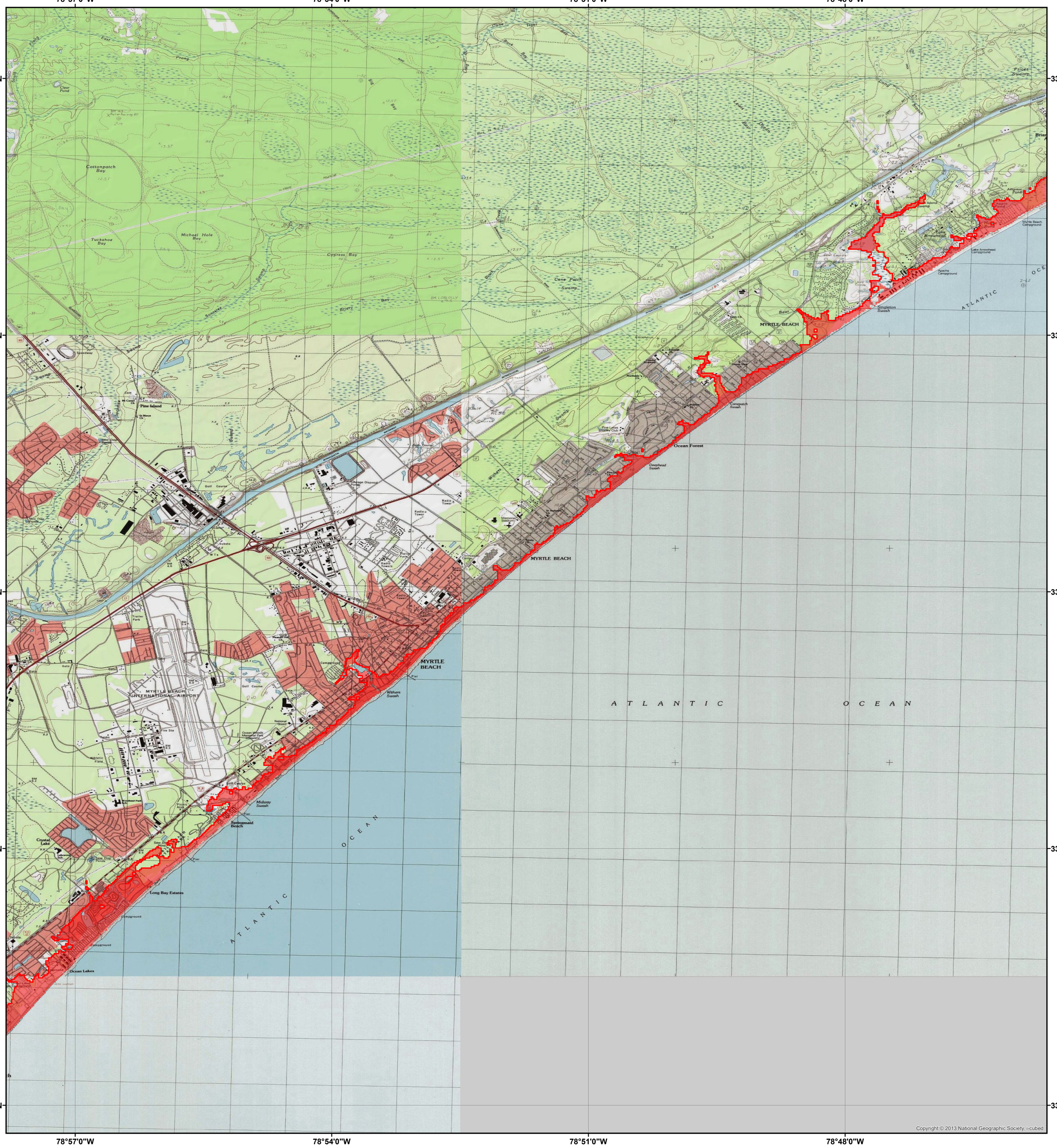
National Oceanic and Atmospheric Adminstration (NOAA)
National Tsunami Hazarad Mitigation Program (NTHMP)
Center for Applied Coastal Research (CACR), University of Delaware

Tsunami Inundation Map for Emergency Planning
Myrtle Beach

State of South Carolina
Myrtle Beach



METHOD OF PREPARATION

The inundation mapping for Myrtle Beach NGDC DEM was funded by the National Tsunami Hazard Mitigation Program (NTHMP). Here, a brief description is provided about the process this map was generated through. For comprehensive information about the mapping process, one can refer to the inundation report referenced below.

Four sources were modeled for this work, two coseismic, a volcanic cone collapse, and a Submarine Mass Failure Source (SMF). Coseismic sources include a large earthquake in the Puerto Rico Trench (PRT) in the Caribbean Subduction Zone (CSZ), and another earthquake located on Azores Gibraltar plate boundary. Both of these sources are generated according to the standard Okada method. Cumbre Vieja Volcanic (CVV) collapse located in Canary Islands is another significant tsunami source which threatens the location of study. A multi-fluid 3D Navier-Stokes solver (THETIS) was used to model this source. Finally, a slide close to Cape Feart location was studied as the SMF tsunami. These landslide sources are all simulated with the NHWAVE model.

The bathymetry data is provided from the integrated bathymetric-topographic digital elevation model (Myrtle Beach NGDC DEM), generated by National Geophysical Data Center (NGDC) for high-resolution tsunami inundation mapping. For ocean basin tsunami propagation, the depth values were obtained from the 1 arc-minute ETOPO-1 database, while nearshore bathymetry and topography were obtained from NGDCs Coastal Relief Models, which are typically provided on a 3 arc-second grid.

We used the FUNWAVE-TVD model to simulate tsunami nearshore propagation and onshore inundation. FUNWAVE-TVD is a public domain open-source code that has been used for modeling tsunamis inside ocean basin, nearshore, and their inland inundation process. Four levels of nesting was performed in this project to bring the resolution from 1 arc minute (about 2 kilometers) in the ocean basin, down to 1 arc-sec (about 30 meters) nearshore. For each region, the highest resolution data was used to generate the inundation line from the extent of the inundated area. The accuracy of the inundation line shown on this map is constrained by several factors such as the accuracy of the models used here, as well as the accuracy of the bathymetry data. The inundation line depicts the envelope of the inundation lines for all the tsunami sources studied, not one particular source.

For further questions about the map contact James T Kirby (kirby@udel.edu).

Reference:
Tehranirad, B., Kirby, J. T, and Shi, F., 2015, “Tsunami Inundation Mapping for Myrtle Beach, SC NGDC DEM”, Technical Report No. CACR-15-13, Center for Applied Coastal Research, University of Delaware.

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of South Carolina
Myrtle Beach

August, 2015

Scale 1:40,000

0 0.25 0.5 1 1.5 2 Miles

0 2,250 4,500 9,000 Feet

0 0.5 1 2 Kilometers

Tsunami sources modeled for Myrtle Beach, NGDC DEM

	Source	Location	Arrival Time (hrs)
Local source	Cape Fear Slide	76.00 W, 33.10 N	2.0
Distant Sources	Puerto Rico Trench Zone (M=9.0)	Caribbean Subduction Zone	4.5
	Azores-Gibraltar Convergence Zone (M=8.6-9.0)	Gibraltar Straight	9.0
	Cumbre Vieja Volcanic Cone Collapse	Canary Islands	9.0

Center for Applied Coastal Research

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundated Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to help coastal communities to identify their tsunami hazard. This map is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose. The inundation map has been obtained through using the best available scientific information. The inundation line represents the maximum tsunami runup extent utilizing a number of extreme, yet scientifically realistic, tsunami sources. This map is supposed to portray the worst case scenario and does not provide any further information about the return periods of the events studied here.

MAP BASE

Topographic base maps prepared by the U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

The National Tsunami Hazard Mitigation Program (NTHMP), the University of Delaware (UD), and the University of Rhode Island (URI) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the NTHMP nor UD shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.