

# Experimental Storm Surge Simulations for Hurricane Katrina

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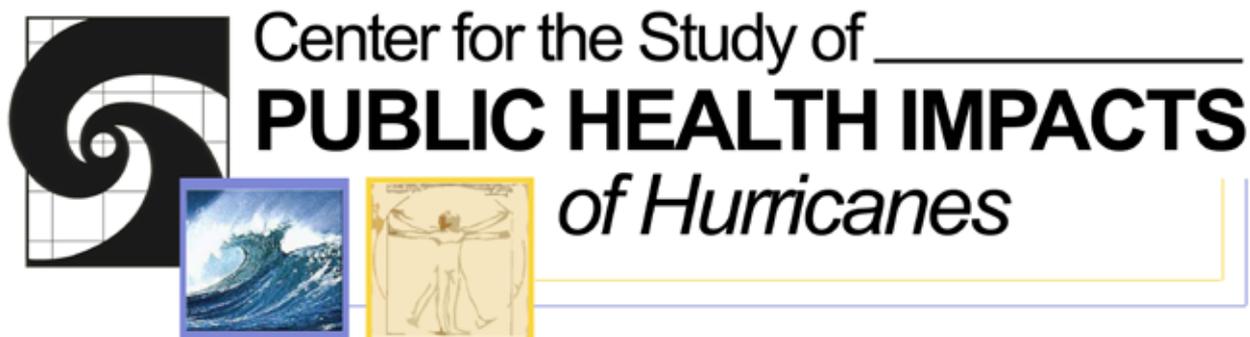
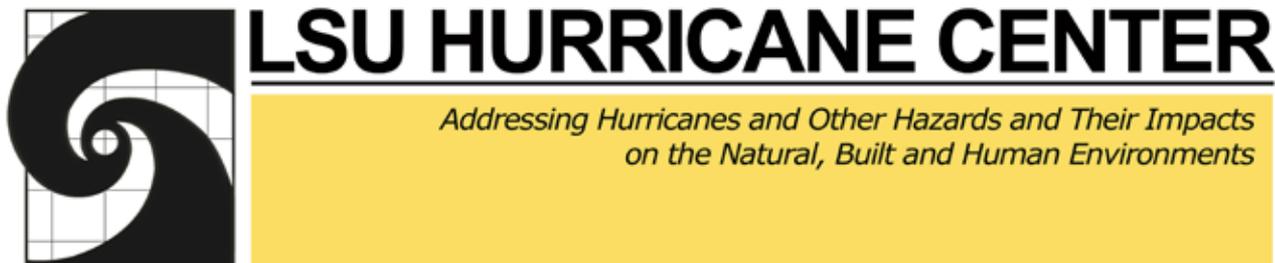
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60<sup>th</sup> Interdepartmental Hurricane Conference  
Mobile, Alabama, 22 March 2006.

# ADCIRC Modeling Team (Collaborators)



School of the Coast & Environment

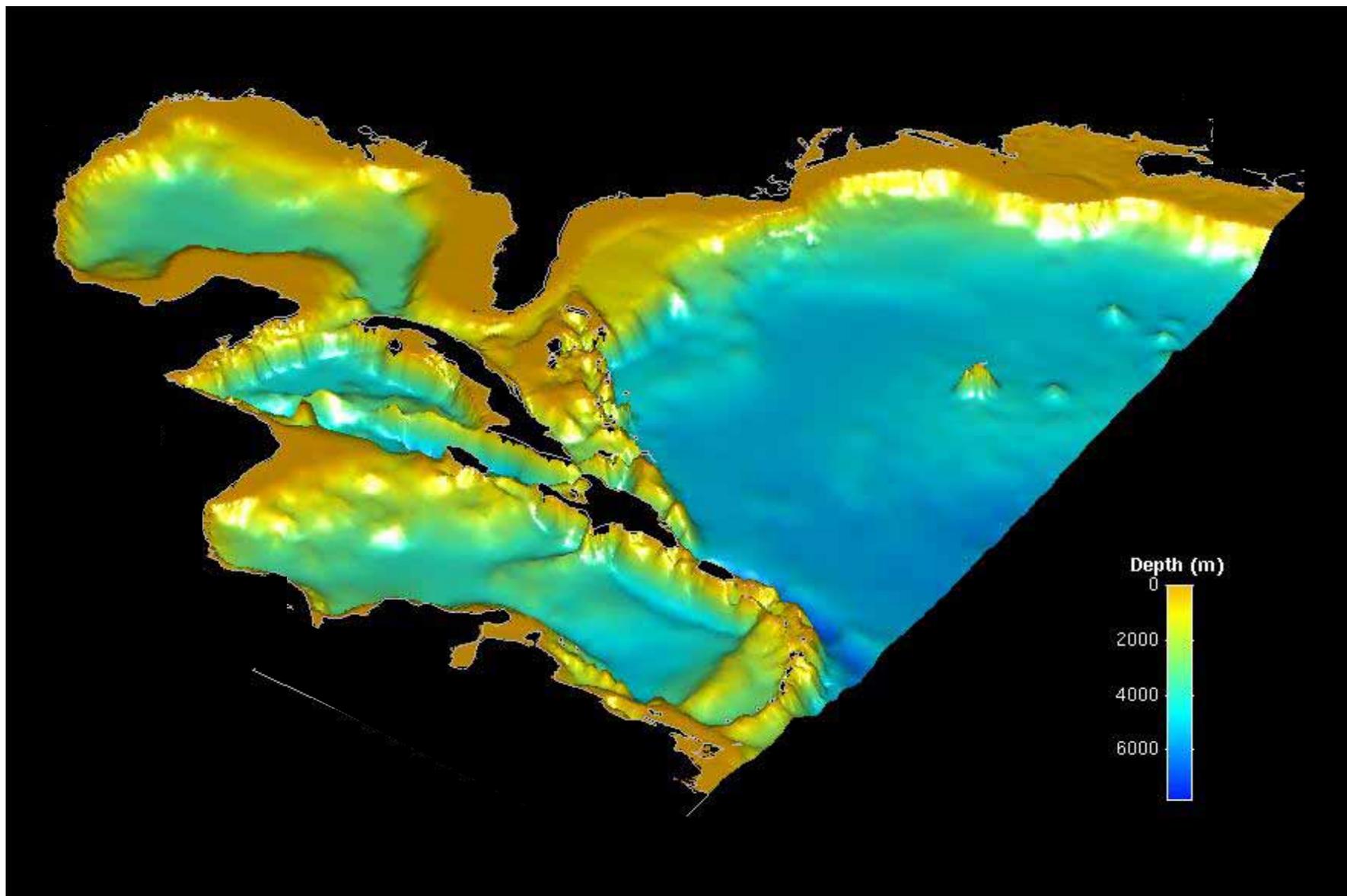
# ADCIRC – 2D Hydrodynamic Model

## Input & Output

- Hurricane Wind Velocities – input
  - Atmospheric Pressure – input
  - Location of the “eye” – input
- 

- Surge or Sea Surface Elevation – output
- Speed or Velocity (Currents) – output

# West Atlantic/Gulf Coast Domain



# Forecasting (ADCIRC)

- Track, Central Pressure, Maximum Sustained Winds from NHC Advisory
- Interpolation based on Unisys Inc. Data (0.5 hr)
- Run Planetary Boundary Layer Wind Model (1.5 hr)
- Initiate ADCIRC with Storm Near Jamaica
- Simulate 8 days on 240 processors in SuperMike (2.5 hr)
- Post-Processing (0.5 to 1.0 hr)
- Develop Maximum Storm Surge Graphic with SMS and Animation
- Submit Products to OEP and Post on [www.hurricane.lsu.edu/floodprediction](http://www.hurricane.lsu.edu/floodprediction) (0.5 to 1.0 hr)
- Total time elapsed 5 to 8 hr

# SuperMike – 1024 CPUs



# 2005 - Storms Simulated at LSU

- \* Hurricane Wilma
- \* Hurricane Rita
- \* Hurricane Katrina
- \* Hurricane Emily
- \* Hurricane Dennis
- \* Tropical Storm Cindy
- \* Tropical Storm Arlene



Hurricane Katrina  
29 August 2005

***NEW ORLEANS, ONE OF OUR “BOWL” CITIES.  
NOTE THE RIVER’S ELEVATION IN RELATION TO THE BOWL***



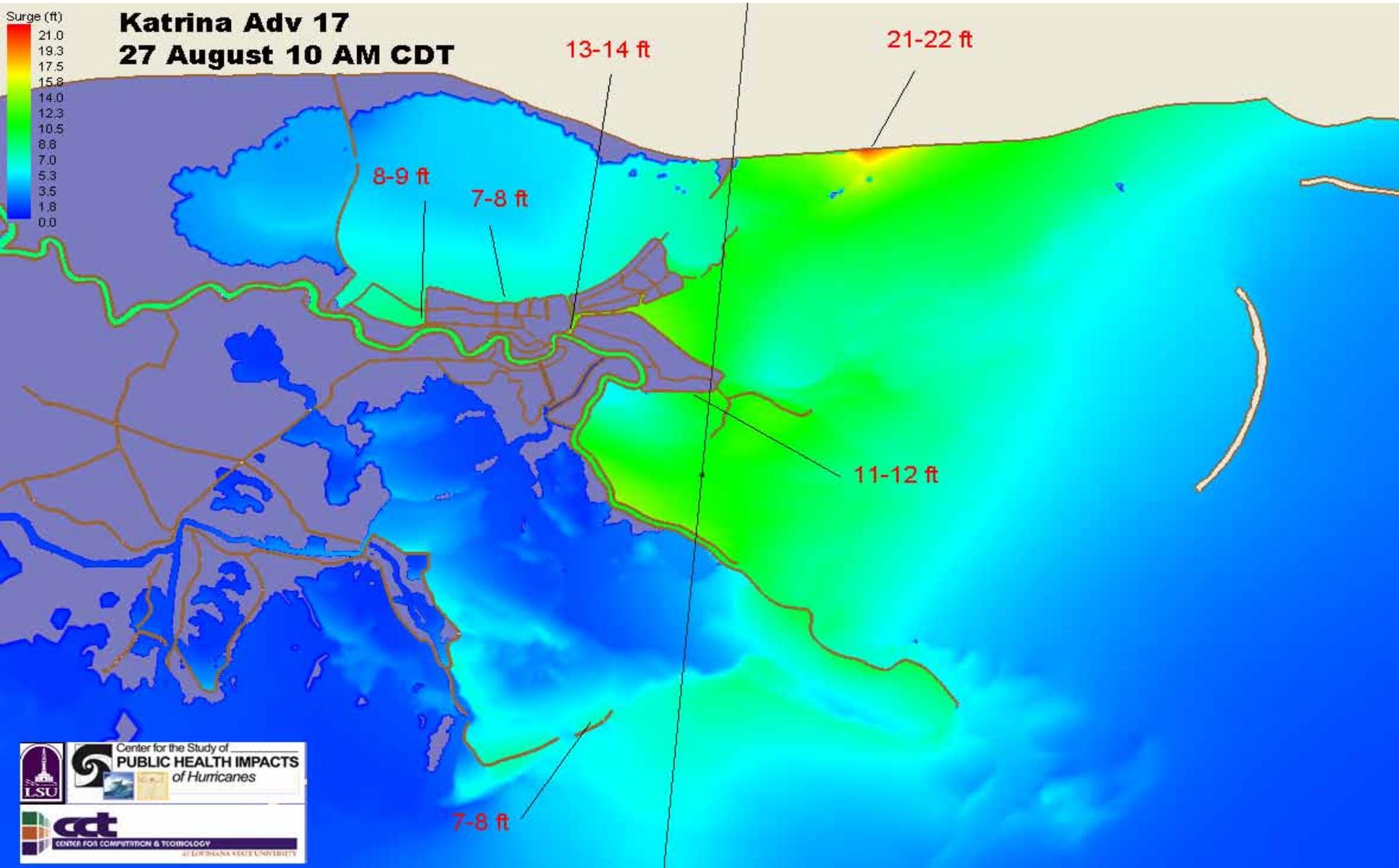
Center for the Study of \_\_\_\_\_  
**PUBLIC HEALTH IMPACTS**  
of Hurricanes



# Katrina Forecasts (CTD)

- NHC Web Advisory                      à   LSU Web
- Advisory 16, Saturday 0400 à 14:31 (10.5 hr)
- Advisory 17, Saturday 1000 à 15:06 (5.1 hr)
- **Advisory 18, Saturday 1600 à 22:07 (6.1 hr)**
- Advisory 22, Sunday 0700   à 14:57 (7.9 hr)
- Advisory 25, Sunday 2200   à 4:28 (6.5 hr)
- Advisory 31, Tuesday 1000 Hindcast

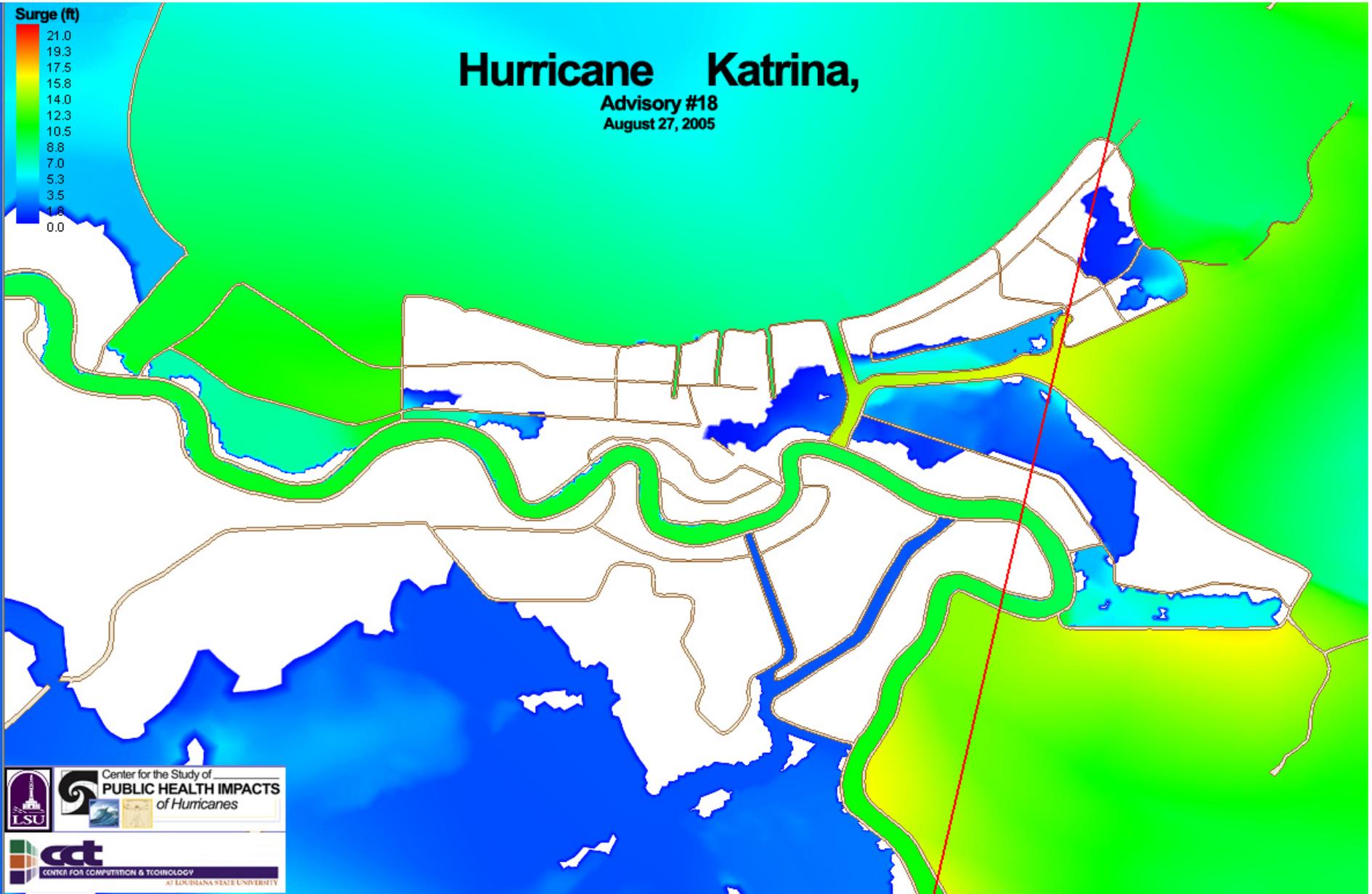
# Adv. # 17



# National Hurricane Center (NHC) Advisories and LSU Hurricane Center Surge Forecasting for Hurricane Katrina

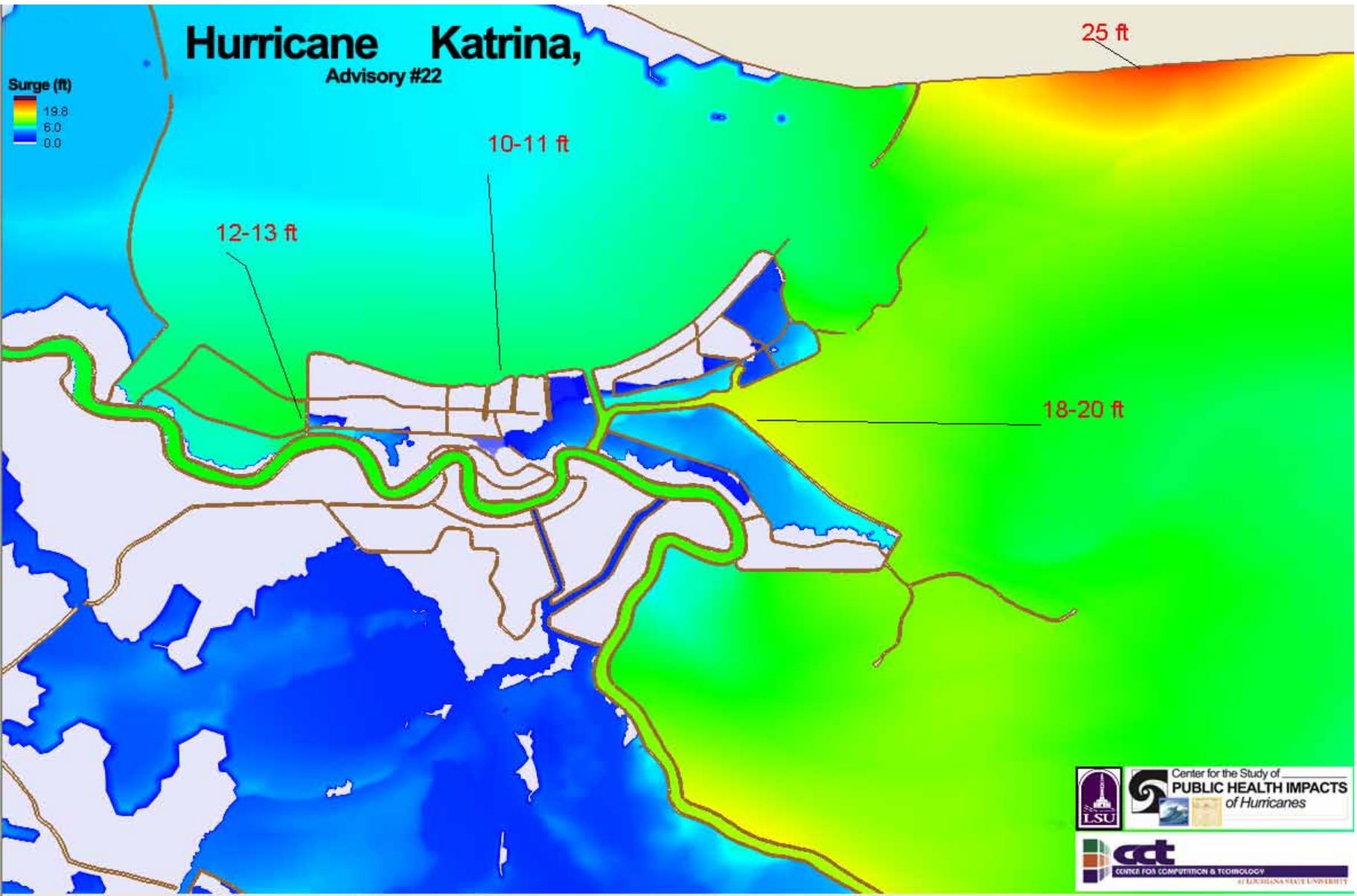
National Hurricane Center (NHC) Advisory Information			LSU Surge Analysis Information		
Advisory Number	Advisory Date:Time (UTC)	Time to Landfall (h)	Date:Time (UTC)	Elapsed Time (h)	New Orleans Flooding
16	8/27/05 0900	51	8/27/05 1930	10.5	NO
17	8/27/05 1500	45	8/27/05 2000	5	NO
18	8/27/05 2100	39	8/28/05 0300	6	YES - 33 hr
22	8/28/05 1200	24	8/28/05 2000	8	YES
25	8/29/05 0300	9	8/29/05 0930	6.5	YES
31	8/30/05 1500	-27	Post Storm		YES

# Advisory # 18, Saturday 2200 (CDT)

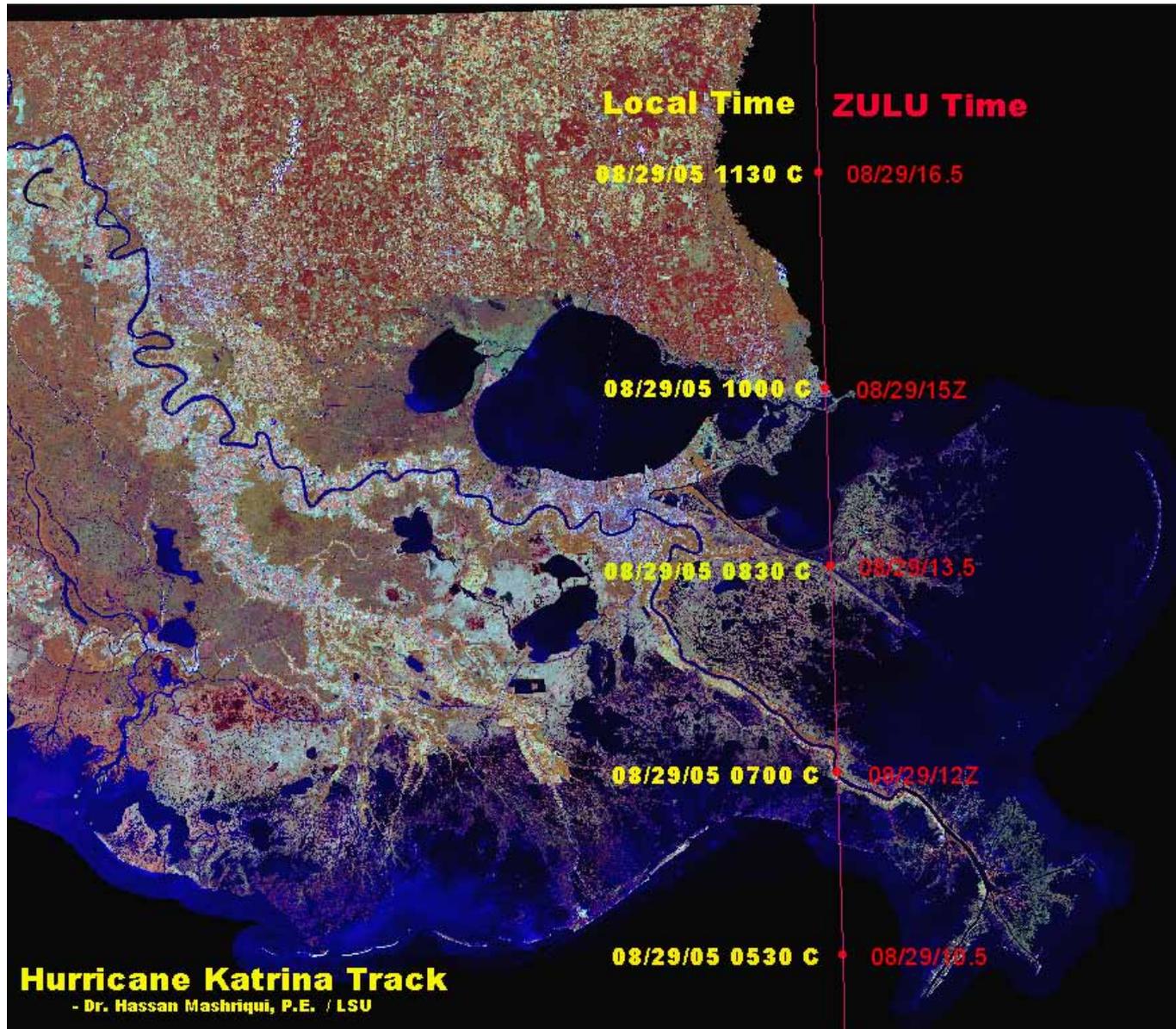




# Advisory # 22, Sunday 1457 (CDT)

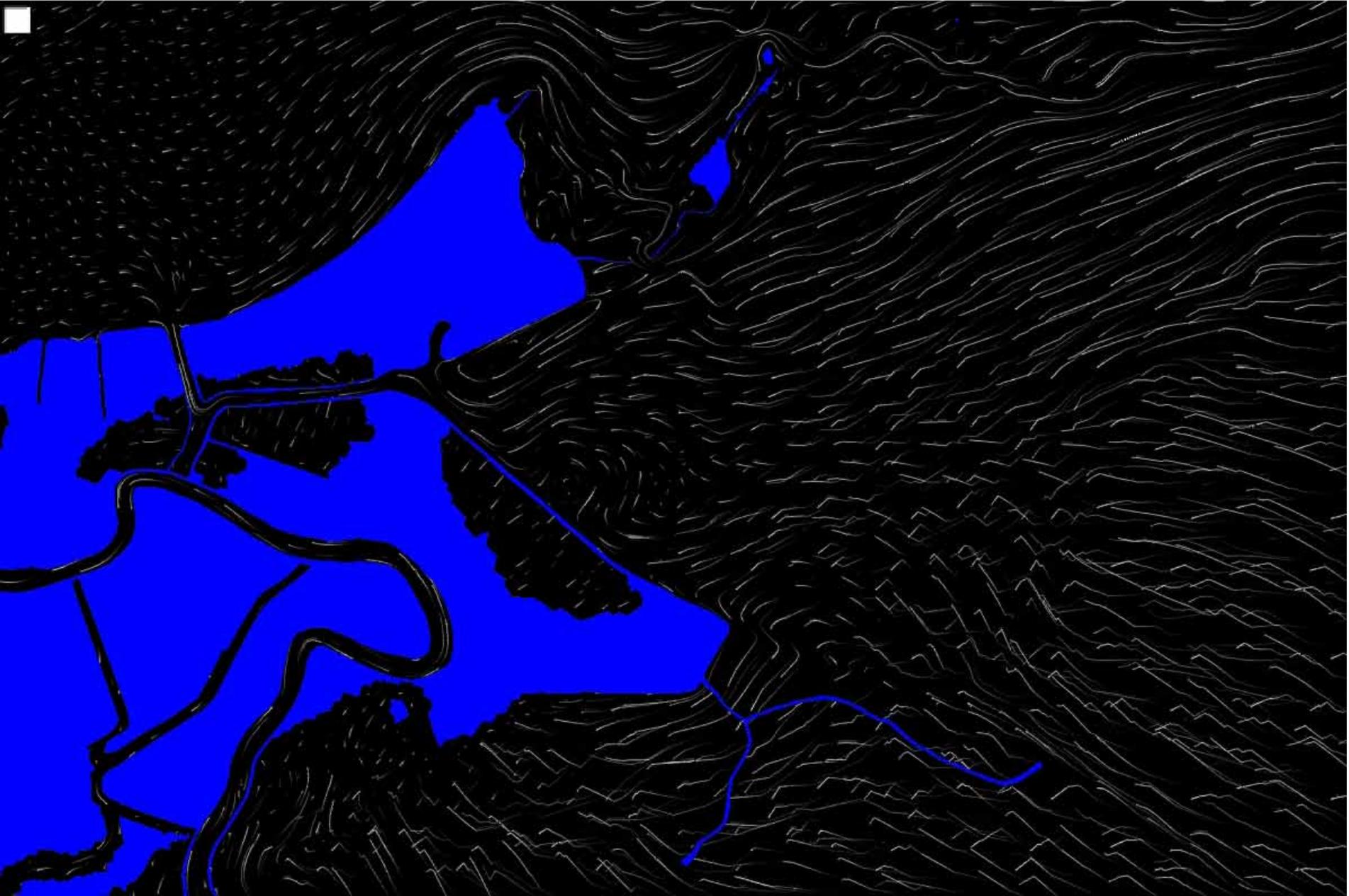


# Katrina's Track



Monday 08/29/05 0400 CDT • 08/29/09Z

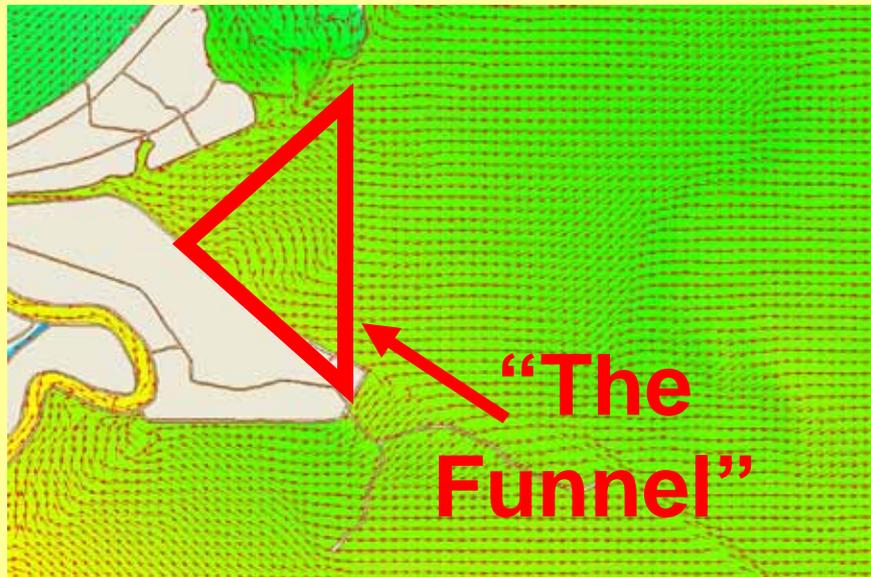
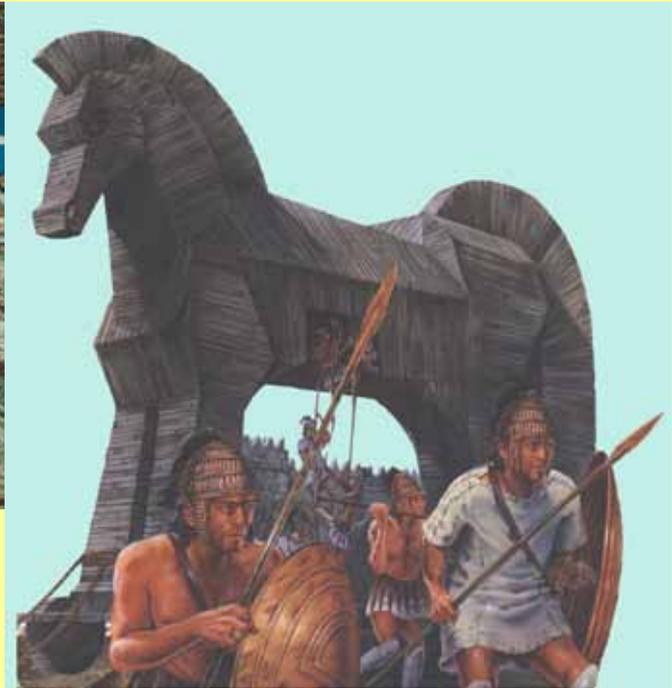
# Katrina's surge animation



This surge path was predicted  
3 months before Katrina !!

--- and presented to the  
emergency managers  
in New Orleans on  
19 May 2005

# “The Funnel” - Crescent City’s Trojan Horse - 19 May 2005



**Bestsy  
1965**

# Conclusions

- Technology saved lives, about 85% evacuation for Katrina

## Future use

- predicting levee overtopping and failure
- guiding pre-landfall flood-fighting efforts
- staging post-landfall breach closure equipment and supplies
- FEMA Flood Map update

Thank You