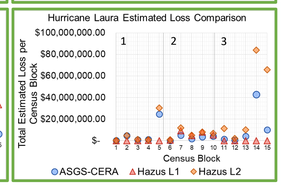












Conclusions

Protected Areas

Areas Hazus had most issues compared to CERA were in protected areas (Isaac sites 3 and 4). This is expected as Hazus is based off SLOSH, a national model that cannot put all of its resources into maintain the Louisiana grid as ADCIRC does. The Hazus methodology is less detailed than SLOSH as well and cannot be expected to pick up everything the SLOSH model does.

ADCIRC Mesh Resolution

The parishes that had some of the most concentrated ADCIRC mesh points were Orleans, Jefferson, Plaquemines, and St. Charles in Hurricane Isaac and St. Mary in Hurricane Laura. For loss estimates, all of these parishes showed large differences between CERA and Hazus, except for Plaquemines, which was actually very close for CERA and Hazus L2 parish percents of total. In looking at parish loss in dollars, all parishes showed differences, but Plaquemines were smaller. While there is a correlation, it could be a coincidence as the parishes showing the most correlation are the ones in protected areas.

L1 Analysis vs. L2 Analysis

While this was not the main concern of this project, it is clear looking at the Hurricane Laura sites that using a L2 analysis as opposed to a L1 changes the assumptions and can cause large differences in flood estimates. The current Hazus zone assumptions used in a Level 1 Analysis can leave out severe flooding.

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