

Myths about Hurricane Katrina's Storm Surge

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WorldWinds, Inc.*

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Walt Disney

Walt Disney was a tantalizing contradiction. He was the creative head of one of the film industry's most renowned movie studios, the inventive genius behind a world-famous theme park, and the genial host to of a weekly television program. Nonetheless, his private life remained remarkably private: to all appearances he was the traditional family man, maintaining a forty-one year marriage and raising two daughters. Since his death, however, more than a few unusual tales have come to be told about our beloved Uncle Walt. In this case, fiction is definitely stranger than truth.

Ratings Key

-  = true
-  = false
-  = multiple truth values
-  = undetermined
-  = unclassifiable veracity

Select this [link](#) for an expanded definition of our rating system.

-  Walt Disney was an [illegitimate](#) child.
-  Walt Disney was dishonorably [discharged](#) from the military.
-  Walt Disney's body was put in [cryonic](#) storage.
-  Walt Disney's face appears on a [bust](#) in the Haunted Mansion.*
-  Walt Disney was born in [Robinson](#), Illinois, and named after a helpful townsman who assisted his parents.

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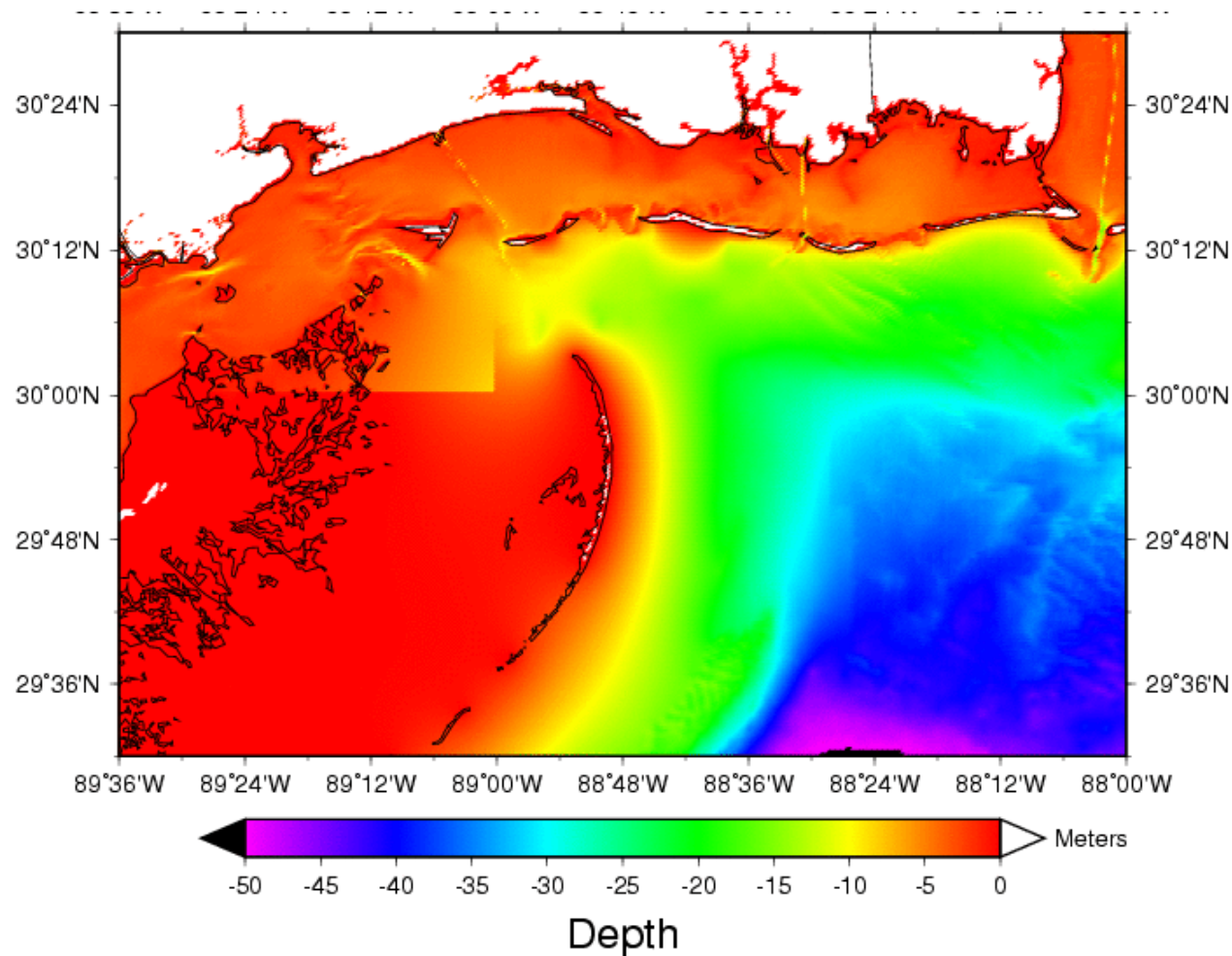
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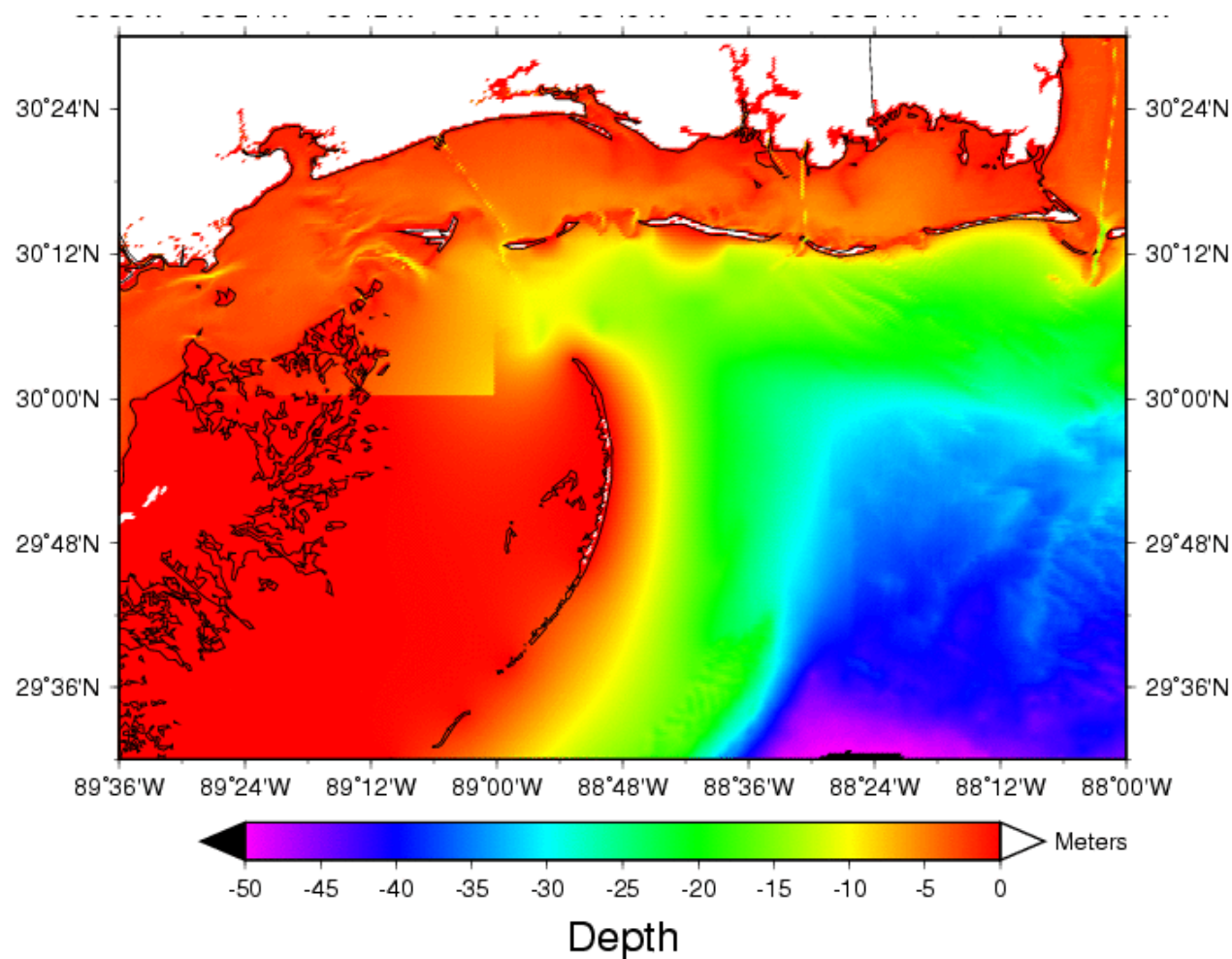
*Some restrictions apply.



Why are surges inundation high in LA marsh and west MS? Very shallow bathymetry!



Why are surges inundation high in LA marsh and west MS? Very shallow bathymetry!



Many theories about other factors. Let's examine some!

Levee trapping

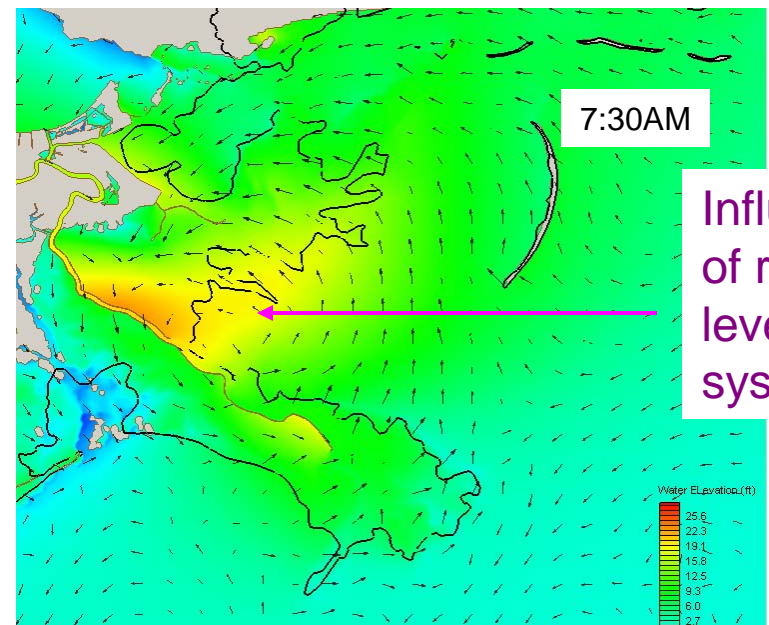
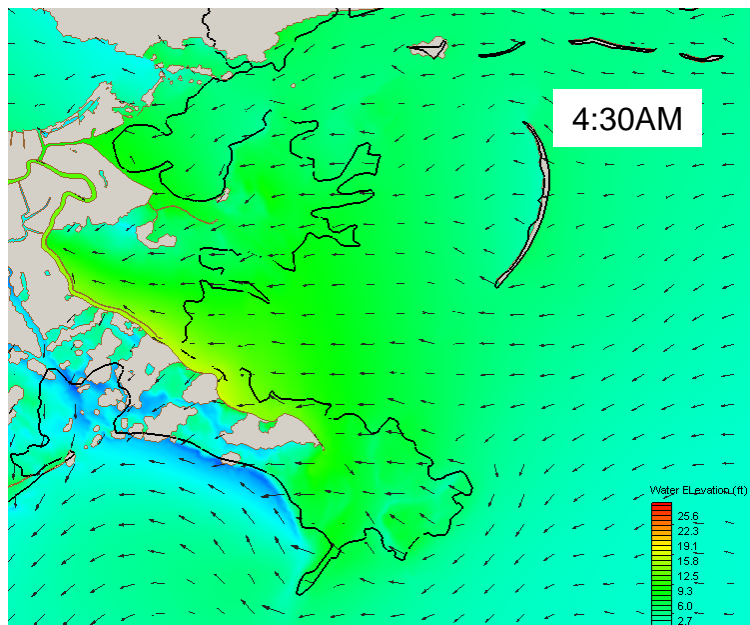
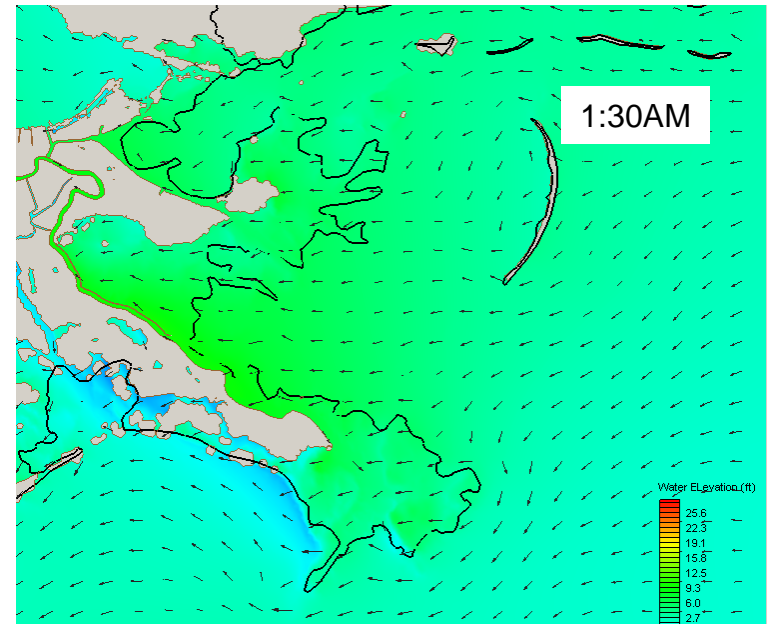
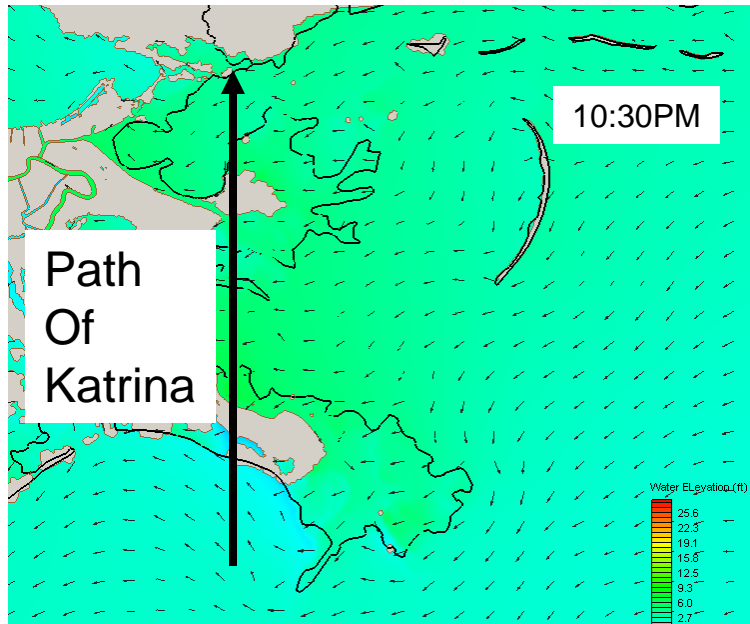
Claim: The river and protection levees enhanced surge eastward.

Levee trapping

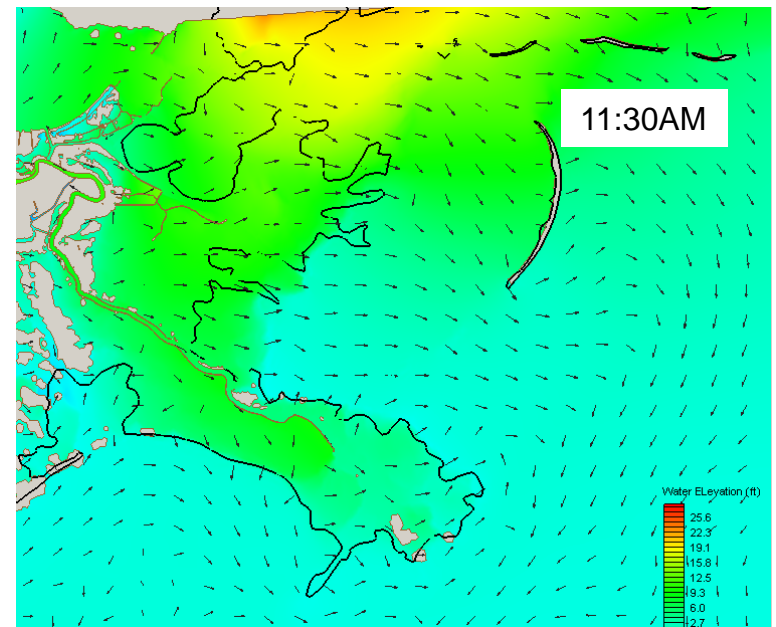
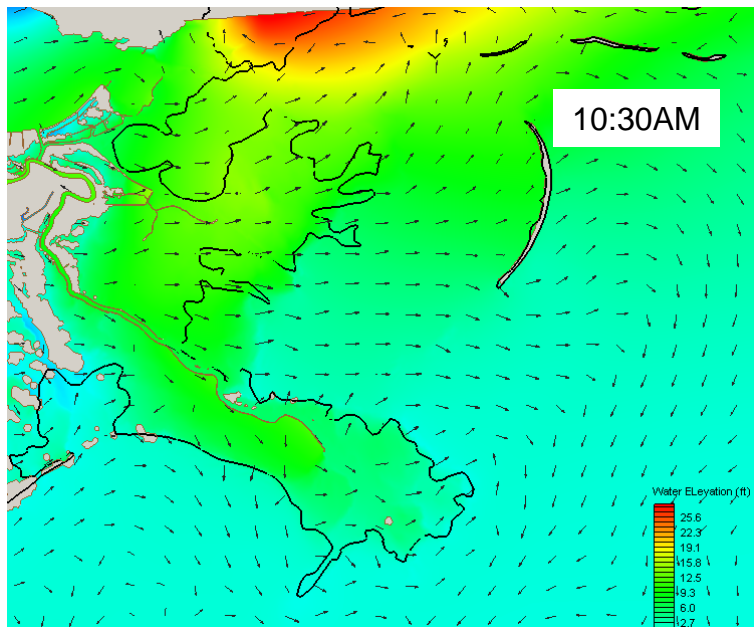
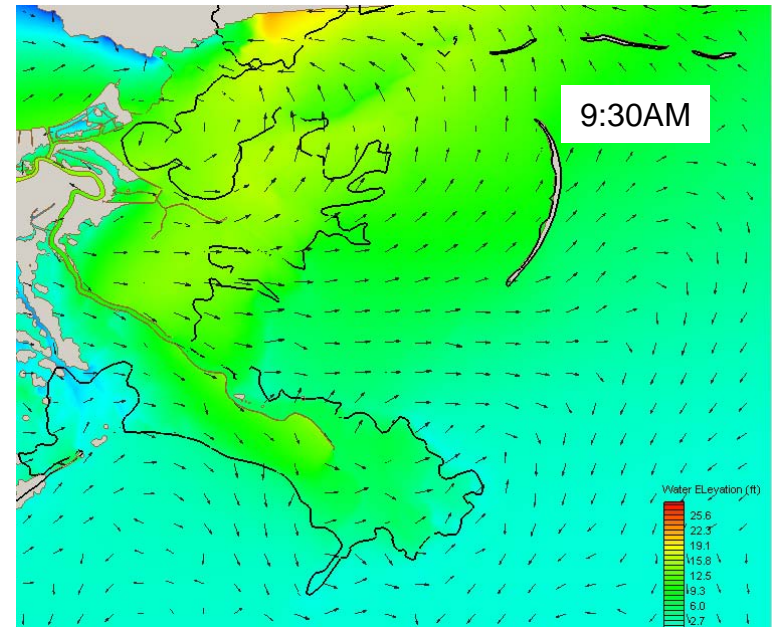
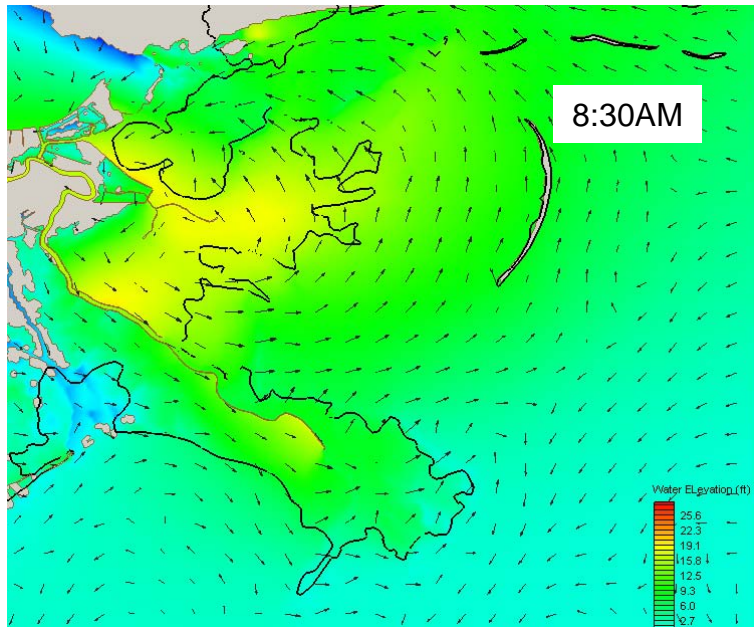
Claim: The river and protection levees enhanced surge eastward.

Status: Mixed truth

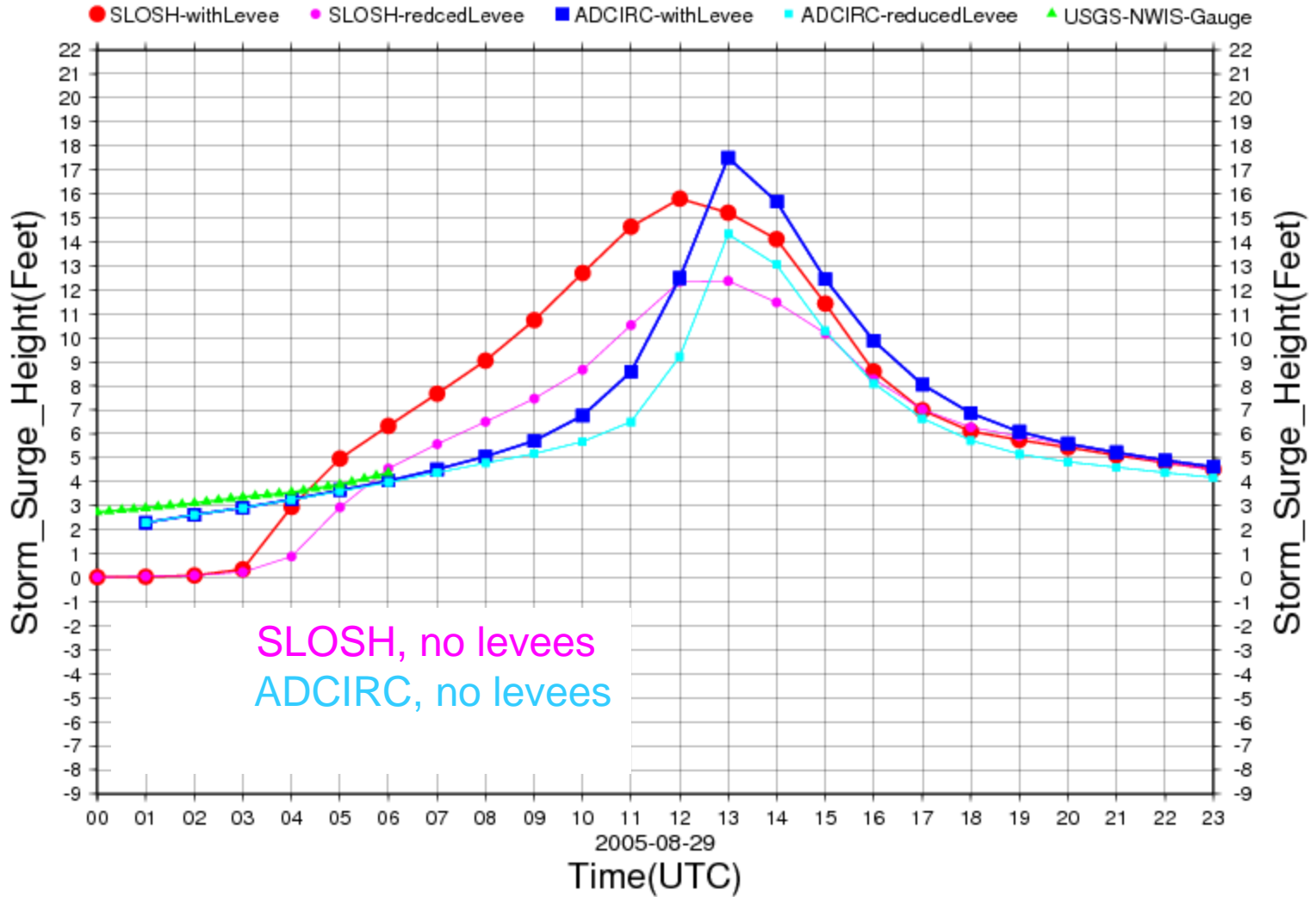
Computer simulation of Katrina storm surge in Louisiana marsh



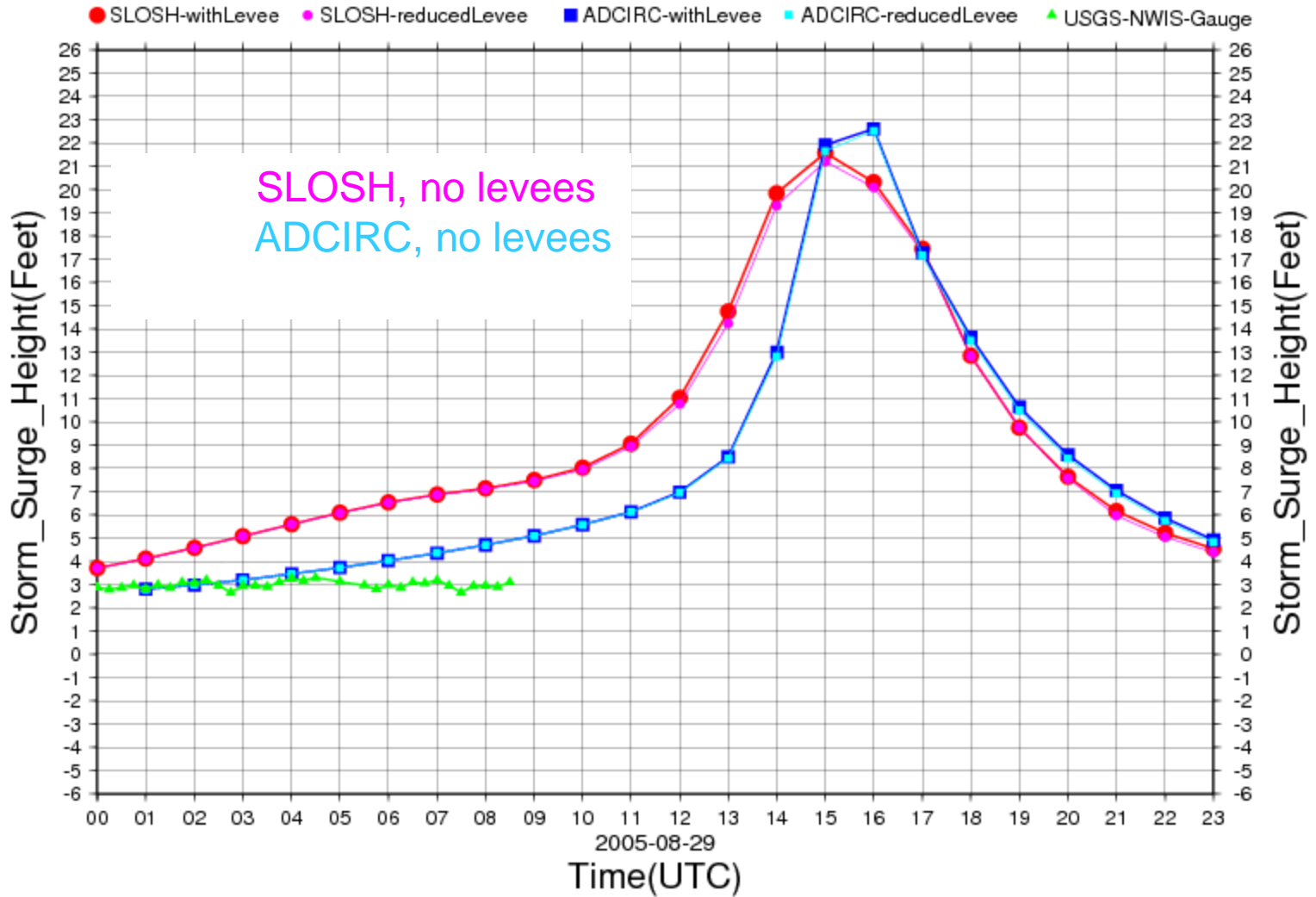
Computer simulation of Katrina storm surge in Louisiana marsh



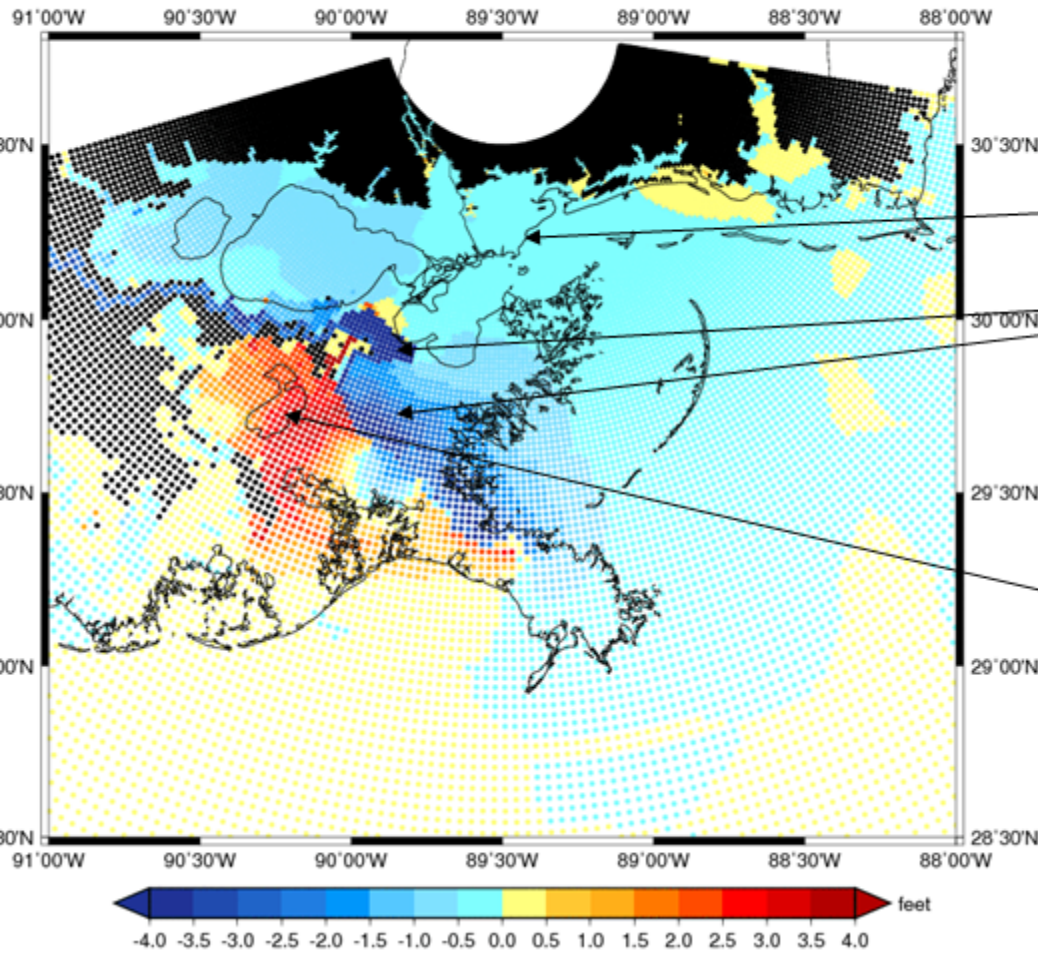
Katrina_Surge_TimeSeries(Crooked_Bayou)



Katrina_Surge_TimeSeries(Mississippi_Sound_at_Waveland)



Katrina_Envelope(WShaffer)(NoLevee-WithLevee)



No impact

More surge, St. Bernard Parish & east

Less surge

Hurricane size

Claim: Katrina's large size increased the storm surge

Hurricane size

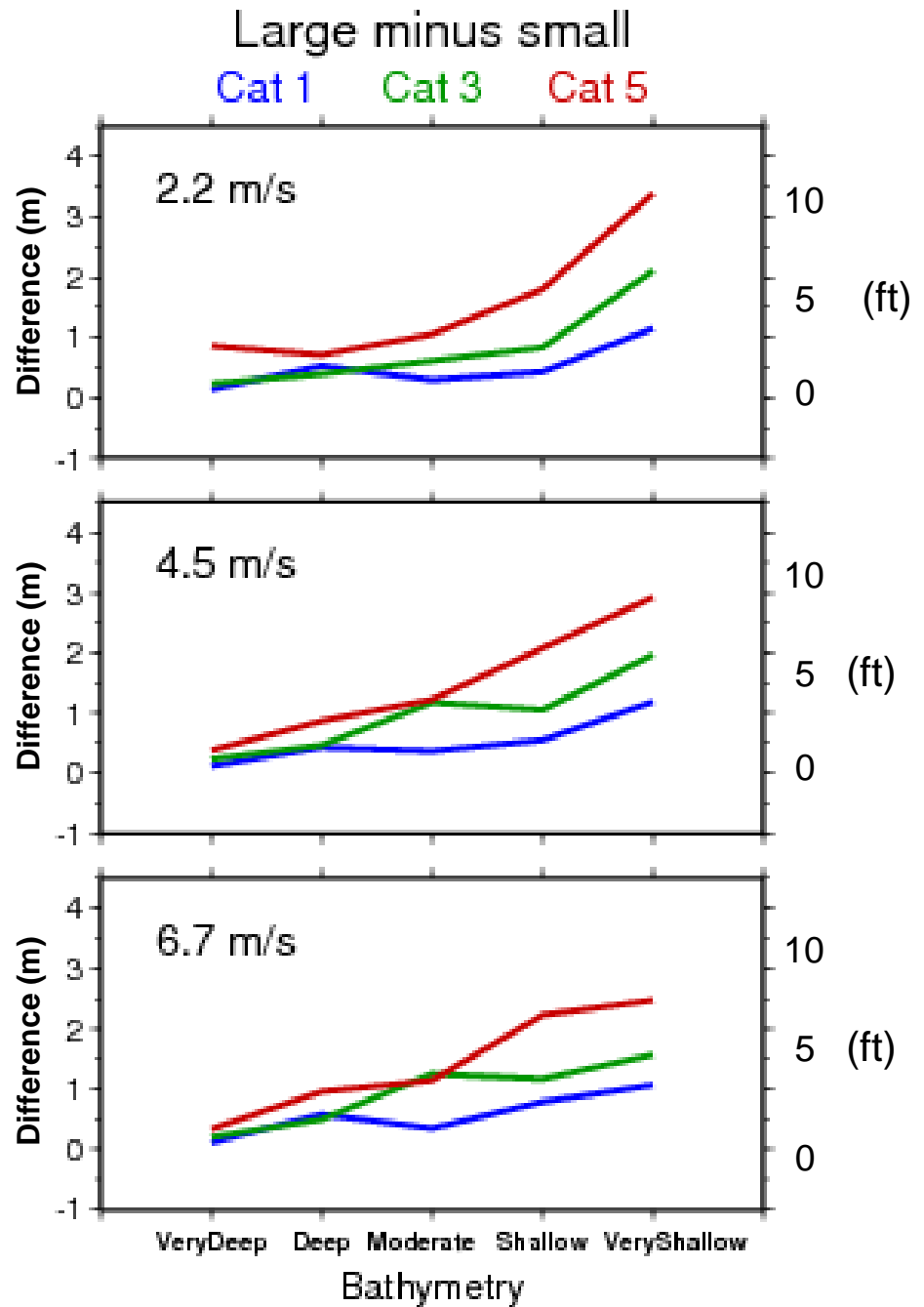
Claim: Katrina's large size increased the storm surge

Status: True

Size influence

Differences from very deep to very shallow

- Cat 1 0 to 4 ft, all speed
- Cat 3 – 0.5 to 5-7 ft (fast/slow)
- Cat 5 – 1-2.5 to 8-11 ft (fast/slow)



Eye size

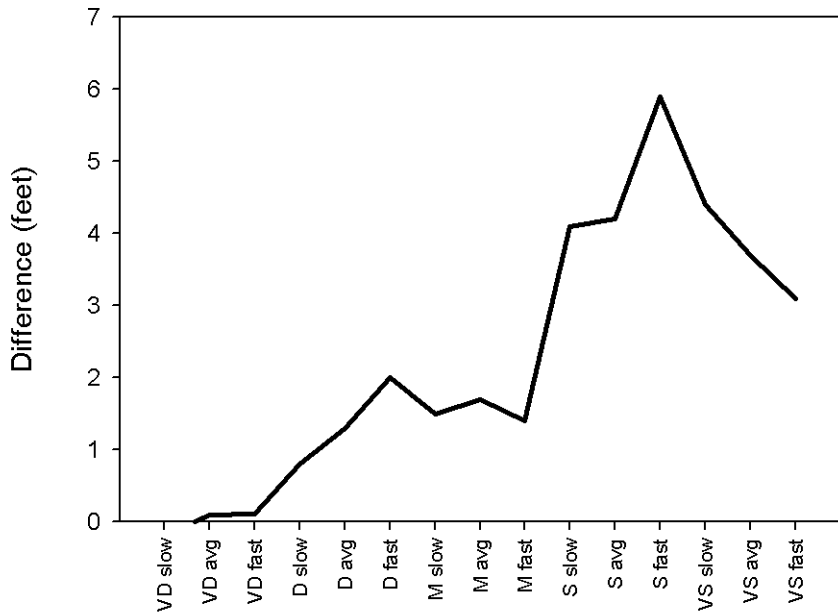
Claim: Katrina's large eye enhanced the surge

Eye size

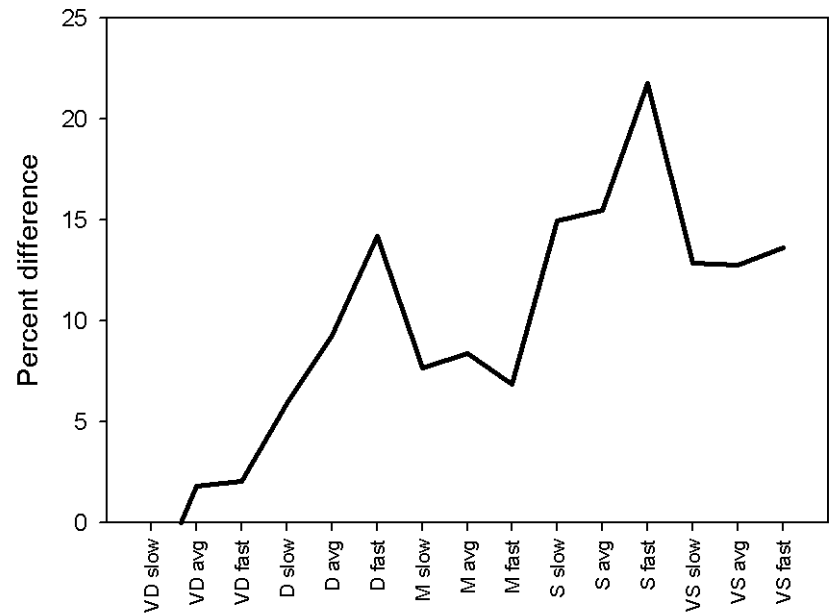
Claim: Katrina's large eye enhanced the surge

Status: Probably mostly false (Only small Cat 4 and 5 in very shallow have meaningful contribution)

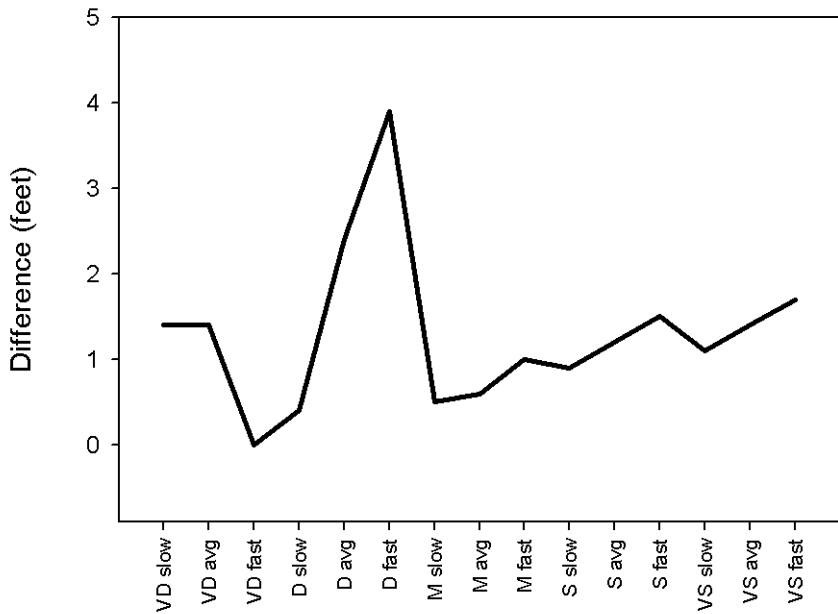
Rmax =22.5 km -Rmax=12 km, Small Category 5



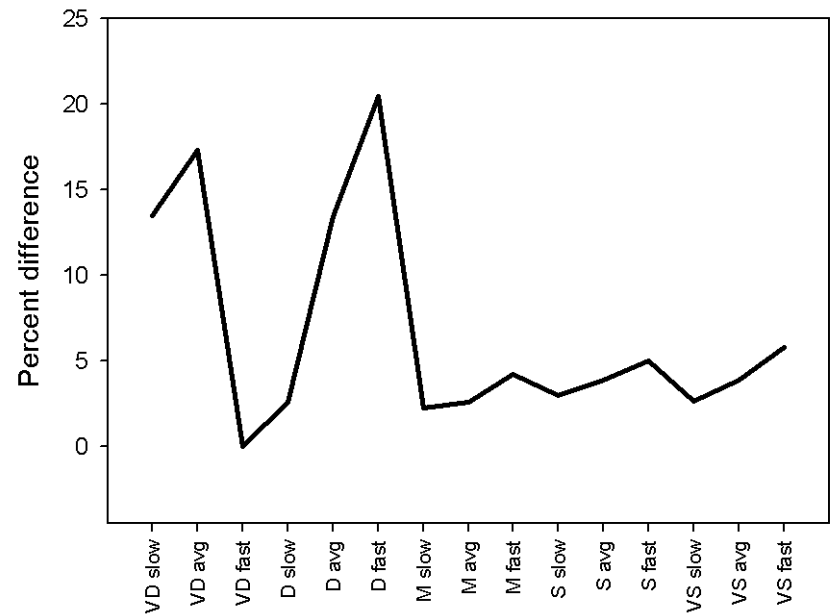
Rmax =22.5 km -Rmax=12 km, Small Category 5



Rmax =22.5 km -Rmax=18 km, Large Category 5



Rmax =22.5 km -Rmax=18 km, Large Category 5



Cat 5 offshore

Claim: The surge was high because Katrina was Category 5 offshore

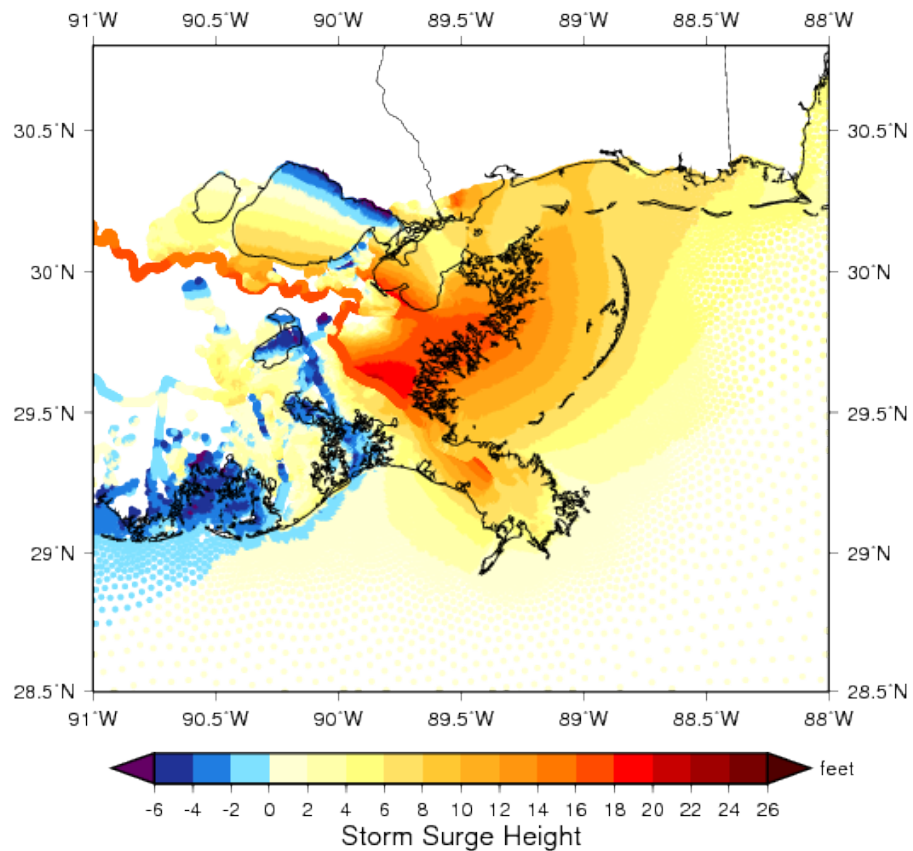
(Recall that Katrina made landfall as a Category 3 one day later)

Cat 5 offshore

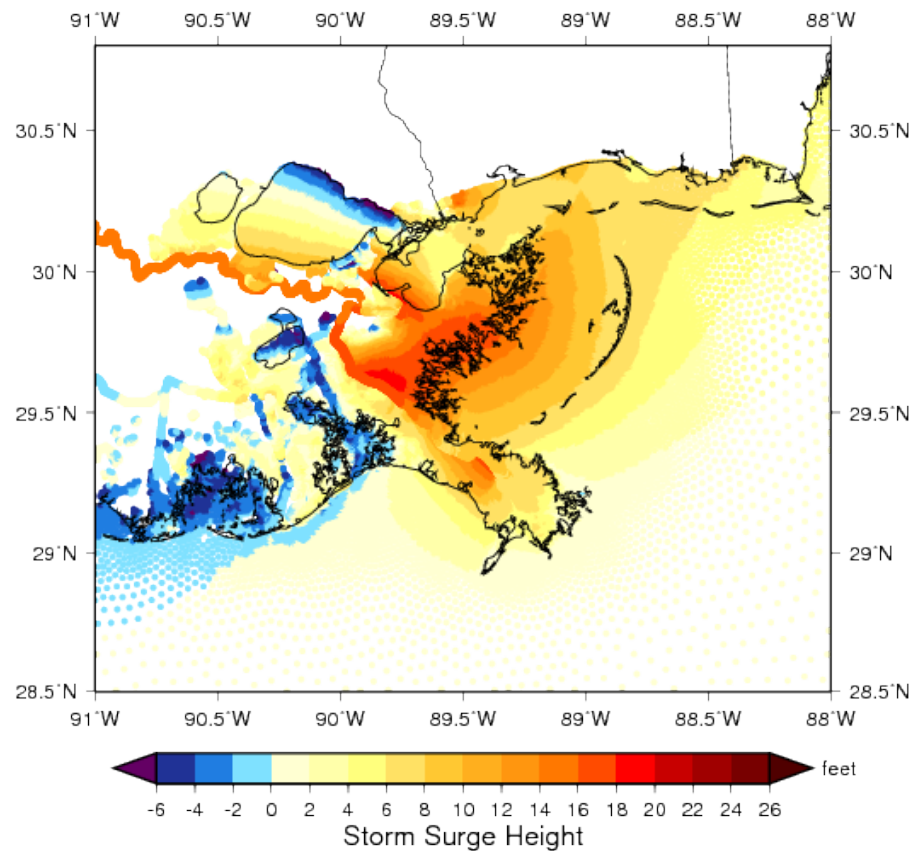
Claim: The surge was high because Katrina was Category 5 offshore

Status: False

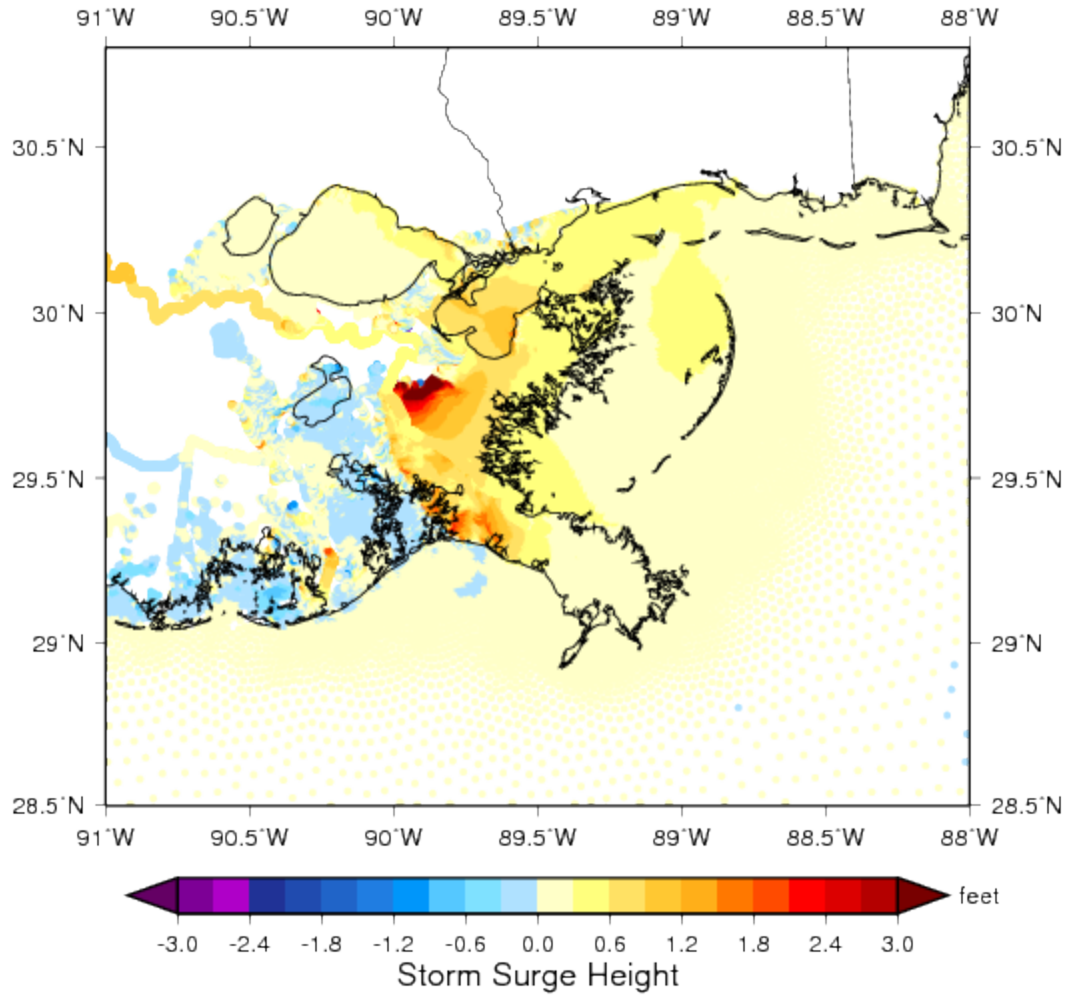
ADCIRC Surge (Cat5 Offshore) (2005082913)



ADCIRC Surge (Cat3 Offshore) (2005082913)

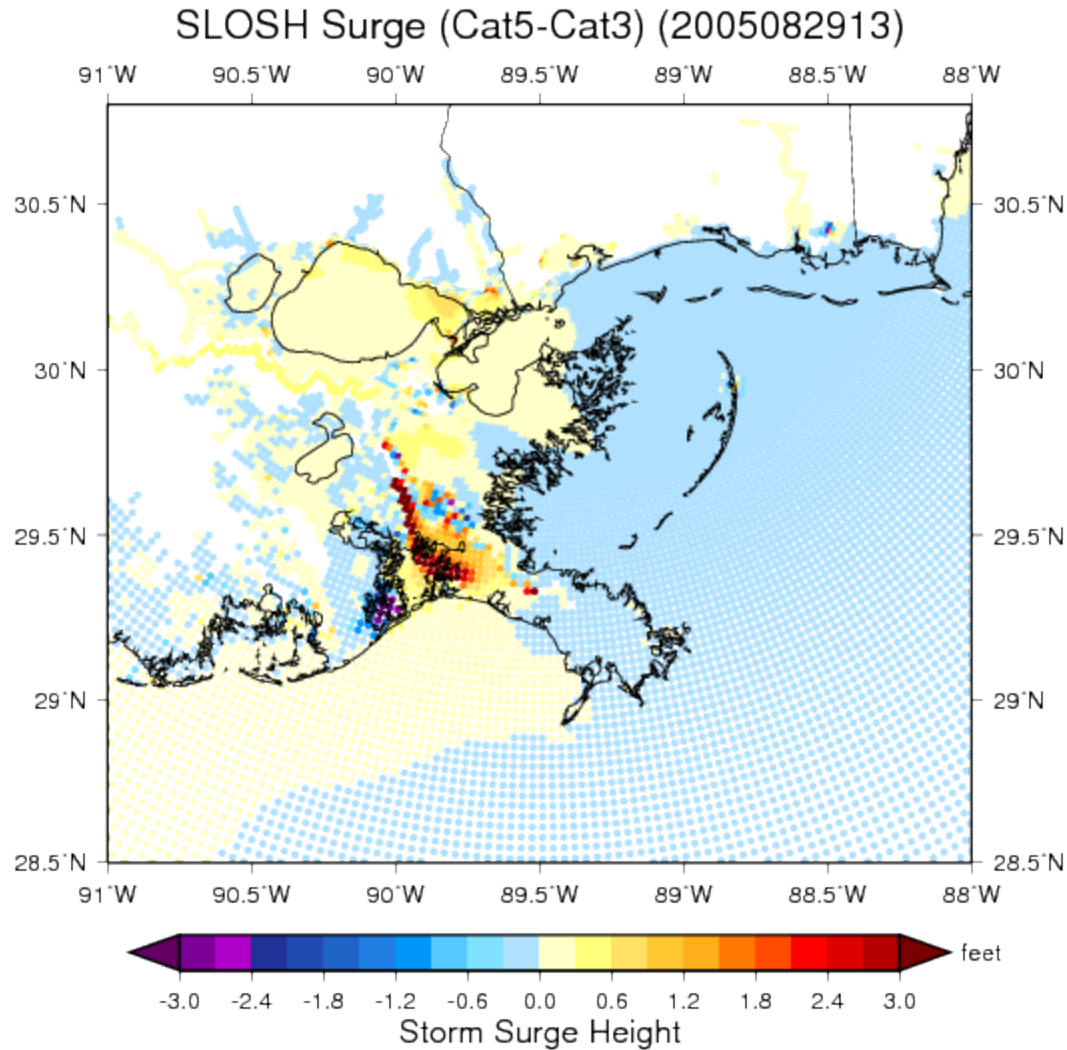


ADCIRC Surge (Cat5-Cat3) (2005082913)



Katrina's offshore Cat 5 contribution less than 1 ft in most places

Similar results for SLOSH



Reason Surge is generated by wind stress on continental shelf

Wetlands

Claim: Louisiana's wetlands provide a "buffer" against storm surge

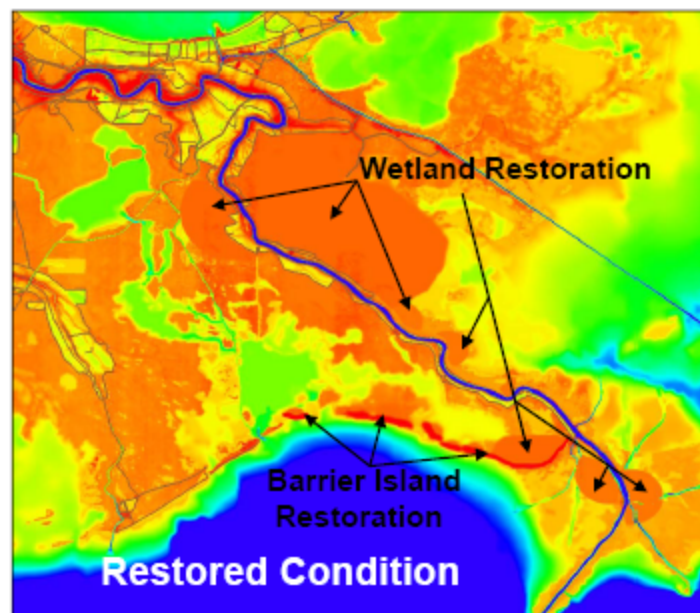
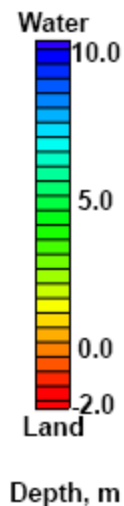
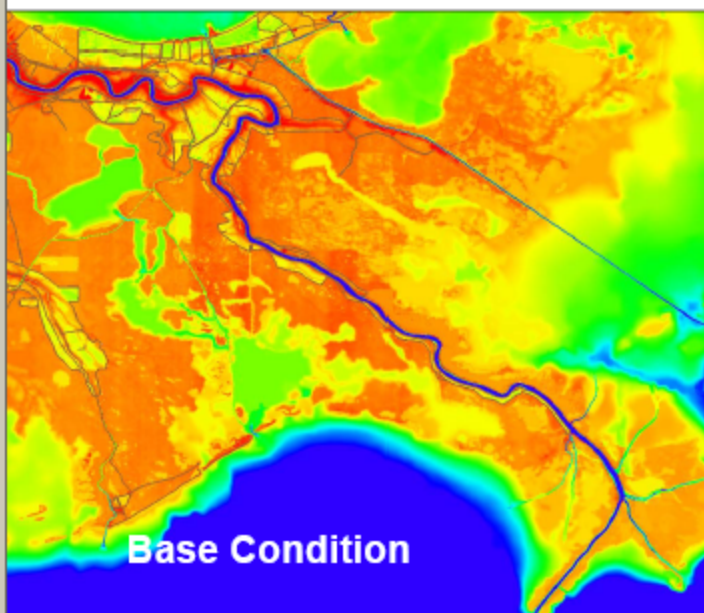
Wetlands

Claim: Louisiana's wetlands provide a "buffer" against storm surge

Status: Mixed truth (some surge reduction inland, substantial wave attenuation)

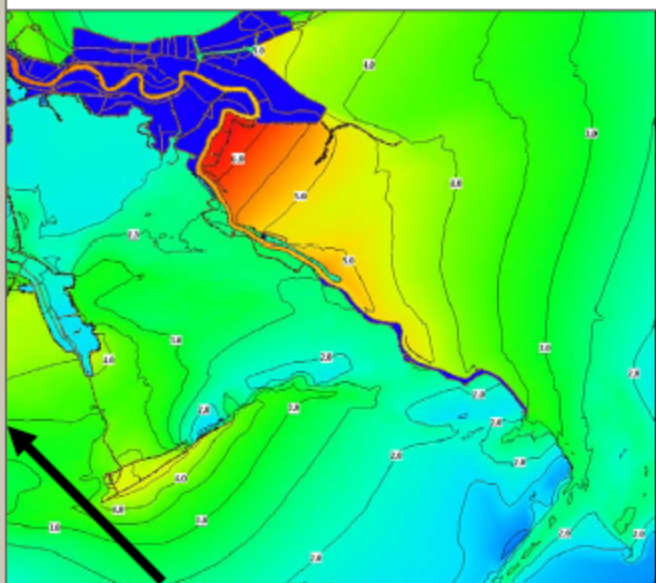


Hypothetical Restoration

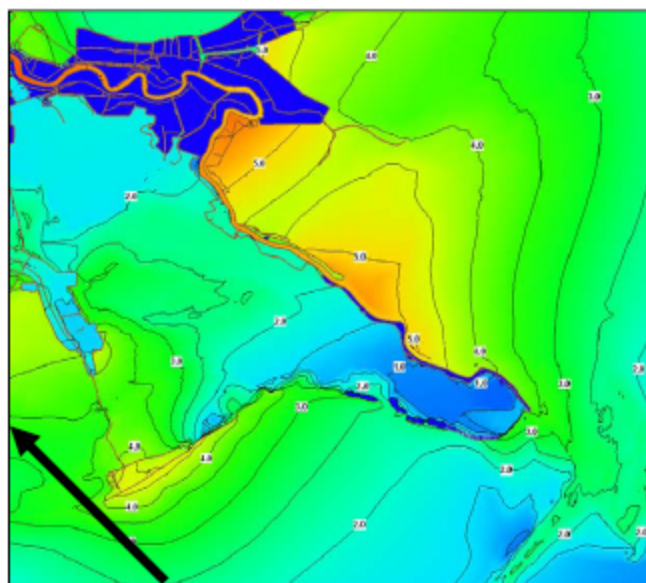




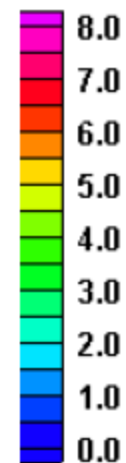
Peak Surge



Base Condition



Restored Condition



Water Elevation, m

Storm: Cp= 900 mb

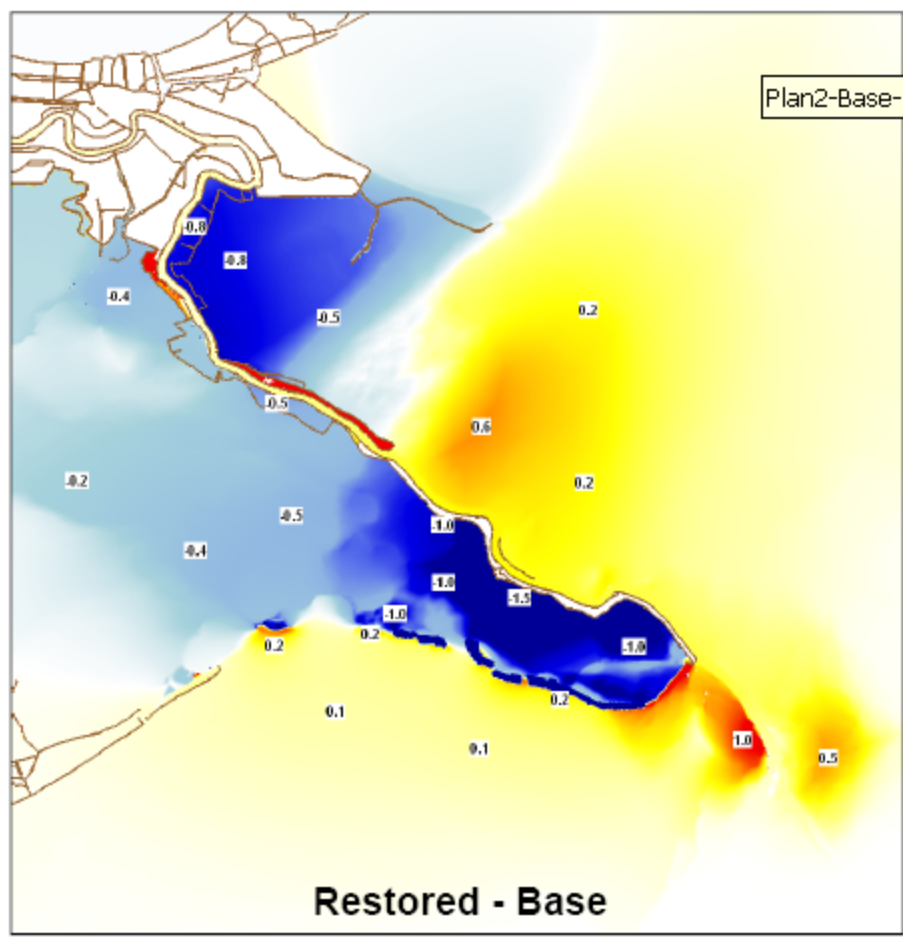
Rm= 17.7 nm

Vf= 11 knots

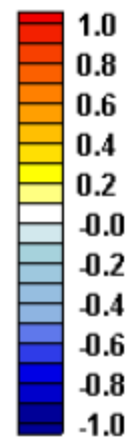
Callout Tool Cloud Tool Arrow Tool Dimensioning Tool Show Select Object Data Tool 81% Help



Peak Surge: Restored-Base

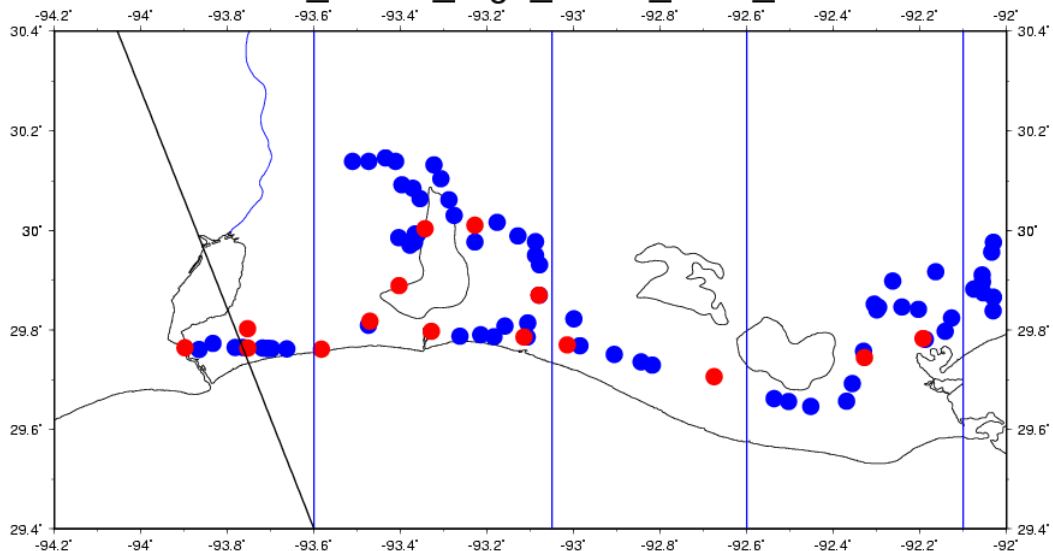


Difference, m

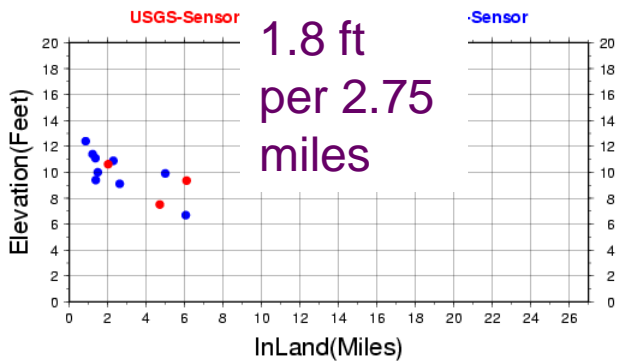


Preliminary work, Hurricane Rita

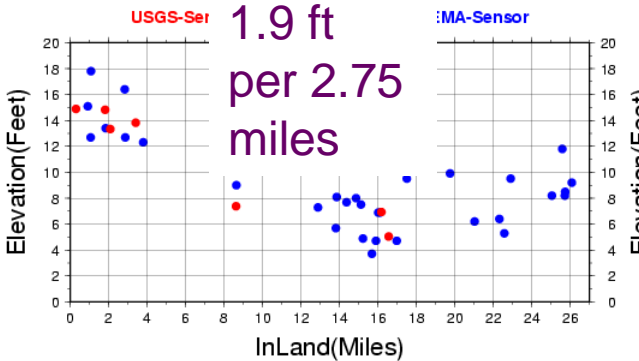
FEMA_USGS_High_Water_Mark_Sites



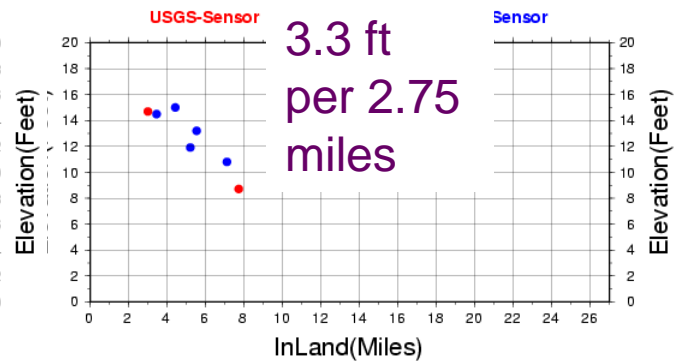
Location VS Surge During Rita (Longitude -94.0 to -93.6)



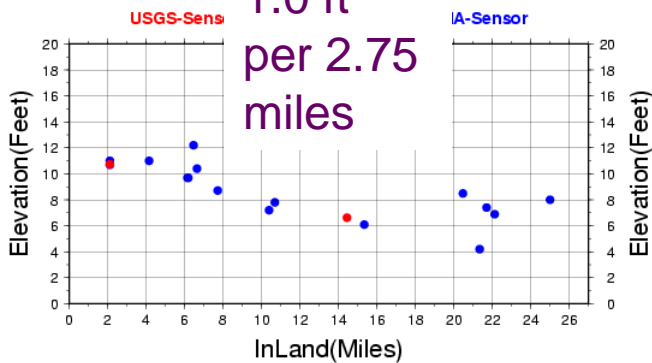
Location VS Surge During Rita (Longitude -93.6 to -93.05)



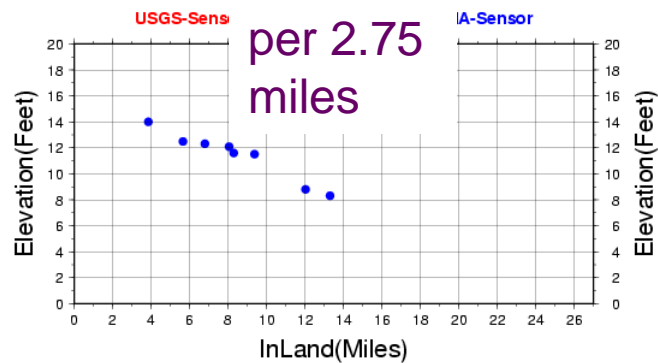
Location VS Surge During Rita (Longitude -93.05 to -92.6)



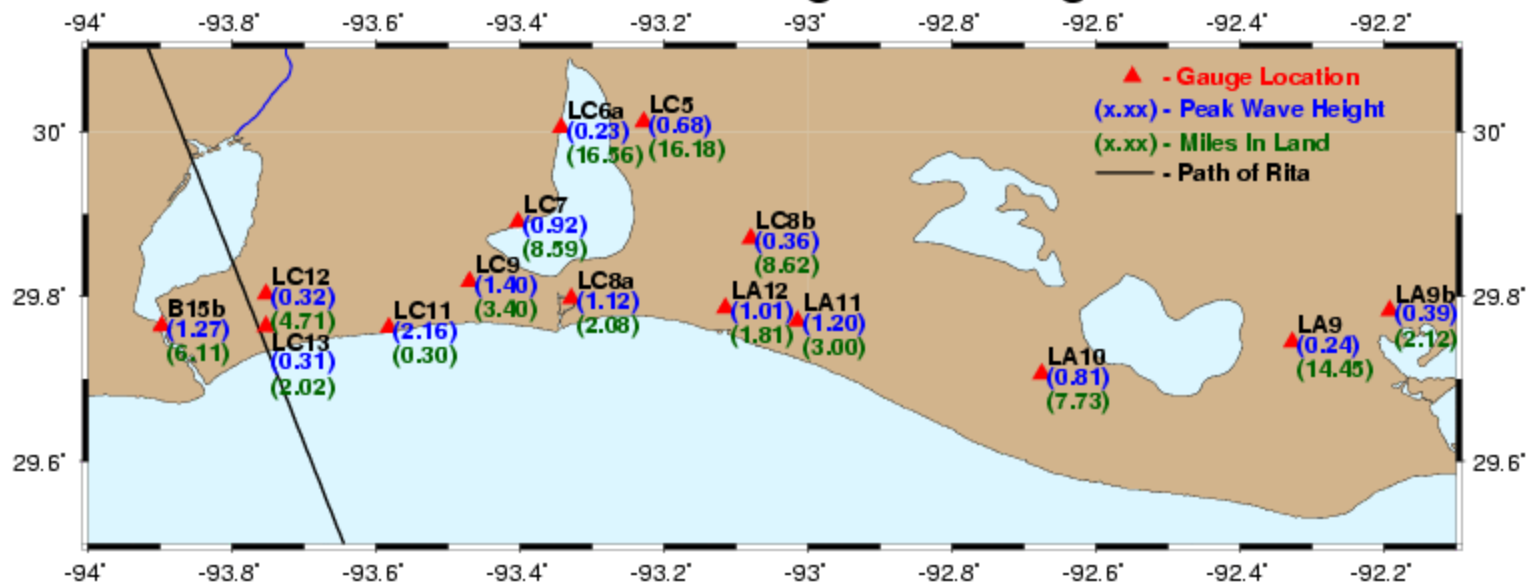
Location VS Surge (Longitude -92.6 to -92.1)



Location VS Surge (Longitude -92.1 to -91.5)



USGS HWM Gauges during Rita



LC8b reduced 64-70% 5.5-6.8 miles inland (compared to LA12 and LA11)
 LC8a reduced 48% 1.8 miles inland (compared to LC11)
 LC9 reduced 36% 3.1 miles inland (compared to LC11)

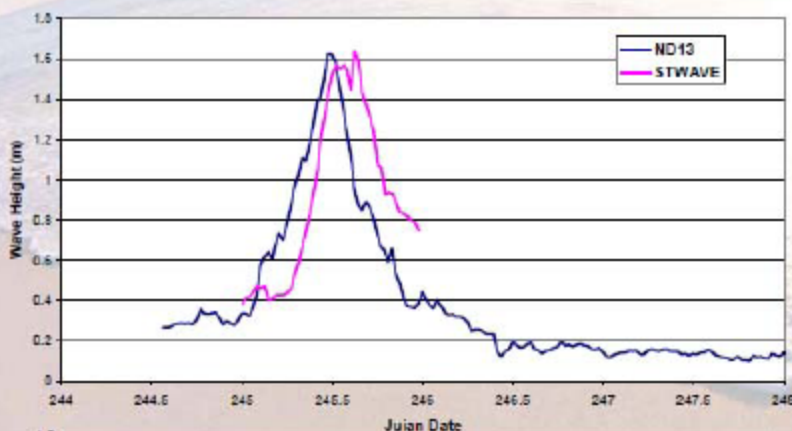


System Validation - Waves



Gustav

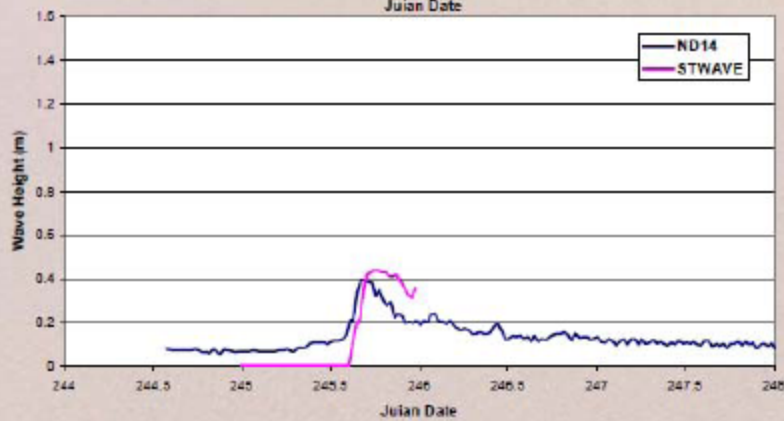
STWAVE Results: Comparison to Data; UND



Caernarvon Marsh

Outer Caernarvon Marsh
 Hmax = 1.5 m (4.9 ft)

Note: Based on preliminary wind fields



Inner Caernarvon Marsh
 Hmax = 0.4 m (1.3 ft)

Slide provided by Chris Bender

MRGO

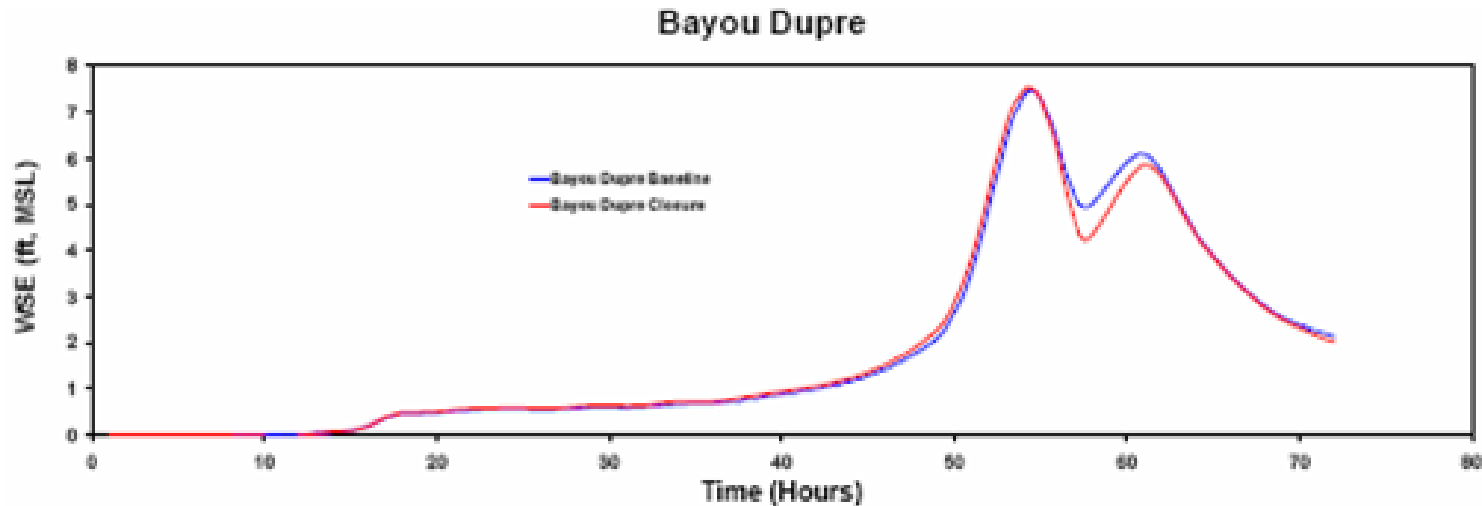
Claim: The Mississippi River Gulf Outlet was a “storm surge highway”, enhancing the surge in St. Bernard Parish

MRGO

Claim: The Mississippi River Gulf Outlet was a “storm surge highway”, enhancing the surge in St. Bernard Parish

Status: False

*ADCIRC simulations with MRGO open (blue)
and closed (red)*



*Little impact of the MRGO on the storm surge at Bayou Dupre south of Lake Borgne.
This result is typical throughout the region.*

“Snopes” final tally

The river and protection levees enhanced surge eastward: **Mixed truth**

Katrina’s large size increased the storm surge: **True**

Katrina’s large eye enhanced the surge: **Mostly false**

The surge was high because Katrina was Category 5 offshore: **False**

Louisiana’s wetlands provide a “buffer” against storm surge: **Mixed truth**

MRGO was a “storm surge highway” in St. Bernard Parish: **False**