

# Hurricanes

Presentation provided by:  
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BUREAU OF  
ECONOMIC  
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# What Is A Hurricane?

- Hurricanes are intense tropical cyclones with a maximum sustained speed of at least 74 mph
- A tropical cyclone is a warm core (or center) low pressure system without any "front" attached, that develops over tropical or near tropical waters, and have circular wind circulation around a well-defined center
- Tropical cyclones rotate counterclockwise in the Northern Hemisphere (clockwise in the Southern)
- Called hurricanes in the Atlantic and Eastern Pacific, typhoons in the Western Pacific, and cyclones in the Indian Ocean

# Hurricanes

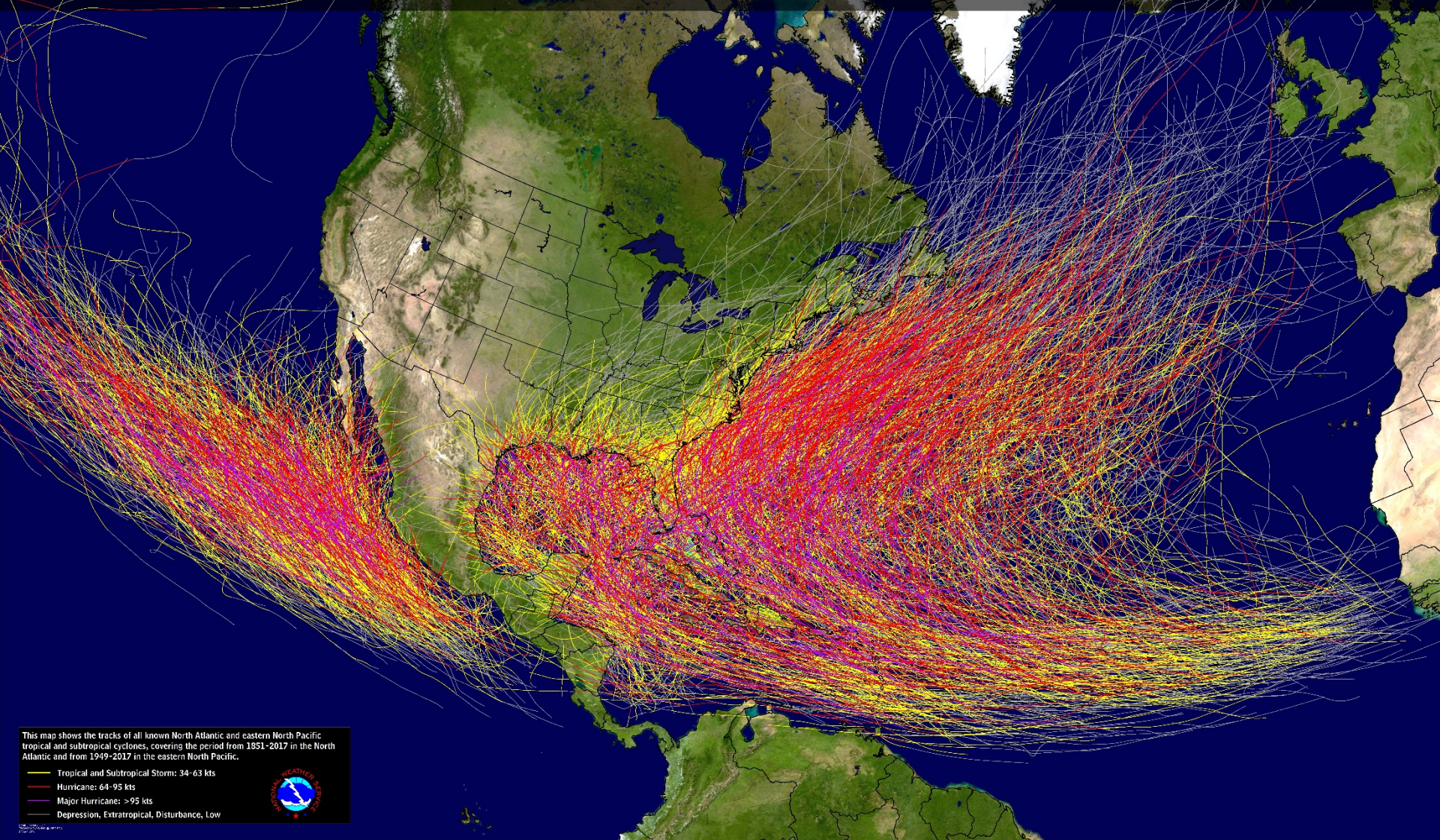
- Hurricanes come in different sizes and intensities, and move at different speeds, all of which determine the impact on the environment.
- A small, fast-moving, higher intensity hurricane may have less impact than a large, slow-moving lower intensity storm.
- Hurricane intensity rated according to max sustained wind speed.
  - Average speed of wind measured for one minute at a height of 33 feet (10 meters) with dropsondes.
  - Hurricane recon airplanes fly at 10,000 feet: measure wind speed and barometric pressure and inspect ocean surface.

Saffir-Simpson Hurricane Scale		
Category	Wind speed (mph)	Storm surge (feet)
5	156	More than 18
4	131–155	13–18
3	111–130	9–12
2	96–110	6–8
1	74–95	4–5
Additional classifications		
Tropical storm	39–73	0–3
Tropical depression	0–38	0



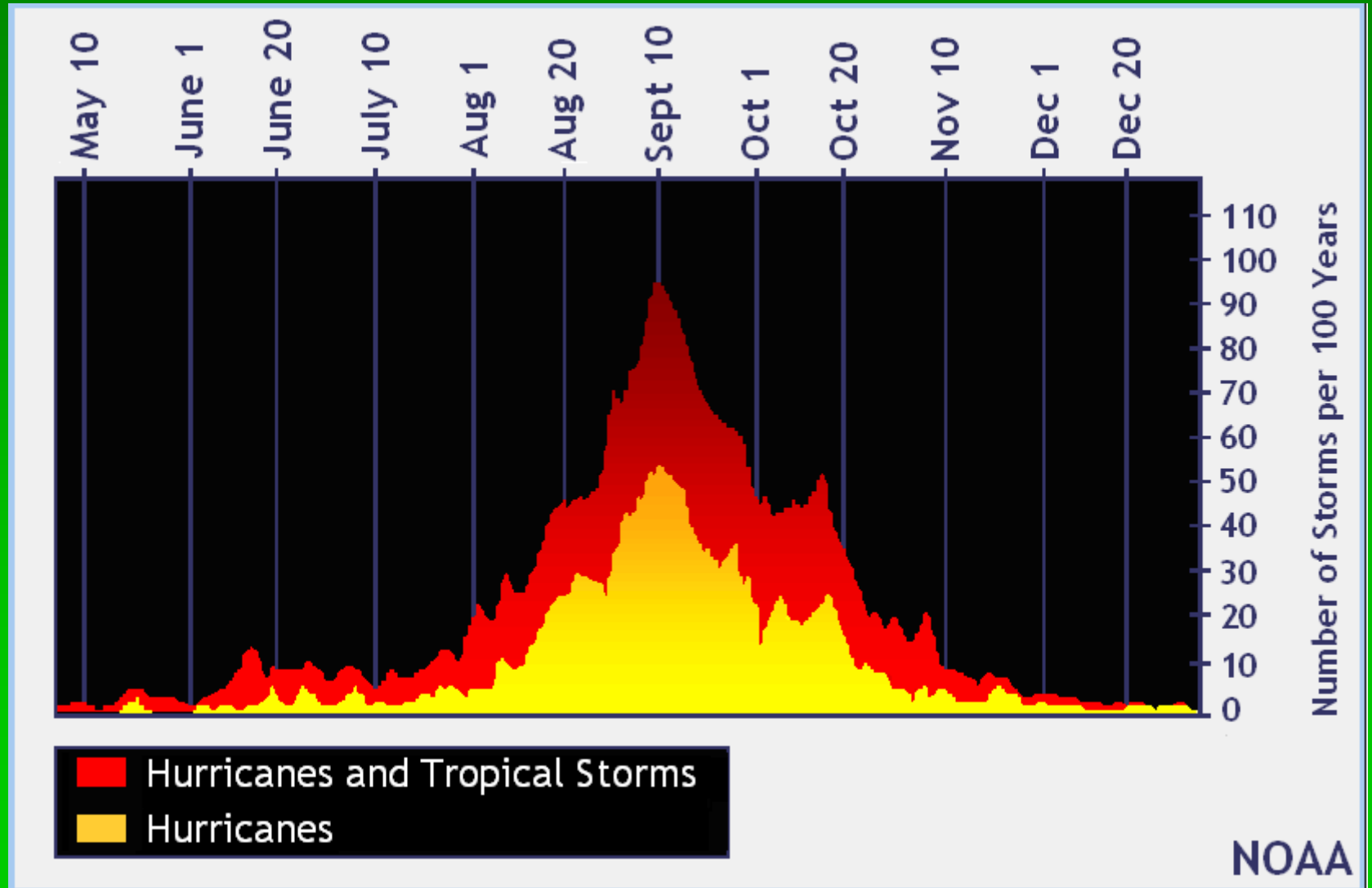
# Tropical Cyclone Tracks

Data from 1949 in the Pacific, from 1851 in the Atlantic





Atlantic hurricane season is from June 1-November 30  
(Atlantic Ocean, Caribbean Sea, and Gulf of Mexico)



# Names for Atlantic Basin Tropical Cyclones

- A tropical cyclone is named when wind speeds = 39 mph.
- If more than 21 storms occur in a season, use Greek alphabet.

- Naming started in 1953 using female names.

- In 1979 started using alternating male and female names.

- Names are retired if storm is so deadly or costly future use would be inappropriate.

- Ike (2008); Katrina & Rita (2005); Harvey, Irma & Maria (2017); Florence & Michael (2018)

2019	2020	2021	2022	2023	2024
Andrea	Arthur	Ana	Alex	Arlene	Alberto
Barry	Bertha	Bill	Bonnie	Bret	Beryl
Chantal	Cristobal	Claudette	Colin	Cindy	Chris
Dorian	Dolly	Danny	Danielle	Don	Debby
Erin	Edouard	Elsa	Earl	Emily	Ernesto
Fernand	Fay	Fred	Fiona	Franklin	Francine
Gabrielle	Gonzalo	Grace	Gaston	Gert	Gordon
Humberto	Hanna	Henri	Hermine	Harold	Helene
Imelda	Isaias	Ida	Ian	Idalia	Isaac
Jerry	Josephine	Julian	Julia	Jose	Joyce
Karen	Kyle	Kate	Karl	Katia	Kirk
Lorenzo	Laura	Larry	Lisa	Lee	Leslie
Melissa	Marco	Mindy	Martin	Margot	Milton
Nestor	Nana	Nicholas	Nicole	Nigel	Nadine
Olga	Omar	Odette	Owen	Ophelia	Oscar
Pablo	Paulette	Peter	Paula	Philippe	Patty
Rebekah	Rene	Rose	Richard	Rina	Rafael
Sebastien	Sally	Sam	Shary	Sean	Sara
Tanya	Teddy	Teresa	Tobias	Tammy	Tony
Van	Vicky	Victor	Virginie	Vince	Valerie
Wendy	Wilfred	Wanda	Walter	Whitney	William

# Hurricanes as Geologic Agents

## ■ Wind

- Wind is NOT a major geologic agent because wet sand is hard to move

## ■ Storm surge

- Storm surge is a major geologic agent as it transports large amounts of sediment

## ■ Waves

- Waves are a major geologic agent because of their erosive powers

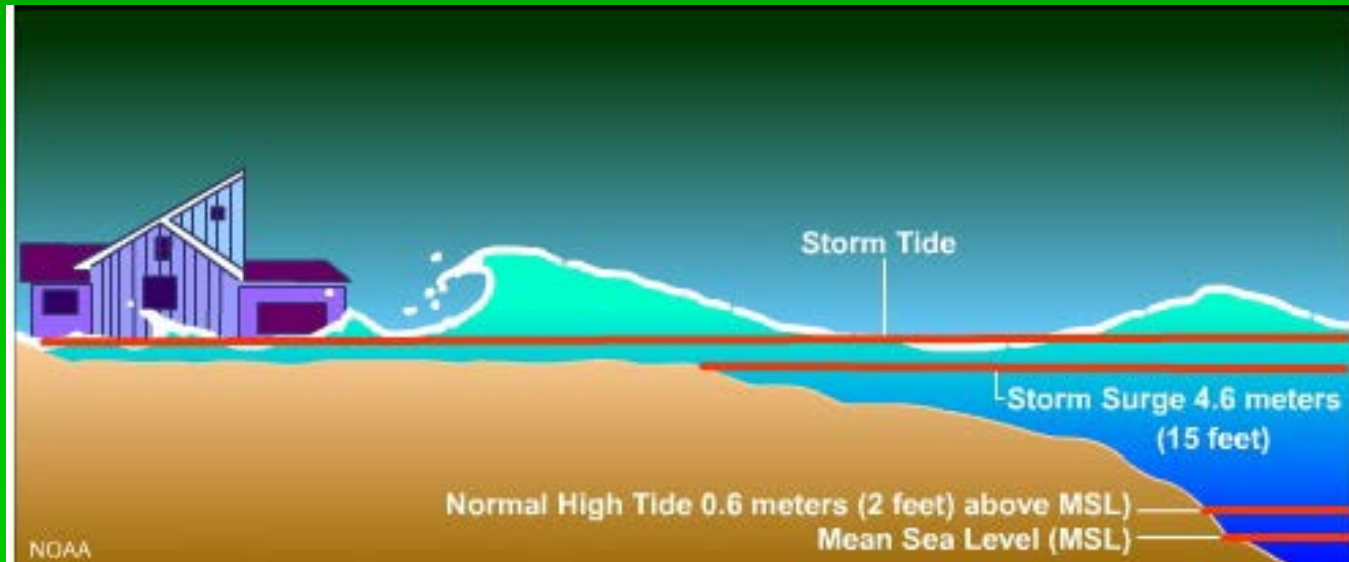
## ■ Rainfall

- Rain is a major geologic agent because extensive flooding causes erosion.

# Storm Surge

**Storm surge** is the rise of sea level produced by water being pushed toward shore by the force of winds swirling around the storm. Measured as the height of the water above the normal predicted astronomical tide

**Storm tide** is the total observed seawater level during a storm, resulting from the combination of storm surge and the astronomical tide. As a result, the highest storm tides are often observed during storms that coincide with a new or full moon.

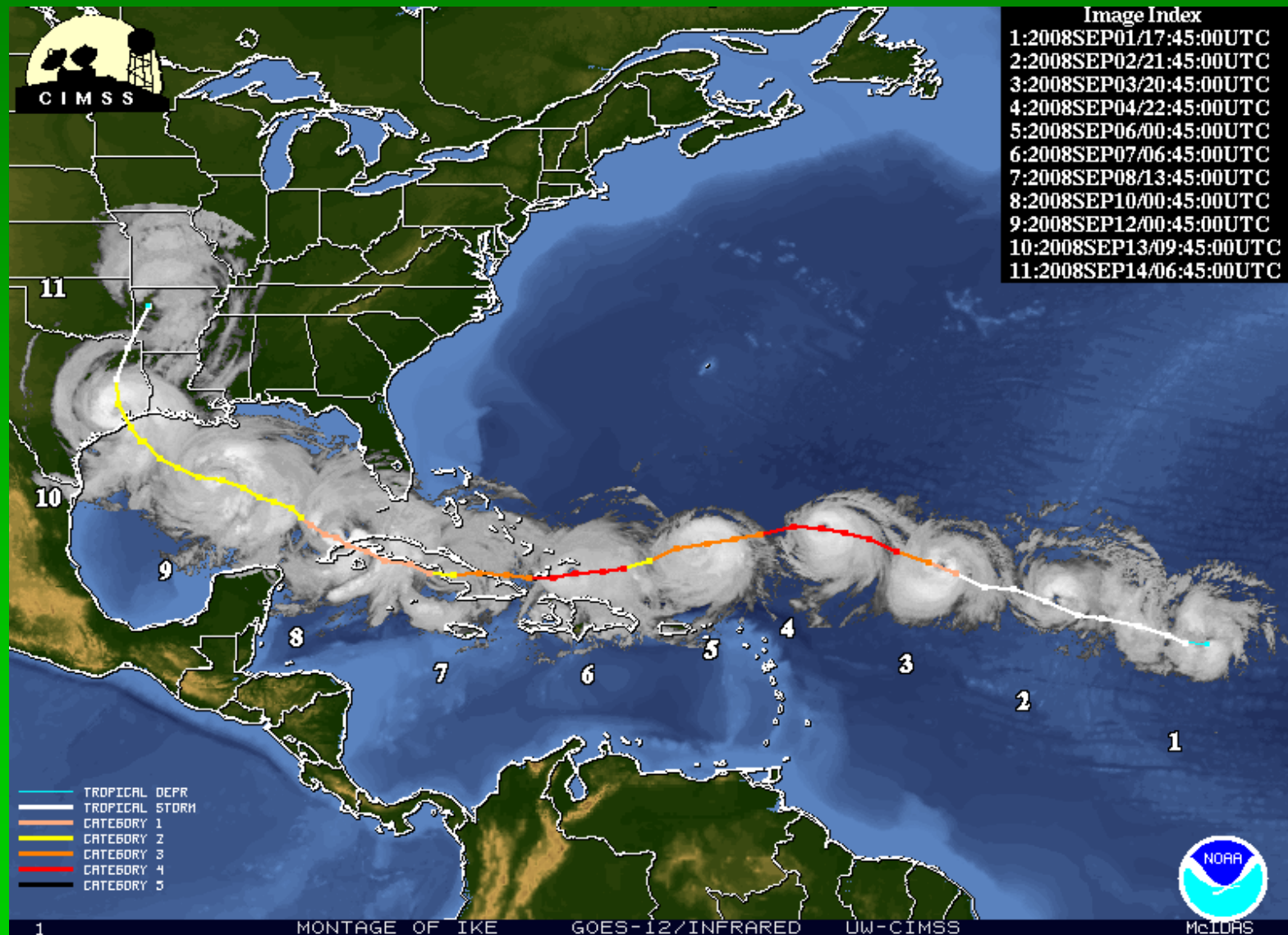


<https://oceantoday.noaa.gov/hurricanestormsurge/>

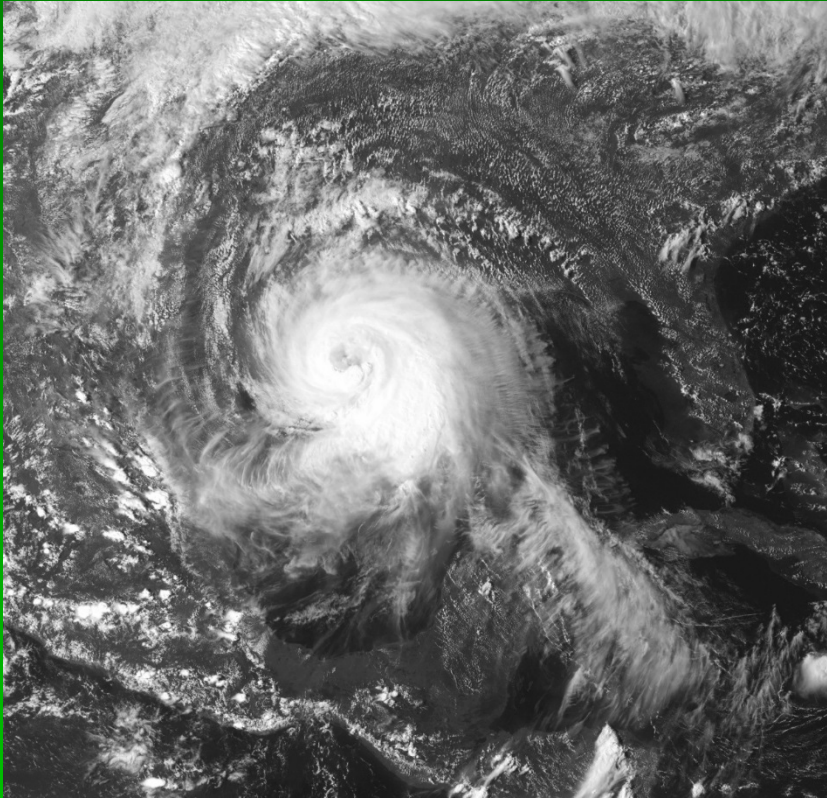
[http://www.nhc.noaa.gov/surge/animations/hurricane\\_stormsurge.swf](http://www.nhc.noaa.gov/surge/animations/hurricane_stormsurge.swf)



# Hurricane Ike 2008

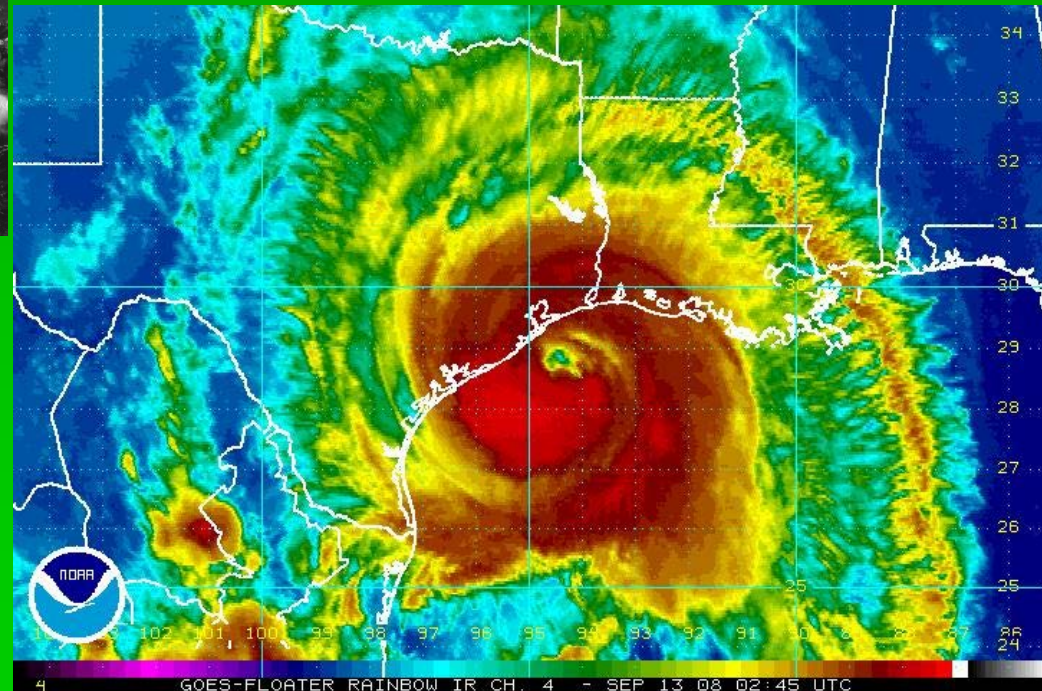


# Hurricane Ike 2008



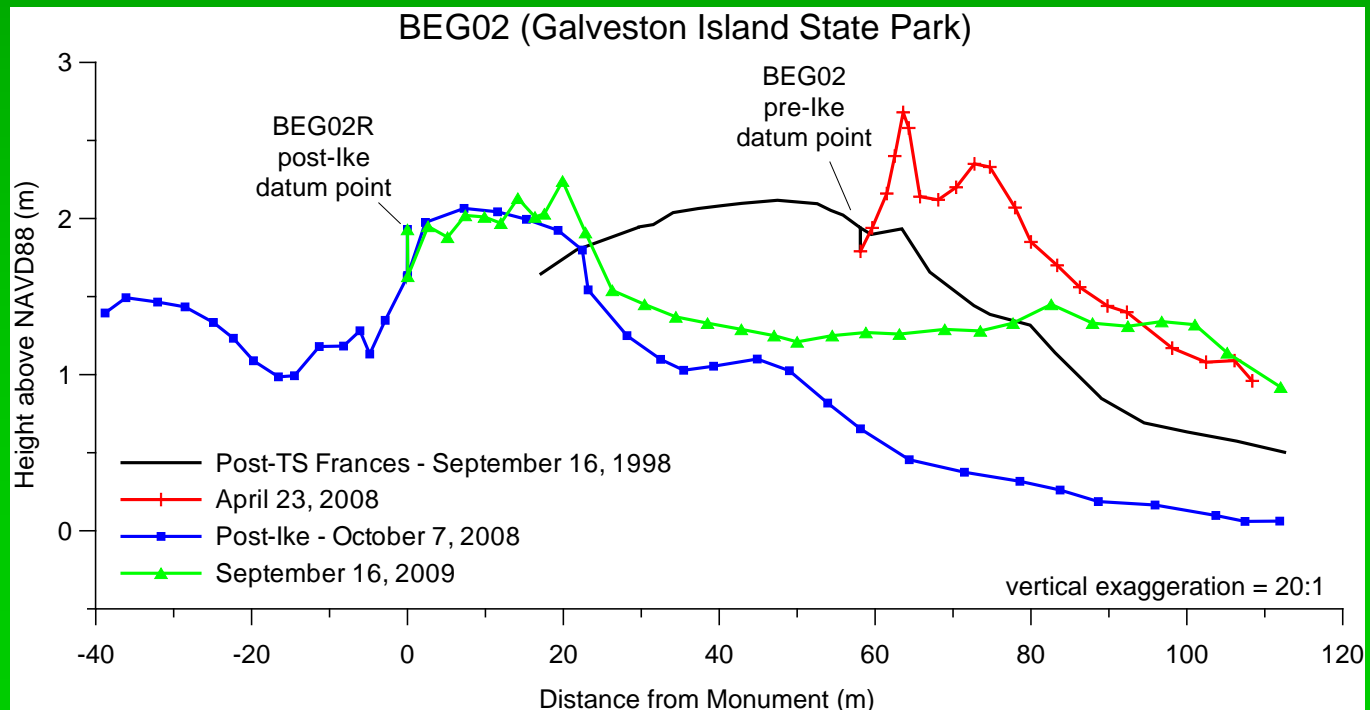
- Category 2 storm that made landfall on Bolivar Peninsula on September 13, 2008.
- Maximum wind speed at landfall was 110 mph. Max wind speed during the storm was 144 mph while in the Atlantic Ocean.
- Storm surge estimated at 15-20 feet on Bolivar Peninsula.

- Due to its immense size, Ike caused devastation from the Louisiana coastline all the way to the Kenedy County region south of Corpus Christi, Texas.



# Hurricane Ike on Galveston Island

- Dune system at Galveston Island State Park was completely destroyed.
- Shoreline position moved 174 feet landward due to the storm.
- Pre-storm datum was located almost 4 feet above the post-storm level of the beach.





April 2008



October 2008 – Post Hurricane Ike



Photo credit: Tiffany Caudle





Photo credit: Tiffany Caudle