

WHAT IS THE EFFECT OF THE EARTH'S TEMPERATURE ON CYCLONIC STORMS?

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Data 608 Story 5

INTRODUCTION

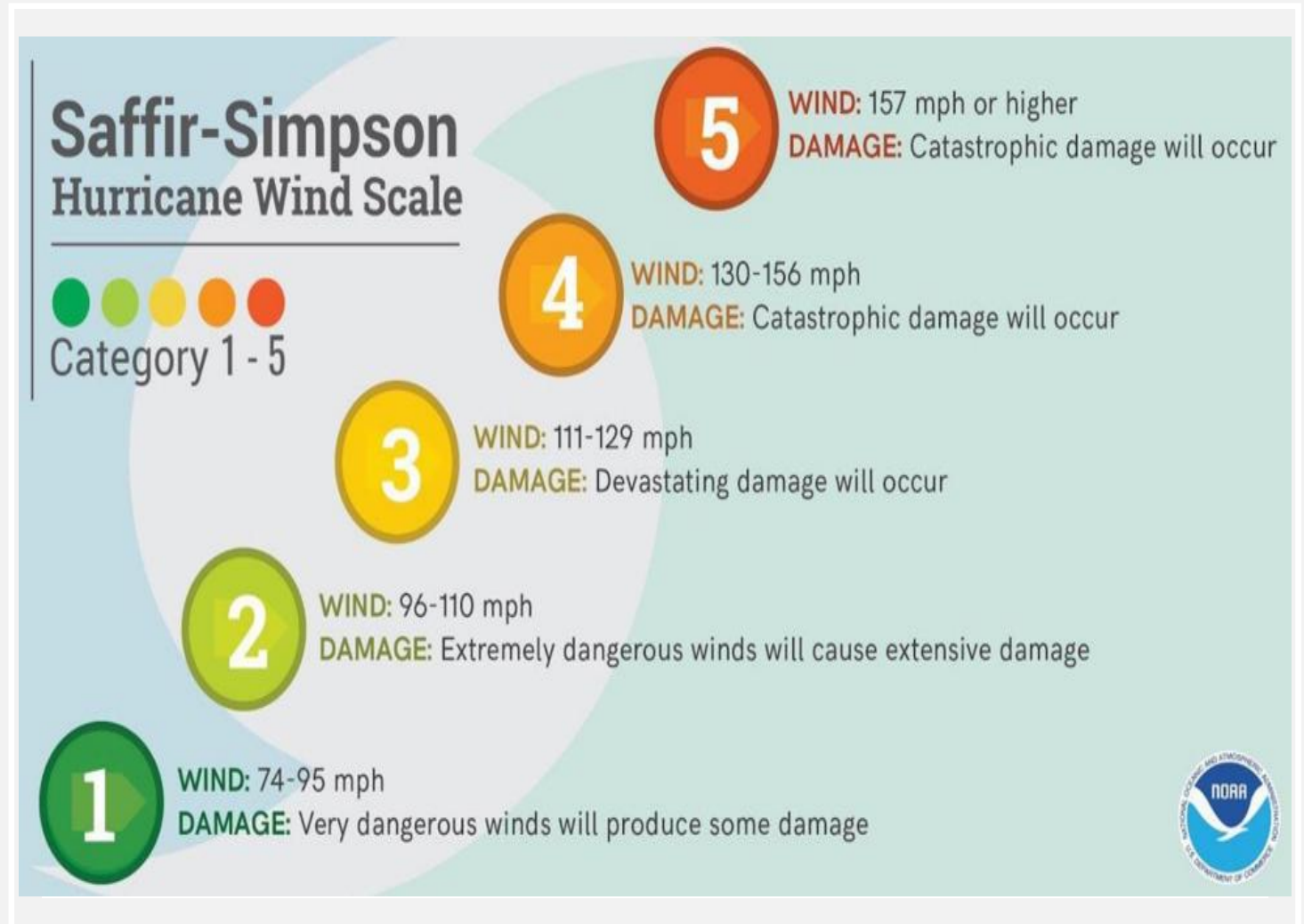
In observing the impact of Earth's rising temperatures on the frequency and intensity of cyclonic storms, we posit a significant correlation. This relationship is highlighted by several notable examples:

- **Hurricane Harvey (2017):** Caused catastrophic flooding in Houston, leading to over 100 fatalities.
- **Super Typhoon Haiyan (2013):** One of the most powerful tropical cyclones recorded, it devastated parts of Southeast Asia, especially the Philippines, resulting in over 6,000 deaths.
- **Joplin Tornado (2011):** Ranked among the deadliest in U.S. history, it led to 158 deaths and extensive destruction.

These events underscore the urgent need to understand the connection between global warming and the increasing severity of storms.

HOW ARE STORMS CATEGORIZED?

Source: <https://dod.hawaii.gov/hiema/what-are-the-hazards-of-a-hurricane/>



SEVERE STORMS CAUSE SEVERE DAMAGE

Source: https://www.masslive.com/news/2017/08/the_7_most_devastating_us_hurr.html



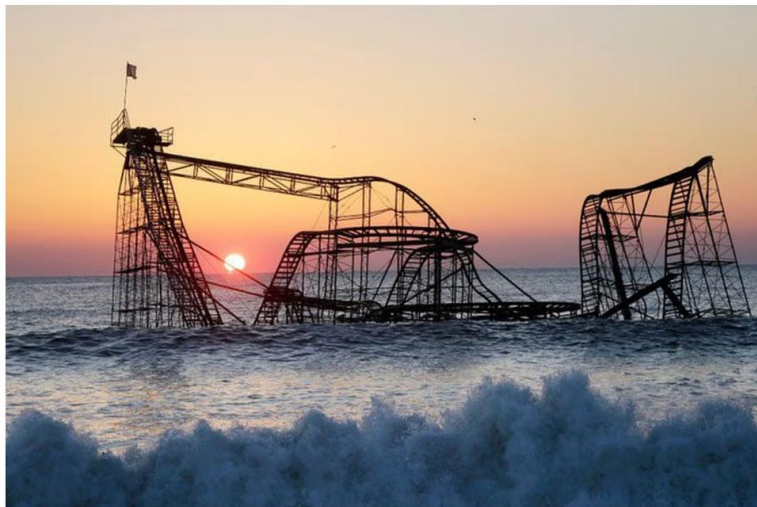
Residents in Pensacola, Fla., look over the wreckage of homes following Hurricane Ivan, Thursday, Sept. 16, 2004.



Hurricane Harvey made landfall near Corpus Christi, TX on Friday, Aug. 25, 2017.



An aerial view of Hurricane Rita's devastation of the town of Cameron soon after the storm, Sept. 25, 2005.



In this Feb. 25, 2013, file photo, the Jet Star Roller Coaster is in the ocean after part of the Funtown Pier was destroyed during Superstorm Sandy in Seaside Heights, N.J.



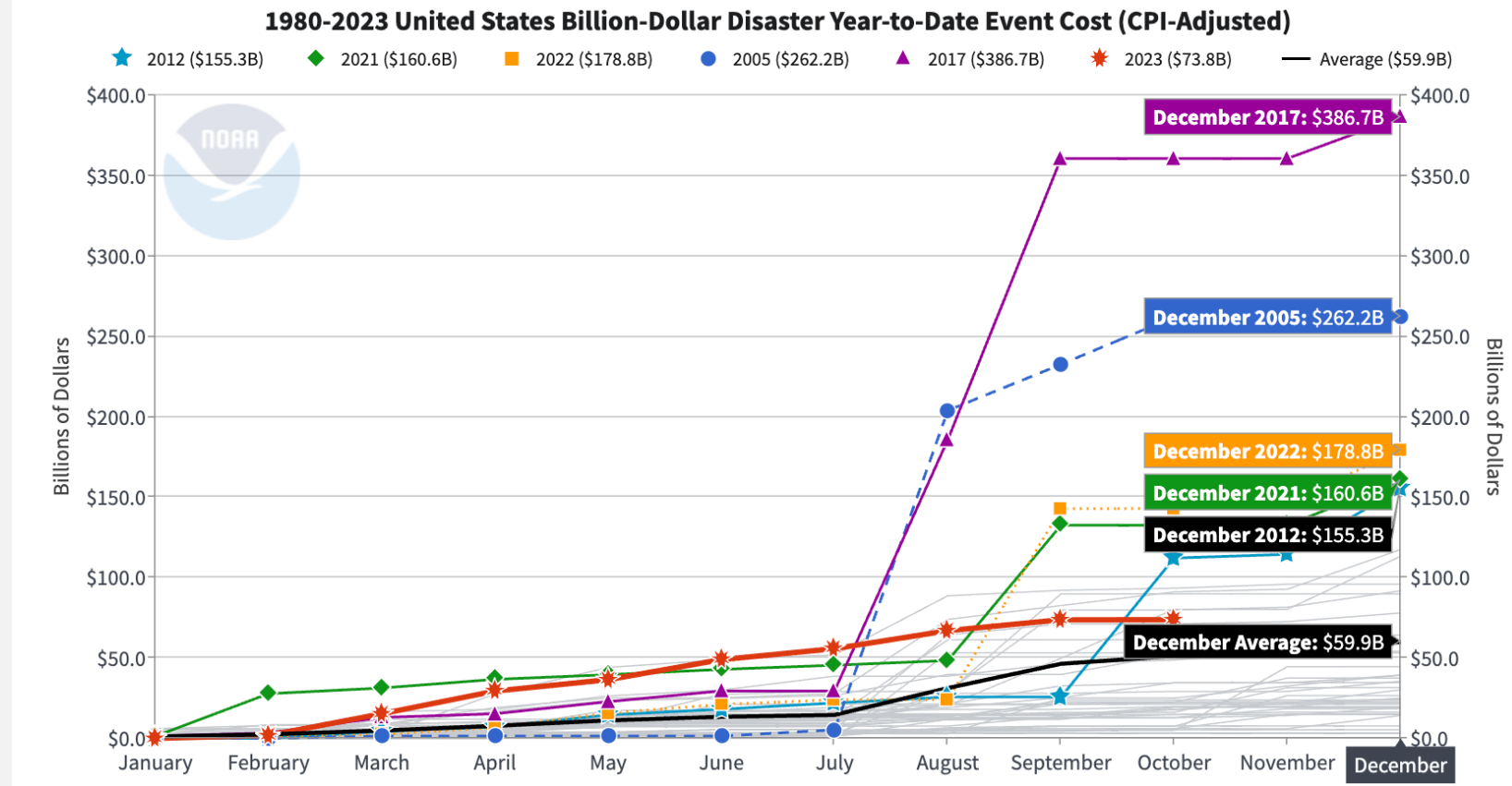
New Orleans' Lower 9th Ward was largely destroyed from Hurricane Katrina.

SEVERE STORMS CAUSE SEVERE DAMAGE

The total cost 373 events since 1980 exceeds \$2.645 trillion.



The per year cost of severe storms and tropical cyclones since 1980 has skyrocketed.



HOW ARE CYCLONES MEASURED?

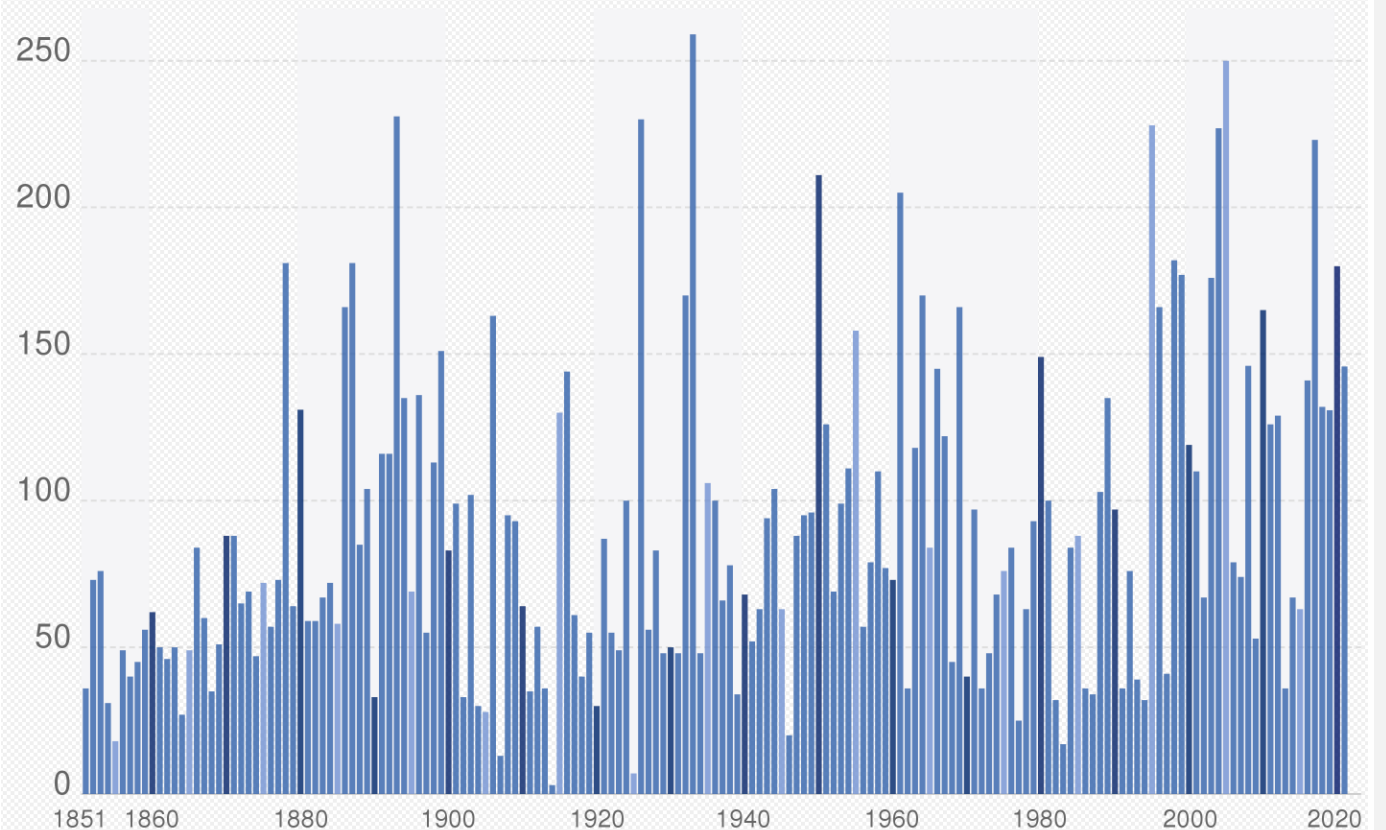
Accumulated cyclone energy (ACE)

is a metric used by various agencies to express the energy released by a [tropical cyclone](#) during its lifetime. It is calculated by summing the square of a tropical cyclone's [maximum sustained winds](#), measured every six hours.

Classification criteria

Category	ACE Index	% of 1951-2020 median
Extremely active	> 159.6	> 165%
Above-normal	> 126.1	> 130%
Near-normal	73-126.1	75-130%
Below-normal	< 73	< 75%

Accumulated Cyclone Energy of North Atlantic hurricanes



Source: Hurricane Database HURDAT (NOAA)

Source: <https://ourworldindata.org/grapher/ace-north-atlantic-hurricanes>

HOW ARE CYCLONIC STORMS MEASURED?

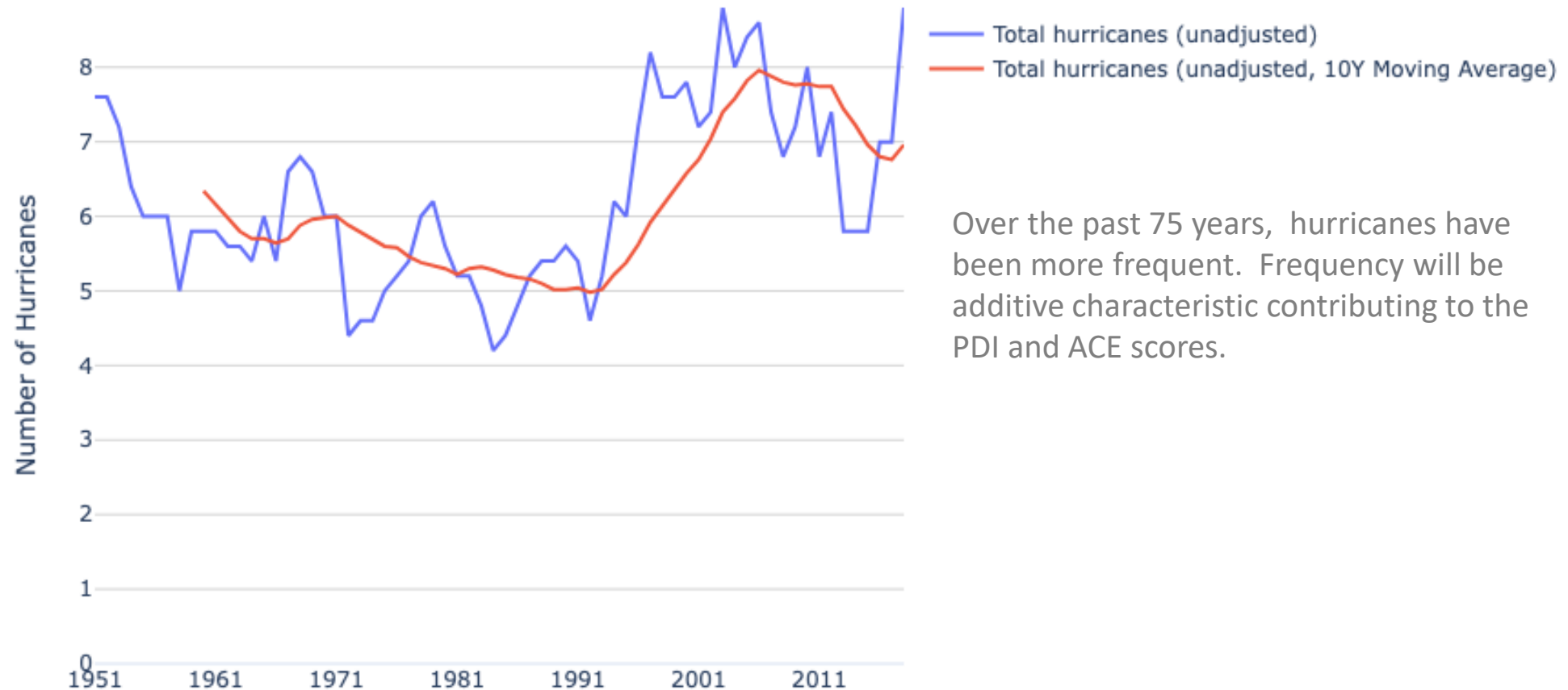
Power Dissipation Index (PDI)

The Power Dissipation Index (PDI) is a metric used to quantify the overall power or intensity of tropical cyclones. The measure uses:

- **Maximum Sustained Wind Speed:** This is the average highest speed (measured in knots or miles per hour) of the winds blowing around the center of the storm.
- **Duration of the Storm:** The PDI considers the length of time a storm maintains its intensity. This is important because a longer-lasting storm, even with moderately high winds, can accumulate a high PDI due to prolonged exposure to its winds.

WHAT IS THE CURRENT TREND FOR STORM FREQUENCY?

Hurricane Frequency in North Atlantic and 10 Year Moving Average Trend

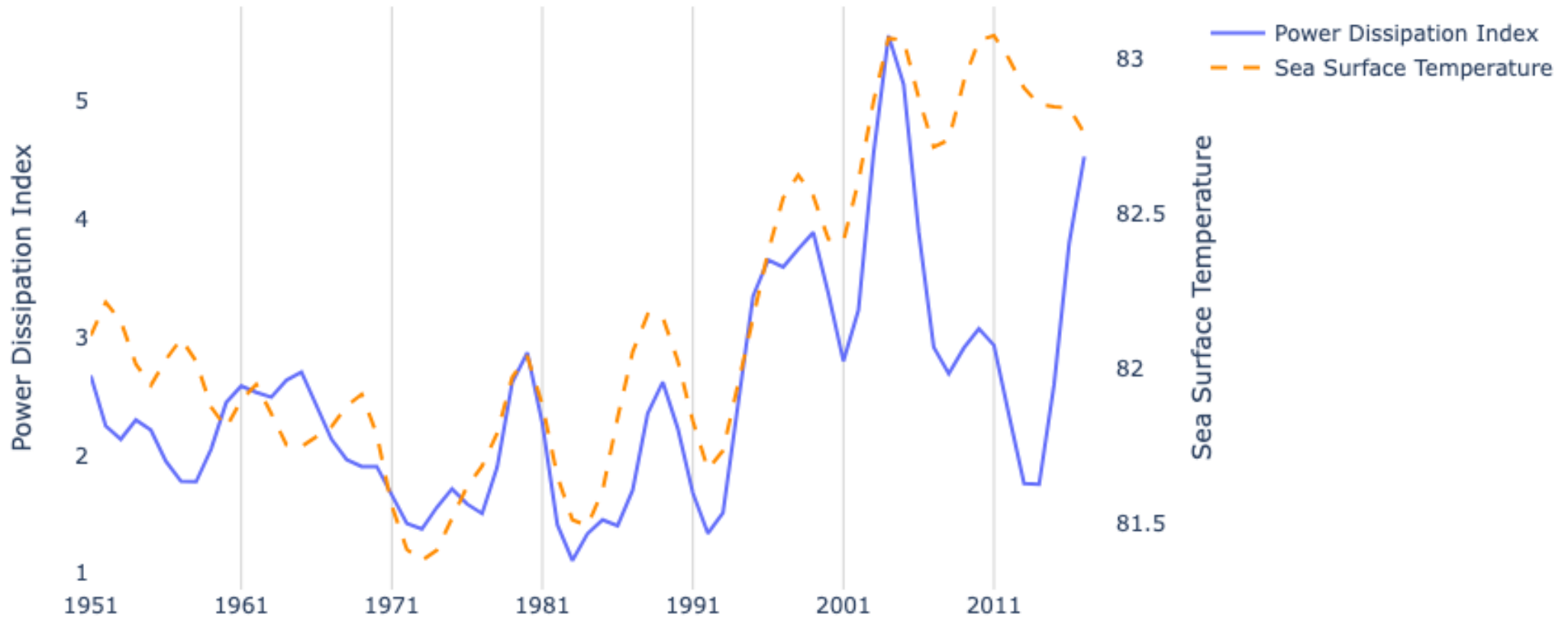


Over the past 75 years, hurricanes have been more frequent. Frequency will be additive characteristic contributing to the PDI and ACE scores.

WHAT IS THE CURRENT TREND FOR POWER DISSIPATION (PDI)?

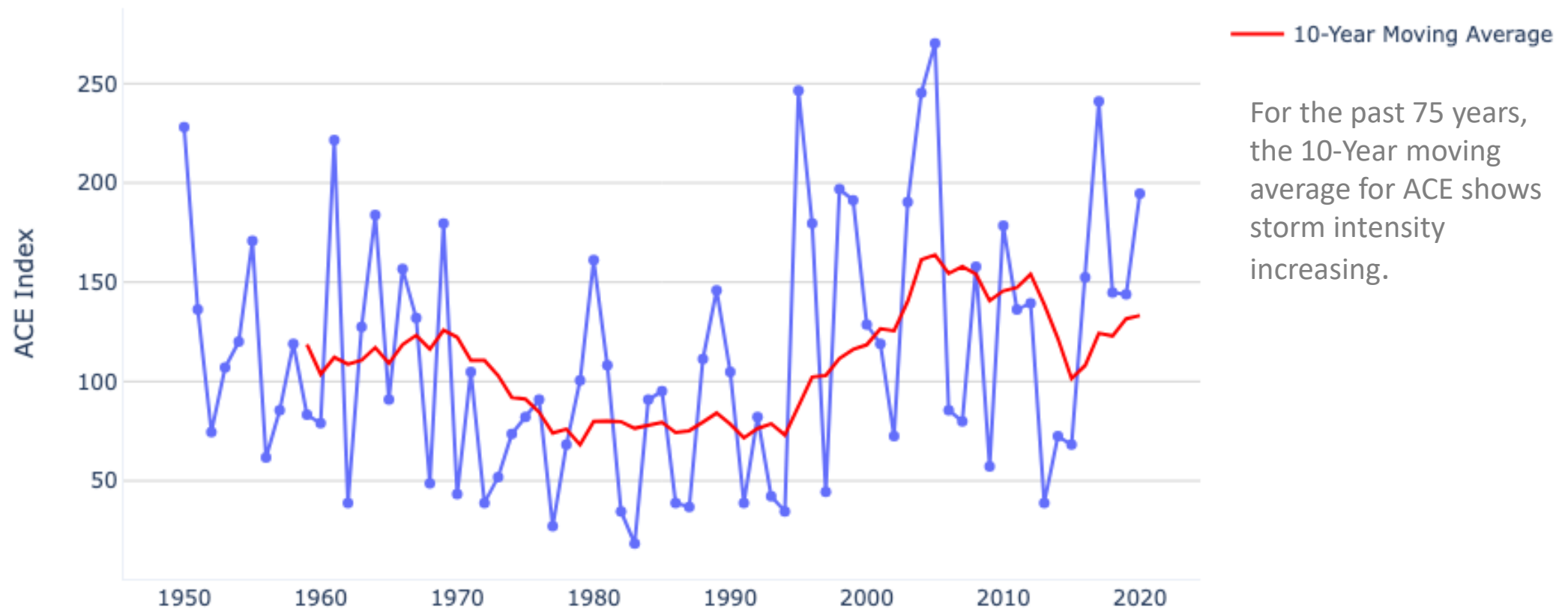
PDI and Sea Surface Temperature Move Together

Over the past 75 years, PDI trend has increased and correlates to the rise in sea surface temperature.



WHAT IS THE CURRENT TREND FOR ACCUMULATED CYCLONE ENERGY (ACE)?

Cyclone Intensity Shows Increasing Trend



SUMMARY

The increasing trend in cyclone intensity, as evidenced by the Atlantic Cyclone Energy (ACE) and Power Dissipation Index (PDI) data, is a clear indication of significant changes in our climate system. This increase in cyclone intensity can be attributed to several key factors:

- **Sea Surface Temperature Rise:** Warmer sea surface temperatures to more intense cyclones.
- **Changes in Wind Shear Patterns:** Changes to wind shear are creating conditions more favorable for intense cyclones.
- **Rising Ocean Heat Content:** Increased ocean heat in powering more powerful cyclones.

CALL TO ACTION

- **Strengthen Policies and Research:** Urge policymakers to create robust climate policies and emphasize the need for continued scientific research to better understand and mitigate cyclone impacts.
- **Community Awareness and Preparedness:** Highlight the importance of educating and equipping communities, especially in high-risk areas, to effectively respond to cyclone threats.
- **Promote Global Collaboration and Sustainable Practices:** Advocate for international cooperation and the adoption of sustainable practices to reduce greenhouse gas emissions.