

UNC - LUETTICH
DHS Coastal Resilience Center
Research Project Work Plan Template
Years 4 - 5

[July 1, 2018 – June 30, 2019 / July 1, 2019 – June 30, 2020]

1. Project Title.

ADCIRC Prediction System Development Coordination and Improved Connectivity with Hydrologic Models

2. Principal Investigator.

Rick Luettich, Professor, University of North Carolina at Chapel Hill

3. Other Research Participants/Partners.

Brian Blanton, Jason Fleming, Casey Dietrich, Clint Dawson, Scott Hagen, Isaac Ginis, Don Resio

4. Short Project Description.

A substantial portion of the Coastal Resilience Center's research portfolio involves the development and application of new capabilities for the ADCIRC Prediction System (APS) which is comprised of ADCIRC, the ADCIRC Surge Guidance System (ASGS) and the Coastal Emergency Risks Assessment (CERA) web portal. Included in these activities are the development of:

- higher resolution regional grids for the US East and Gulf coasts that integrate with our current national scale Hurricane Surge on demand Forecast System (HSOFS) grid (with Dietrich, Dawson, Hagen, Ginis);
- software to efficiently track and manage multiple ADCIRC runs across different computer platforms including “the cloud” (with Blanton, Fleming);
- additional improvements in the wind model that is included in ADCIRC (with Ginis);
- better coupling to hydrology models that track the movement of fresh water across the land, into streams and rivers until it interacts with coastal waters (with Resio, Ginis, Huang); and
- continued operation and maintenance of the ASGS and CERA to provide access to ADCIRC predicted water levels and flooding during major storm events and water velocities 24x7x365 for US Coast Guard search and rescue operations (with Blanton, Fleming and Kaiser).

This proposed project will contribute to and coordinate the suite of projects providing enhancements to the APS to increase the accuracy and power of this system; provide interpretation of APS results during major storm surge events to maximize the value of these results for end users; and develop improved documentation and testing via an updated website, wiki and test cases to better enable its use by the broader ADCIRC user community.

5. Abstract.

The very active 2017 hurricane season provided valuable experience, end user engagement and lessons learned that we have used to identify important upgrades to the ADCIRC Prediction System (APS), the ADCIRC-based storm surge forecasting capability comprised of ADCIRC, the ADCIRC Surge Guidance System (ASGS) and the Coastal Emergency Risks Assessment (CERA) visualization web portal, that will help us become even more effective in providing storm surge, wave and flooding predictions in the future. Specifically, we believe it is important to increase the resolution with which we can provide predictions along the US East and Gulf coasts beyond that possible using our current national scale grid (the National Oceanographic and Atmospheric Administration's Hurricane Surge On demand Forecast System - HSOFS) ; to more effectively monitor the progress of multiple concurrent ADCIRC runs across different computing platforms; to create a more robust interface with hydrological models that quantify land runoff; to implement research advancements that have been made within the CRC into the ASGS production system; and to continue to improve the documentation and other ADCIRC materials that are available for outreach to the user community.

Together these enhancements will make the ADCIRC Prediction System more advanced, more accessible and a more powerful predictor of the hazards due to severe storms and ensure the ADCIRC user and end user communities continue to grow.