Analysis of Hurricane Noel 2007

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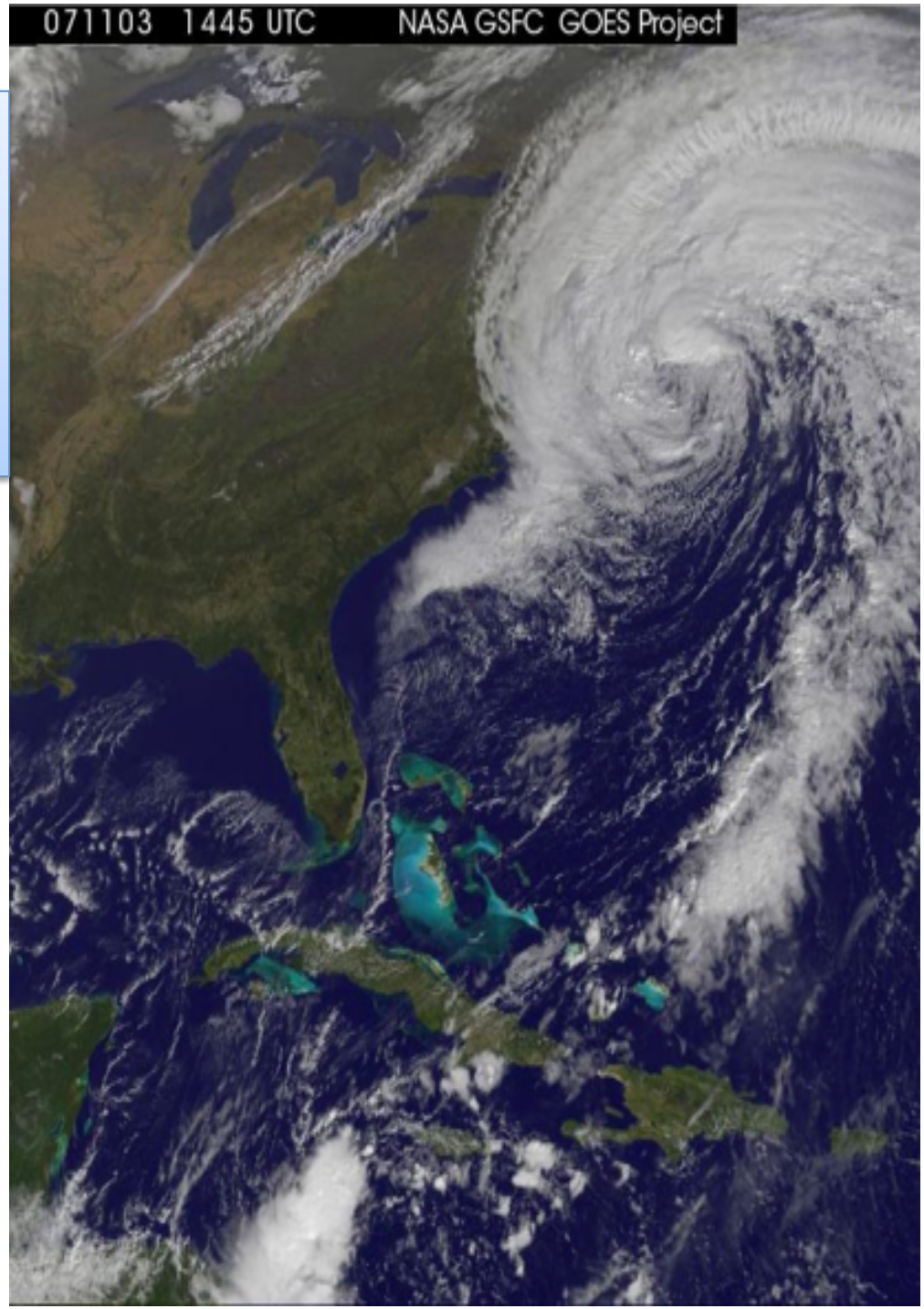
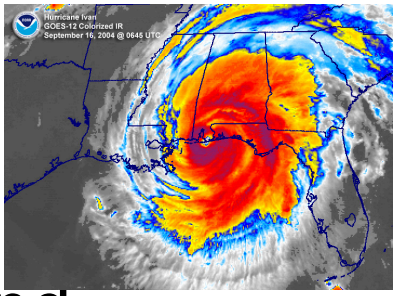


Noel at 10:45 am, 11/3/07
NASA Goddard GOES Project

Introduction



- Tropical Cyclones (TCs) are the costliest and deadliest of all storms. However, there is not much analysis on Extratropical Transitioning Cyclones (ET).
- Post-transition strengthening cyclones undertake a temperature inversion which is hard to forecast. Cooler waters should dissipate the storm but we observe ingredients for cyclogenesis.

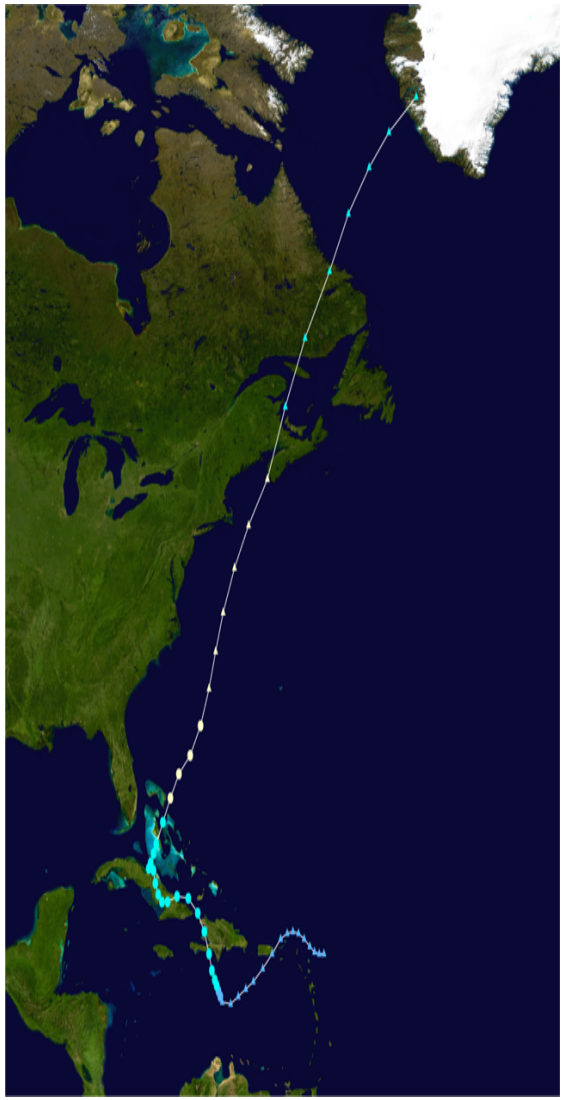
Hurricane Ivan
2004
www.weather.gov

Atlantic City, New Jersey after Hurricane Sandy 2012
www.businessinsider.com

THE NUMERICAL MODEL AND ANALYTICAL DESIGN

- NOAA's ESRL (Earth Systems Research Laboratory) is the simulated model used.
- Analyze Hurricane Noel's atypical characteristics post-transition.
- The 1000mb (surface) geopotential height as well as the 1000mb air temperatures examined

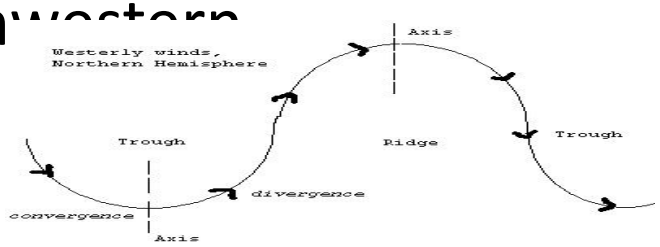
*substantial differences between 1990-2014 in the average temperatures during the most frequent hurricane month.



Hurricane Noel Track - https://en.wikipedia.org/wiki/Hurricane_Noel#/media/File:Noel_2007_track.png

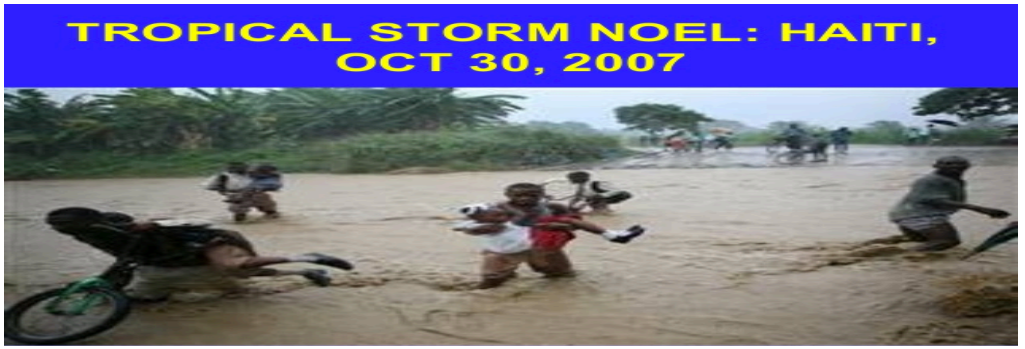
Meteorology Statistics of Storm

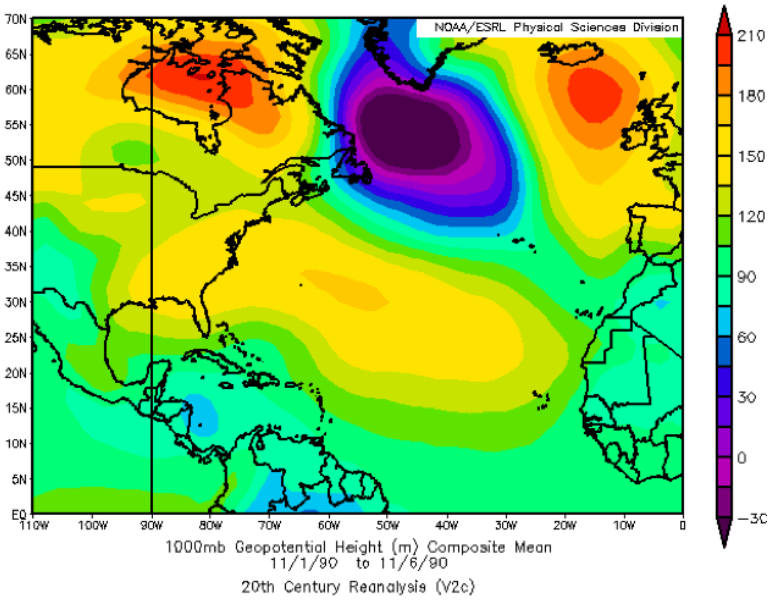
- October 20th - Noel originated as a tropical wave off the coast of Africa and in a week, reached tropical storm stage with winds reaching 34 mph.
- 10/29 – Decreasing vertical wind shear, the storm intensified with 60 mph winds but interaction with the mountainous terrain of Haiti disrupted the storm's development after making landfall near Port-Au-Prince
- 10/31 - 30 hours of moving over Cuba dissipated the storm even more with winds reaching 40 mph.
- 11/1 - Once the storm moved back into Atlantic waters, a mid-latitude trough moving across the Gulf of Mexico created a burst of very deep convection to the northeast of the storm, winds were back to 60 mph while moving across Andros in the northwestern Bahamas.

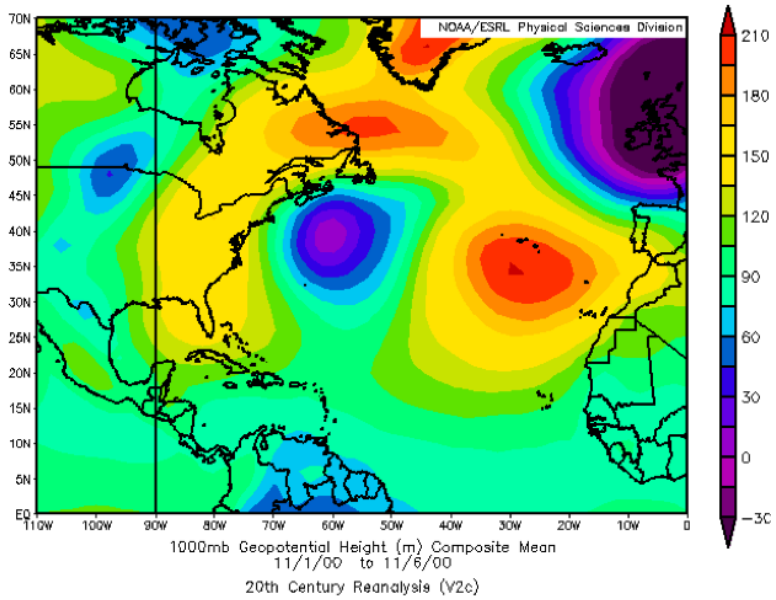


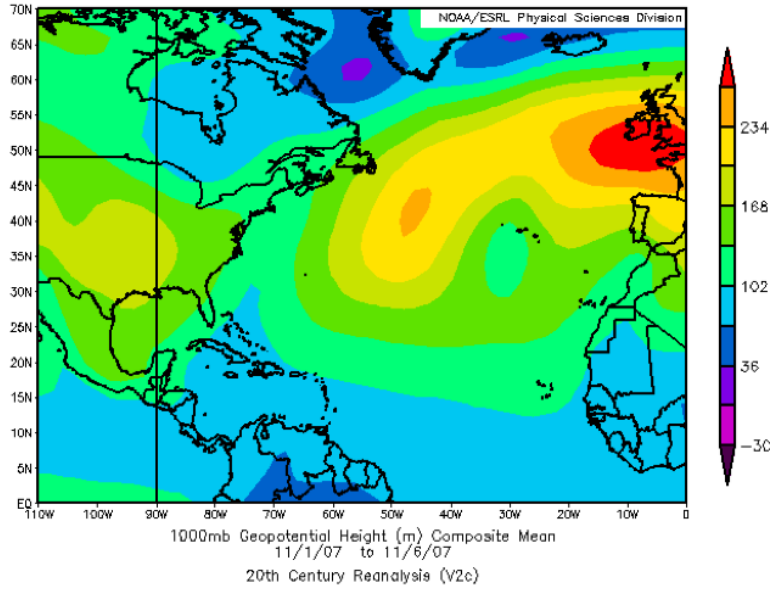
- 11/2 - Noel reached a peak of ~80mph accelerating northeast ahead of the aforementioned mid-latitude trough, reaching hurricane status
- 11/3 - Noel reached extratropical status but continued intensification, reaching winds of 85mph.
- 11/4 - Noel made landfall near Nova Scotia, Canada with winds of 75 mph.
- 11/6 - Noel's extratropical remnants continued moving northeast and merged with a stronger extratropical cyclone over Greenland!

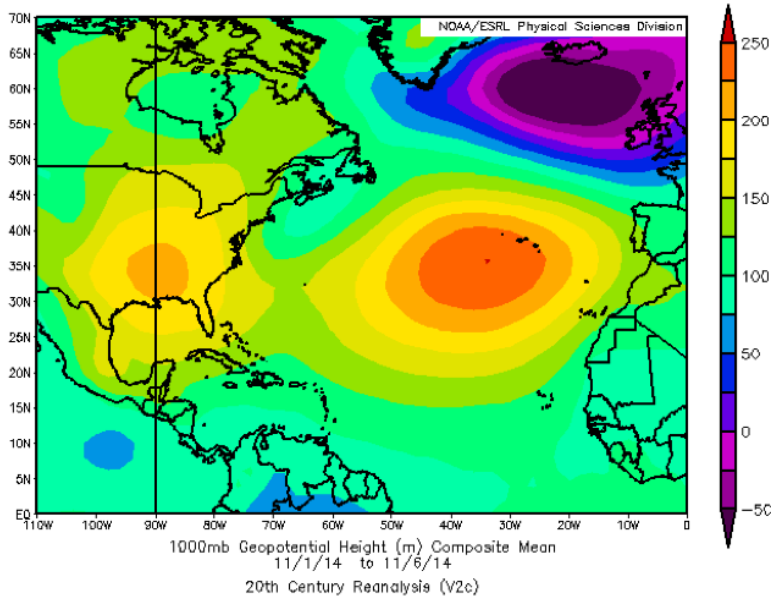
https://results.searchlock.com/search/?q=hurricane%20noel%202007&tbm=isch&sr=sb-serp&slr=1&chnm=js_106



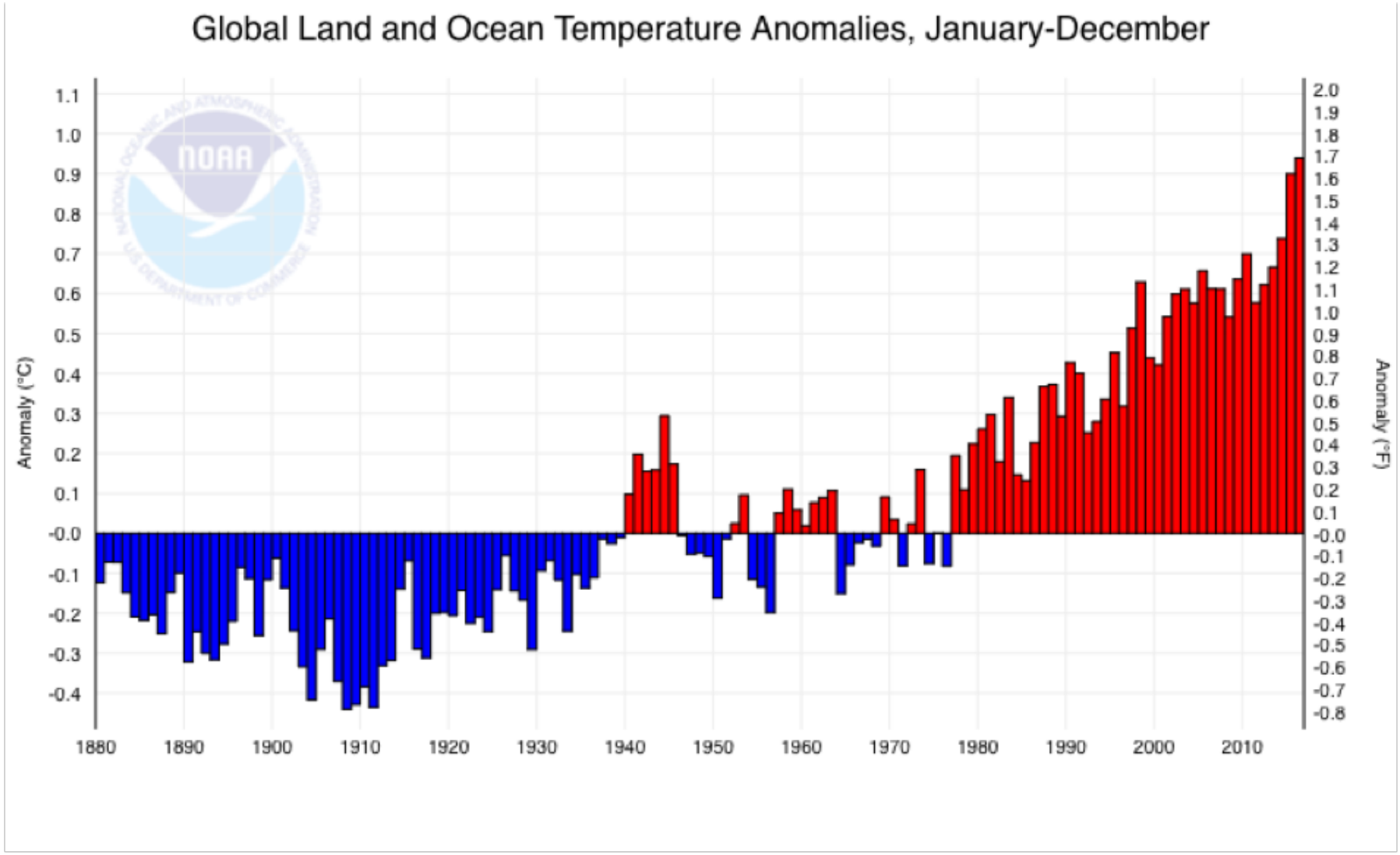




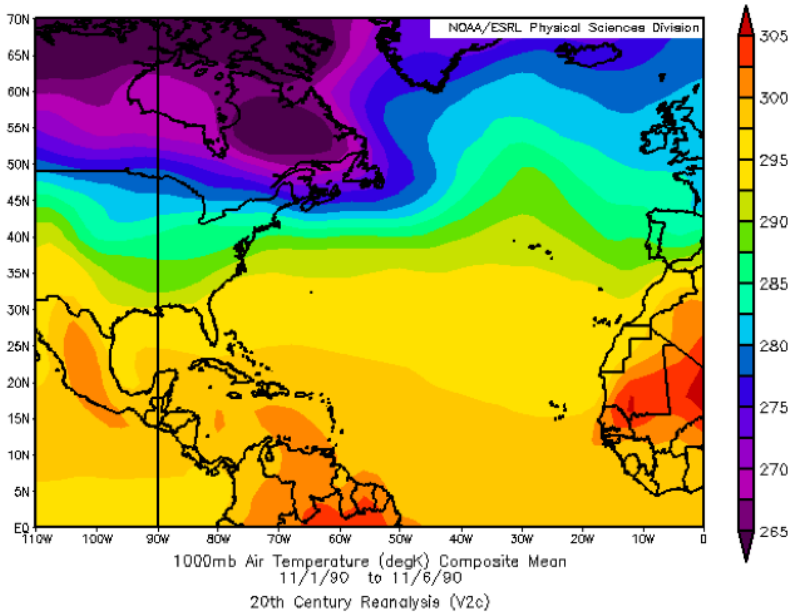


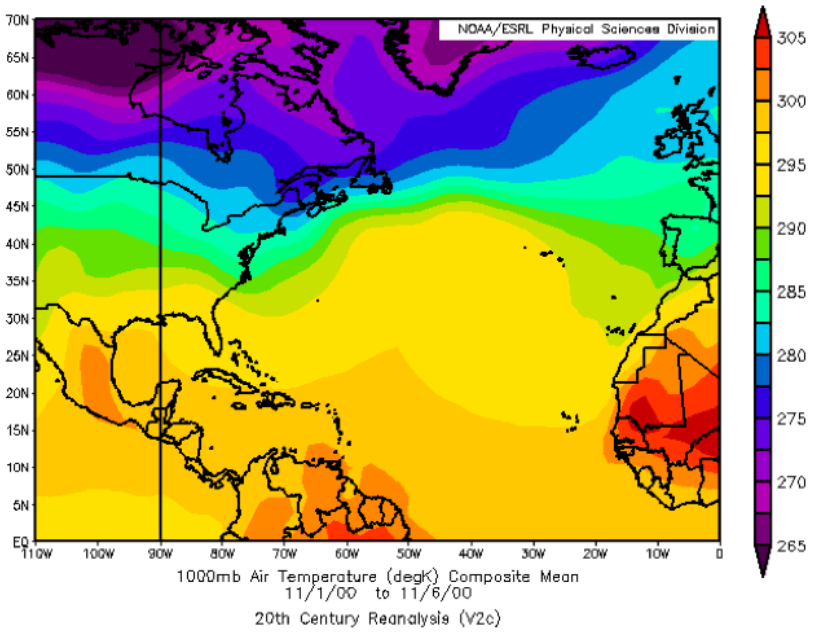


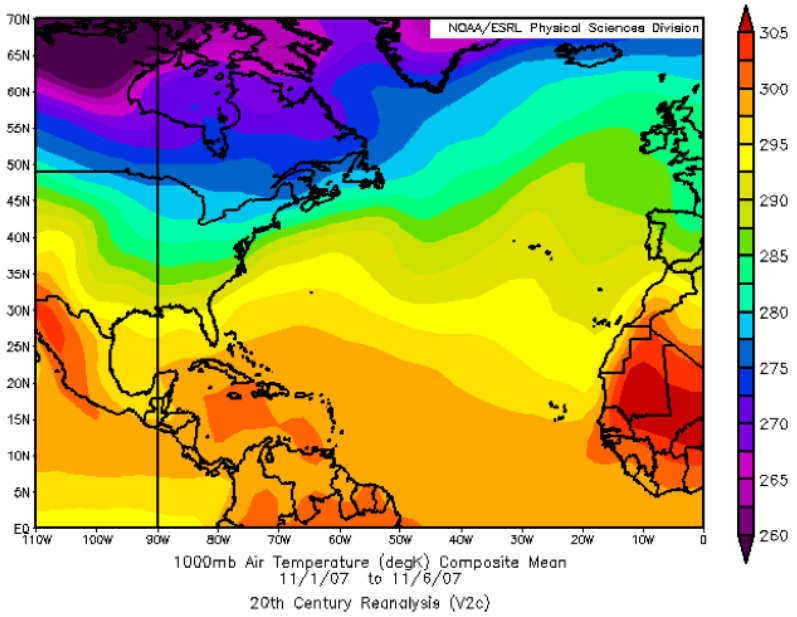
Geopotential Height

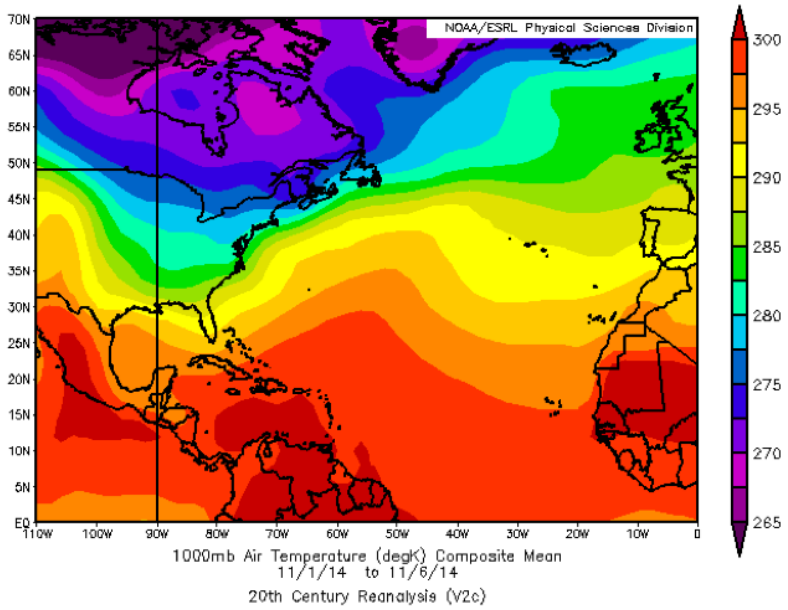


NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, CLIMATE AT A GLANCE: GLOBAL TIME SERIES, PUBLISHED SEPTEMBER 2017, RETRIEVED ON OCTOBER 3, 2017 FROM HTTP://WWW.NCDC.NOAA.GOV/CAG/





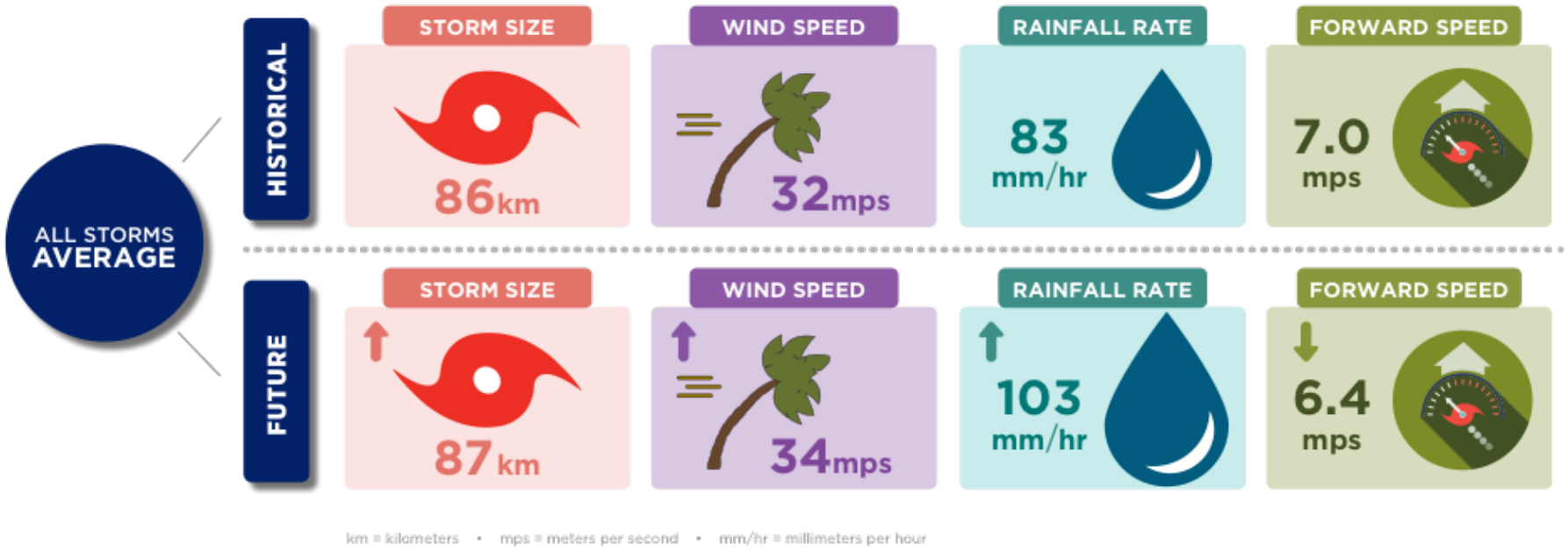


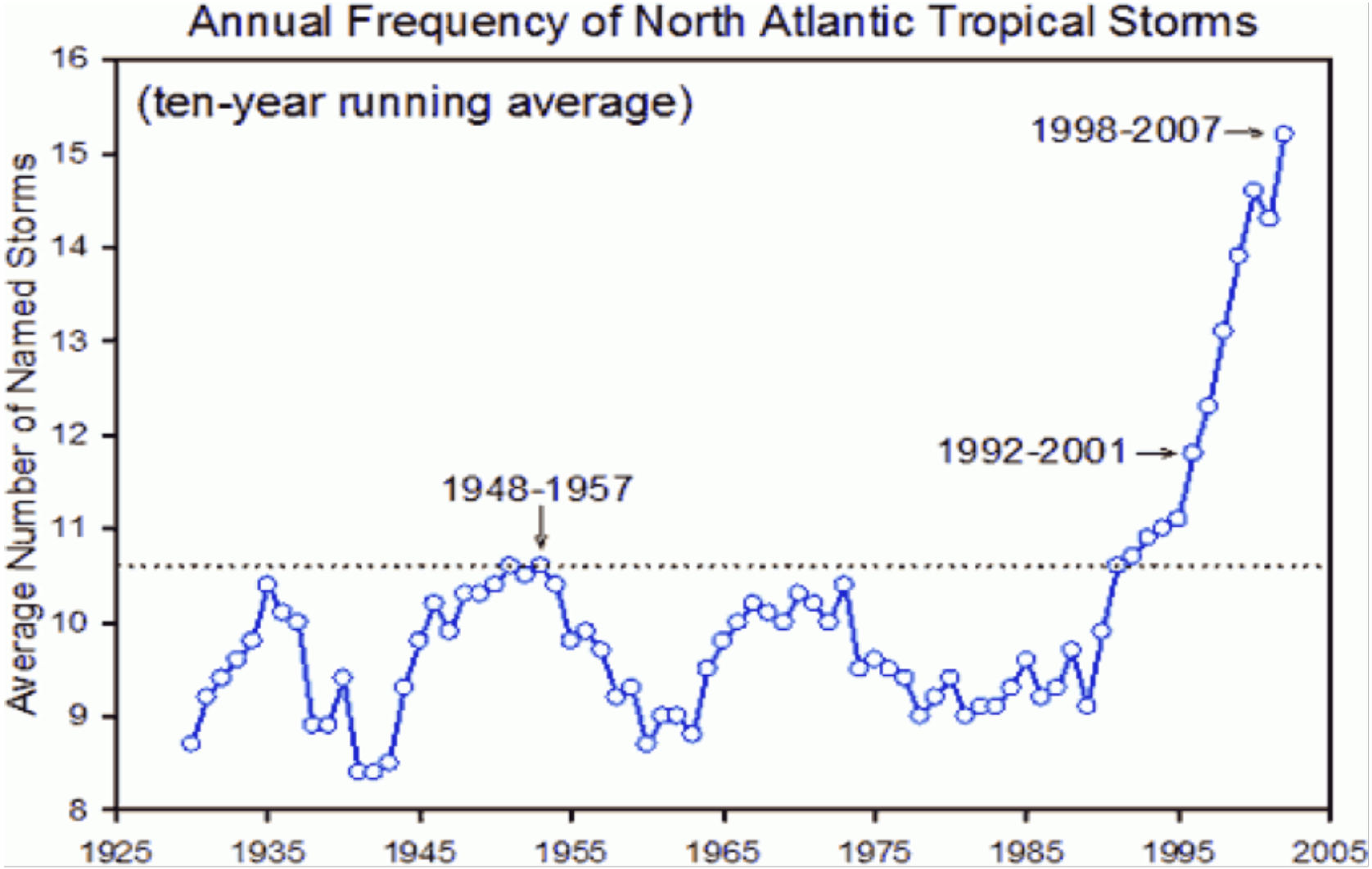


Air Temperature

HURRICANES IN THE FUTURE: A BIT STRONGER, A BIT SLOWER, AND A LOT WETTER IN A WARMER CLIMATE

- NCAR Colorado - 22 named storms were studied to examine how these storms change in a climate simulated closer to the end of this century.





https://skepticalscience.com/hurricanes-global-warming.htm

Summary & Conclusions

- Noel impacted Puerto Rico, Hispaniola, Dominican Republic, Jamaica, Cuba, Bahamas, Florida, Eastern Seaboard, and even Atlantic Canada.
- The highest winds were 80 mph during hurricane status but 85mph during extratropical phase.
- The lowest pressure recorded was 980mb but 965mb during extratropical phase.
- Noel reported 163 direct deaths as well as 6 indirect.
- Damages totaled $580,000,000 (2007 US Dollars)
- Extratropical Cyclones are some of the hardest storms to predict.

MIKE THEISS/SCIENCE PHOTO LIBRARY
This was a category 1 hurricane that struck the coast of New England on 11/3/2007. Photographed in Nova Scotia, Canada, on 11/4/2007

ACKNOWLEDGMENTS

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