

ERODING COASTLINES

Coastal Impacts of Extreme Storms



Storm-Impact Regimes

SWASH: $R_{high} < D_{low}$



COLLISION: $D_{low} < R_{high} < D_{high}$



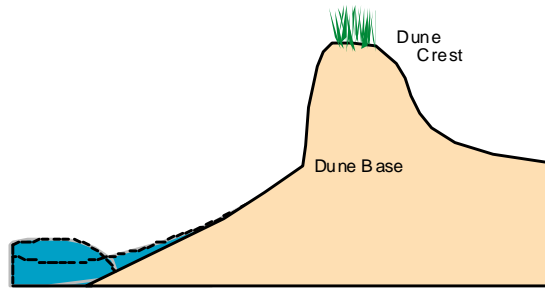
OVERWASH: $R_{high} > D_{high}$



INUNDATION: $surge + setup > D_{high}$

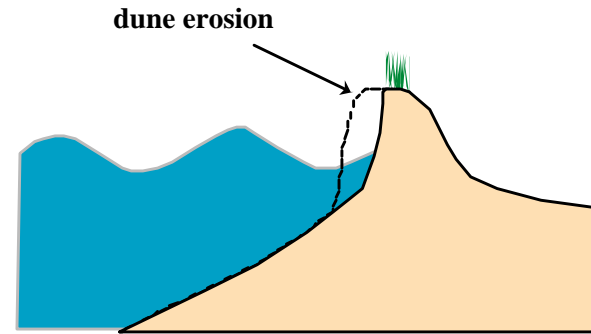


IMPACT LEVEL 1 Swash Regime



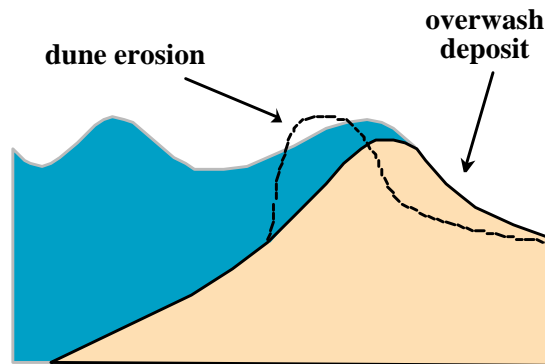
No Net Change

IMPACT LEVEL 2 Collision Regime



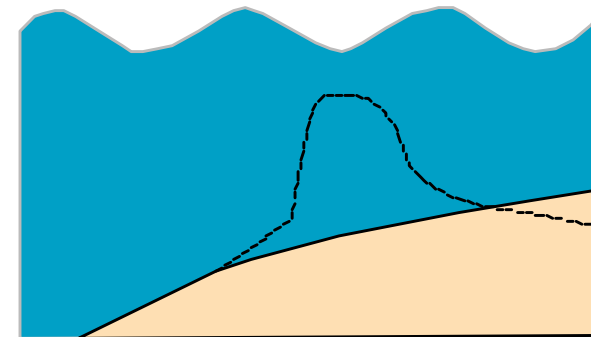
Net Dune Erosion

IMPACT LEVEL 3 Overwash Regime



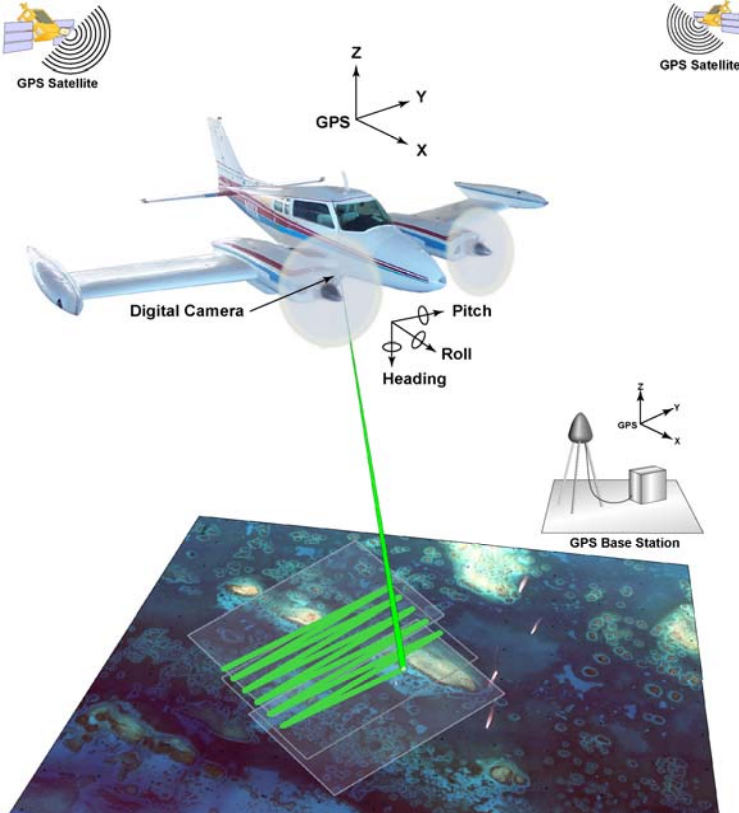
Net Onshore Transport
Order 100 meters

IMPACT LEVEL 4 Inundation Regime



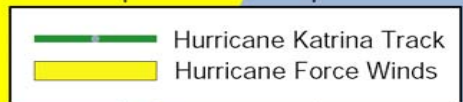
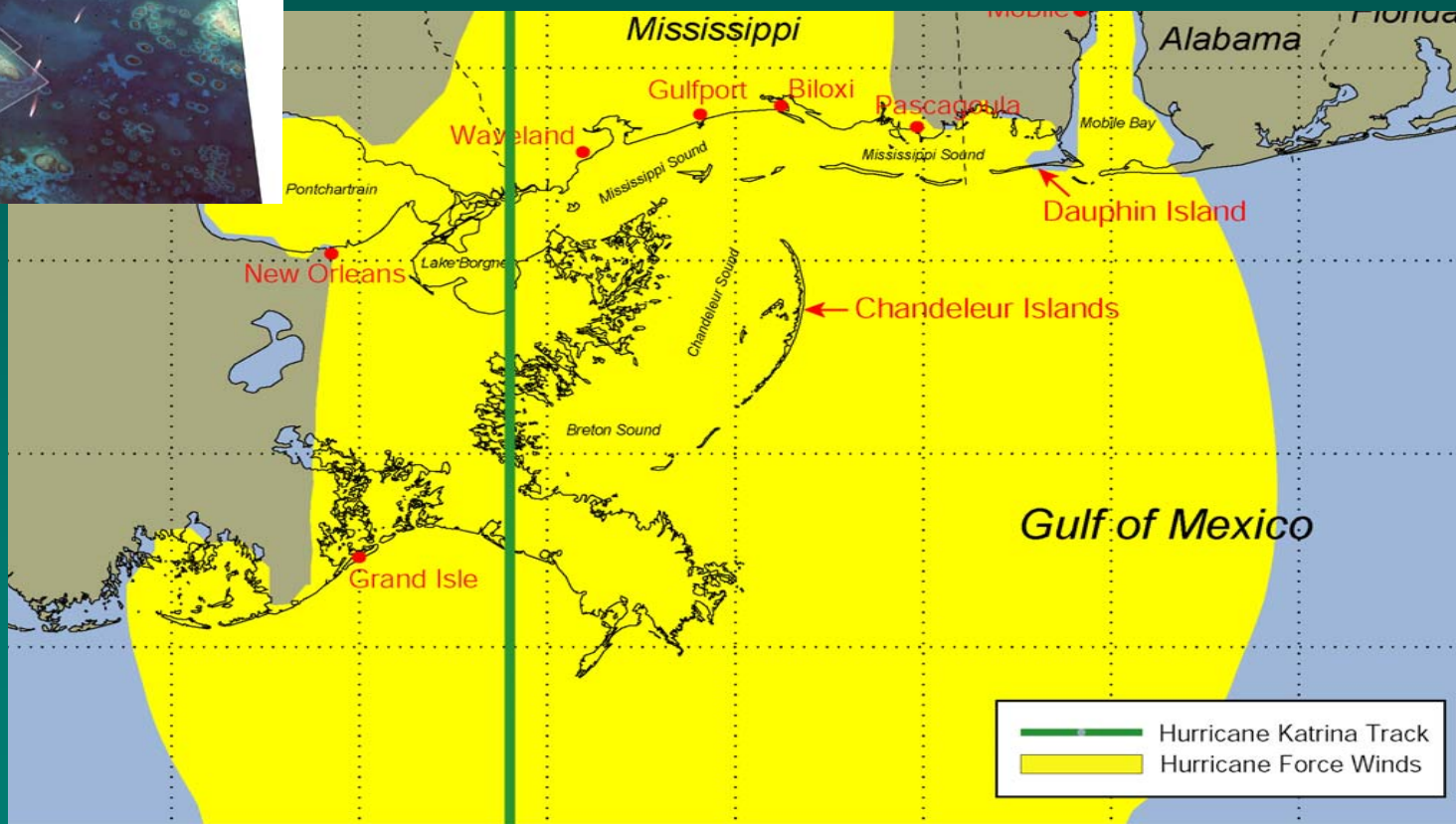
Net Onshore Transport
Order 1,000 meters

Sallenger
(2000)



Experimental Advanced Airborne Research Lidar -- EAARL

Data from NOAA
Hurricane Research Division



Extreme Coastal Change

May 2004 (Pre Ivan)

A

Mississippi
Sound

Gulf of
Mexico

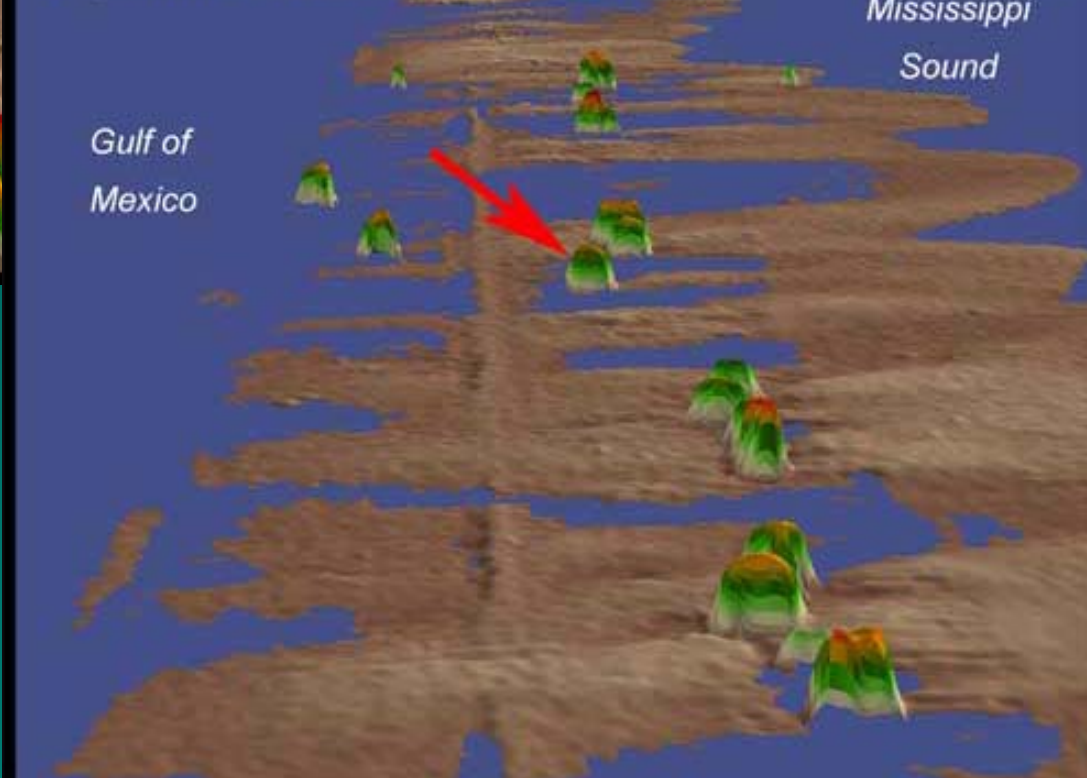


September 2005 (Post Katrina)

C

Mississippi
Sound

Gulf of
Mexico



Dauphin Island, AL



August 31, 2005

Gulf of Mexico

Mississippi Sound

D



Post Katrina

September 2005 (Post Katrina)

Gulf of Mexico

Mississippi Sound

C



Dauphin Island, AL



August 31, 2005

Gulf of Mexico

Mississippi Sound

D



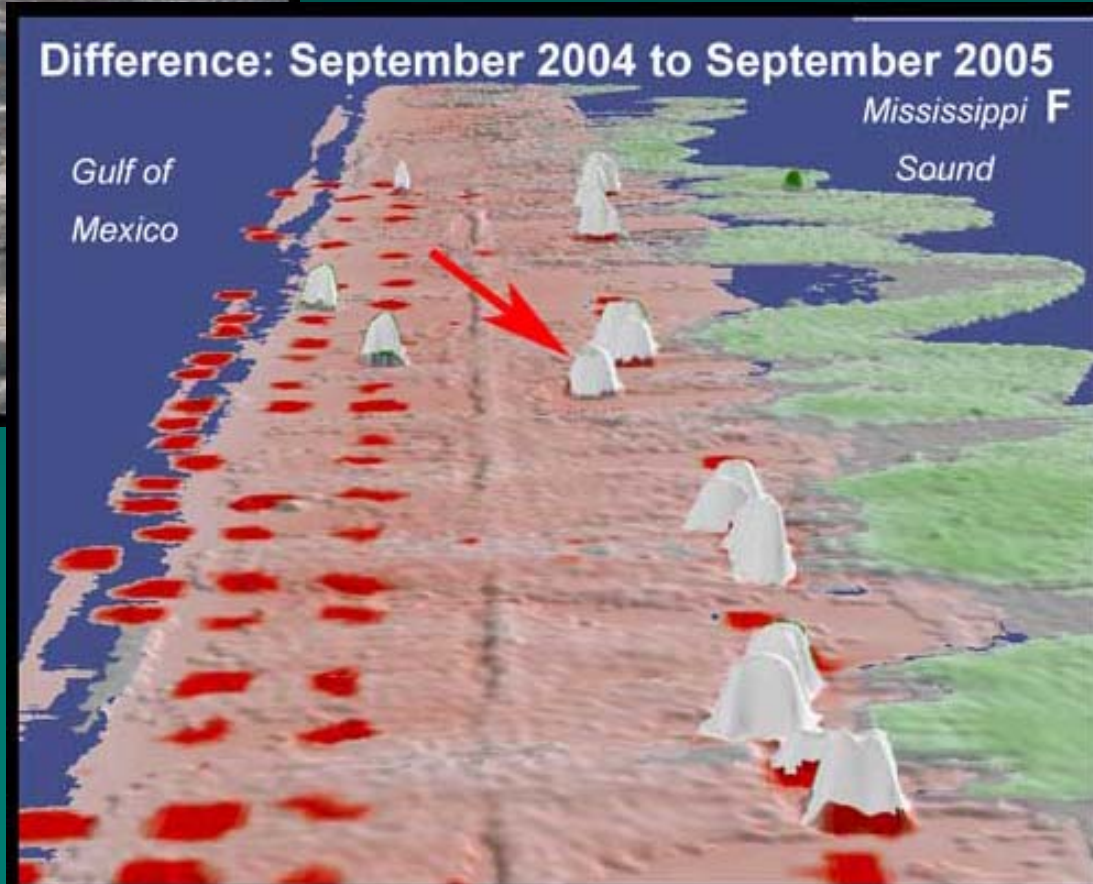
Hurricane Katrina, 2005

Difference: September 2004 to September 2005

Gulf of Mexico

Mississippi Sound

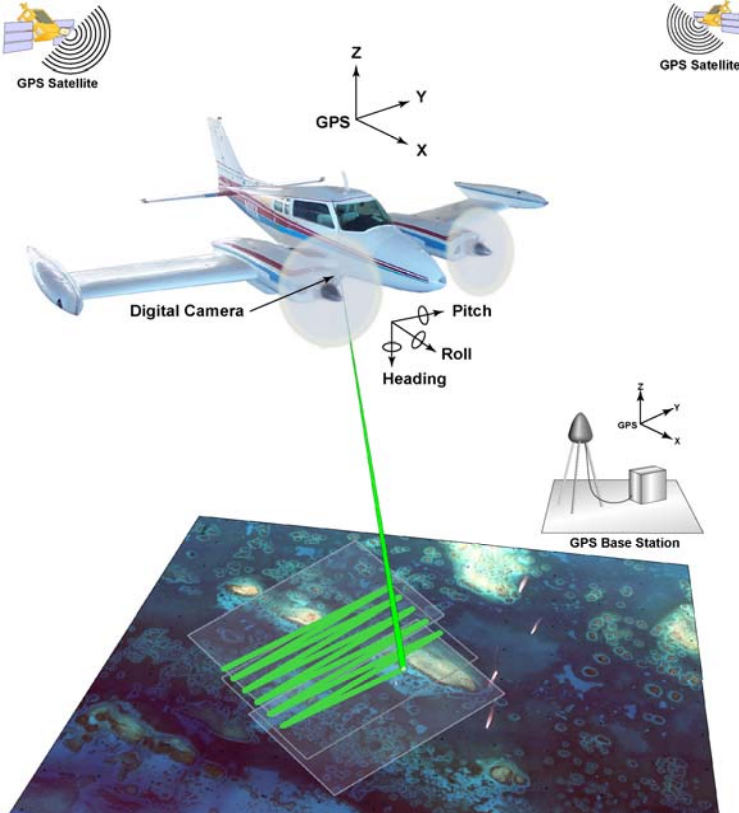
F



Dauphin Island, Alabama

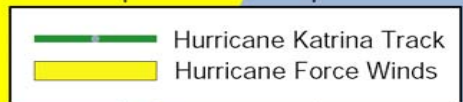
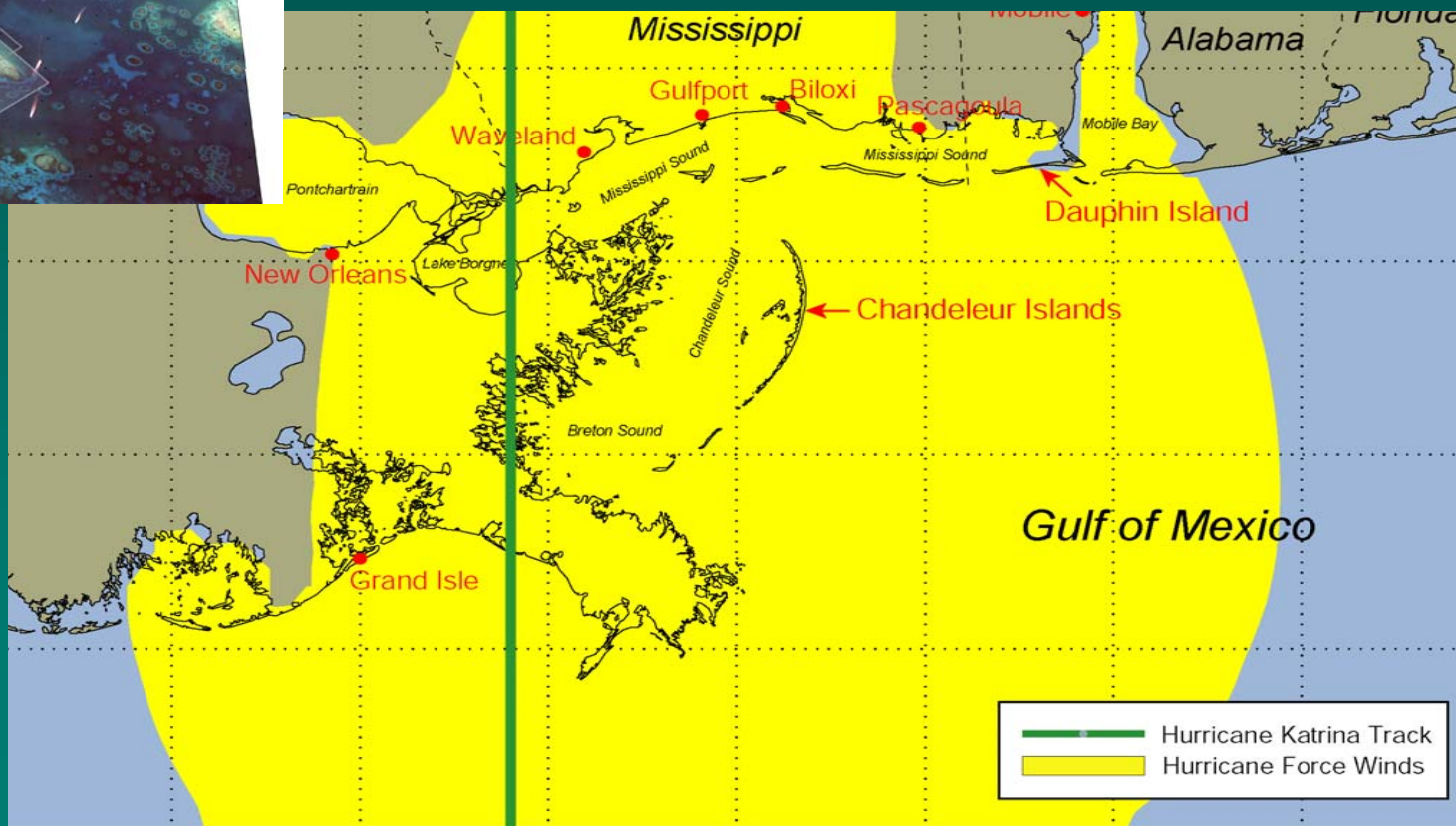


Photo credit: National Geographic

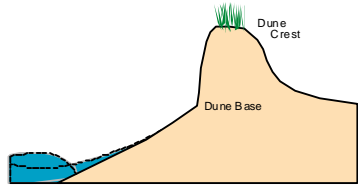


Experimental Advanced Airborne Research Lidar -- EAARL

Data from NOAA
Hurricane Research Division

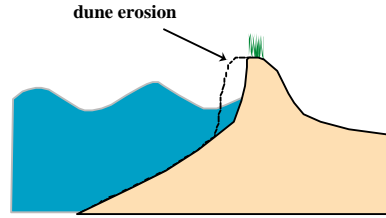


IMPACT LEVEL 1
Swash Regime



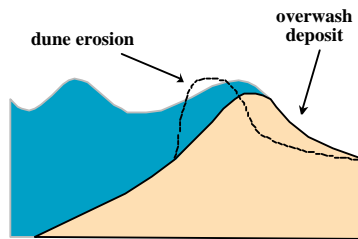
No Net Change

IMPACT LEVEL 2
Collision Regime



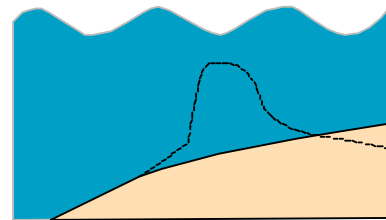
Net Dune Erosion

IMPACT LEVEL 3
Overwash Regime



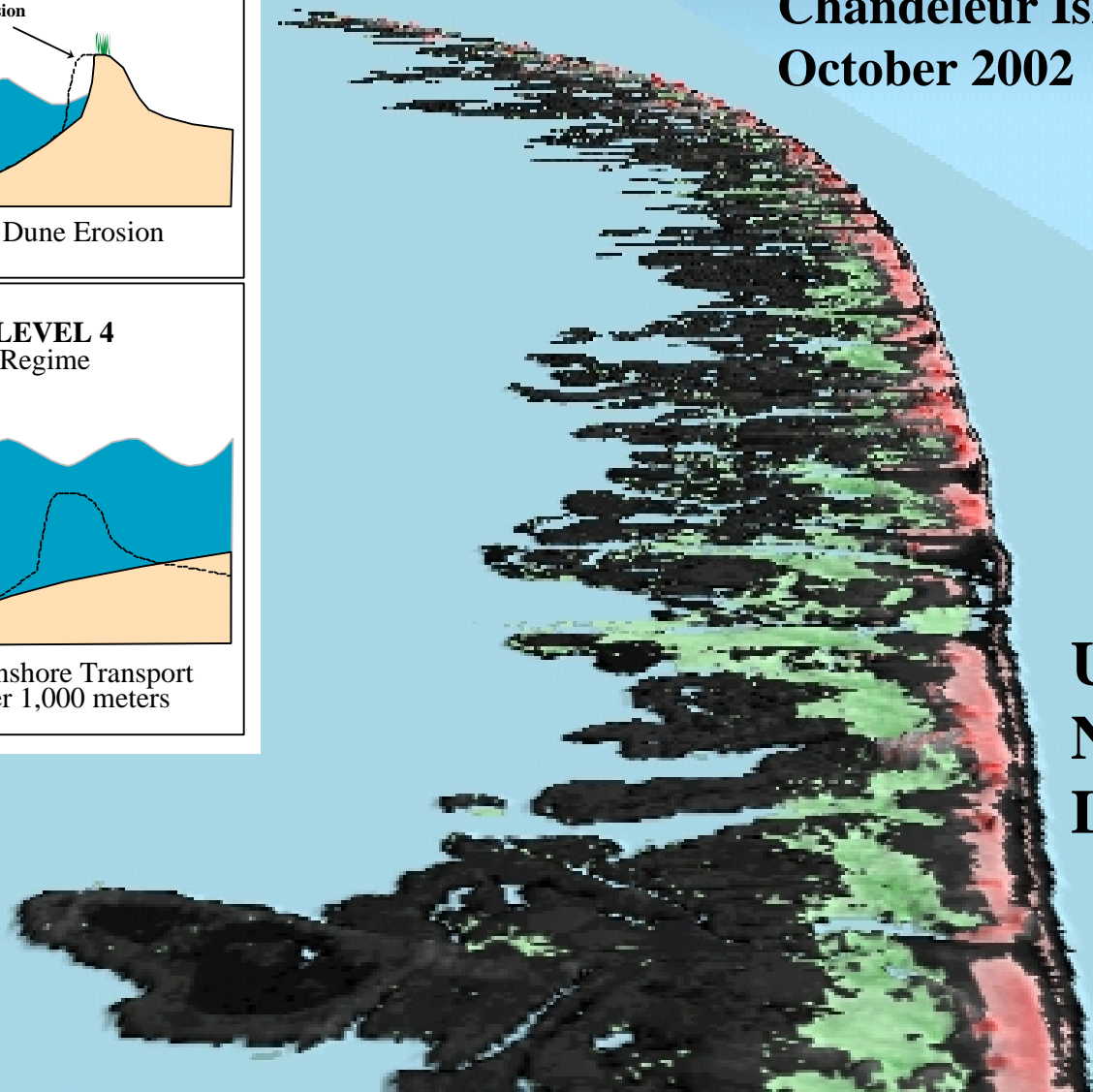
Net Onshore Transport
Order 100 meters

IMPACT LEVEL 4
Inundation Regime



Net Onshore Transport
Order 1,000 meters

Hurricane Lili
Chandeleur Islands, LA
October 2002



USGS
NASA
LA DNR

Chandeleur Islands, Louisiana

July 17, 2001



August 31, 2005



Pre Katrina

Post Katrina

July 17, 2001



Pre
Katrina

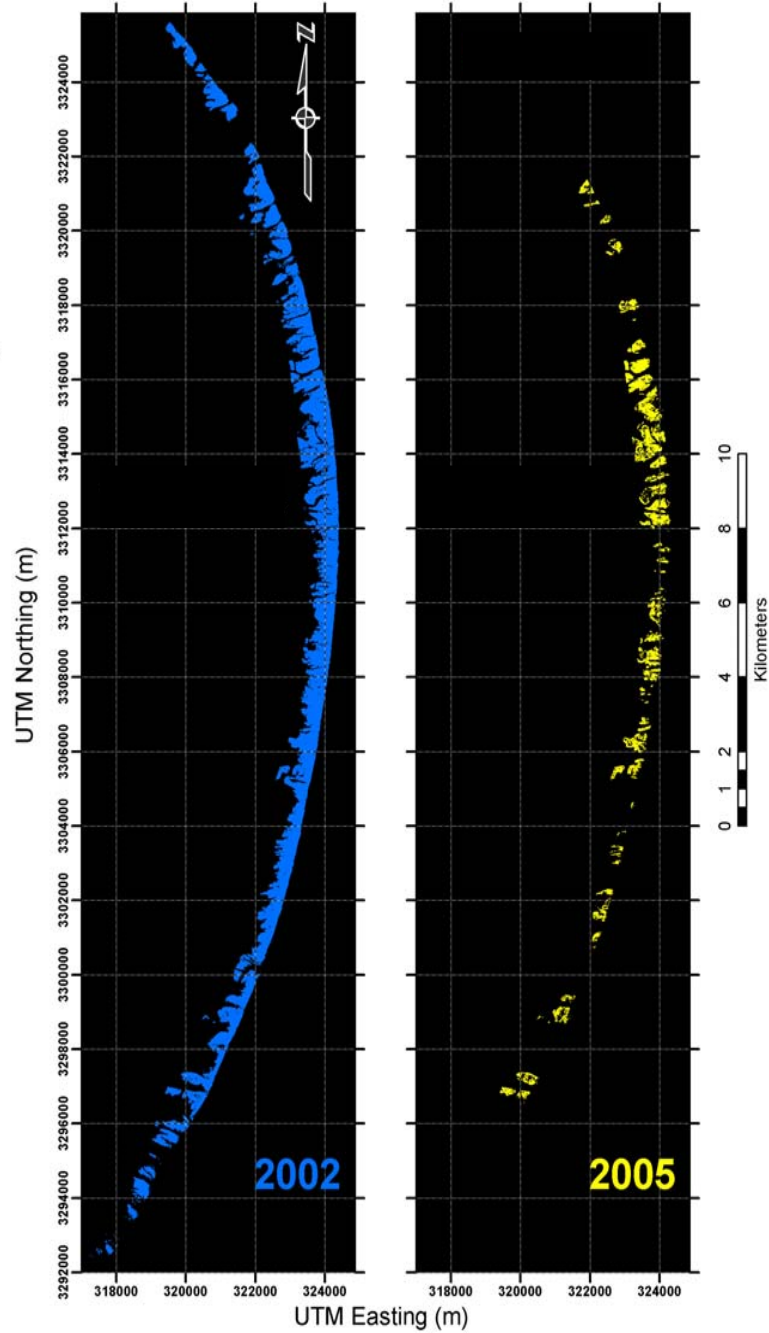
Post
Katrina

August 31, 2005



Extreme coastal change

Chandeleur Islands, LA



**Nor'Ida:
Outer Banks
North Carolina**



