



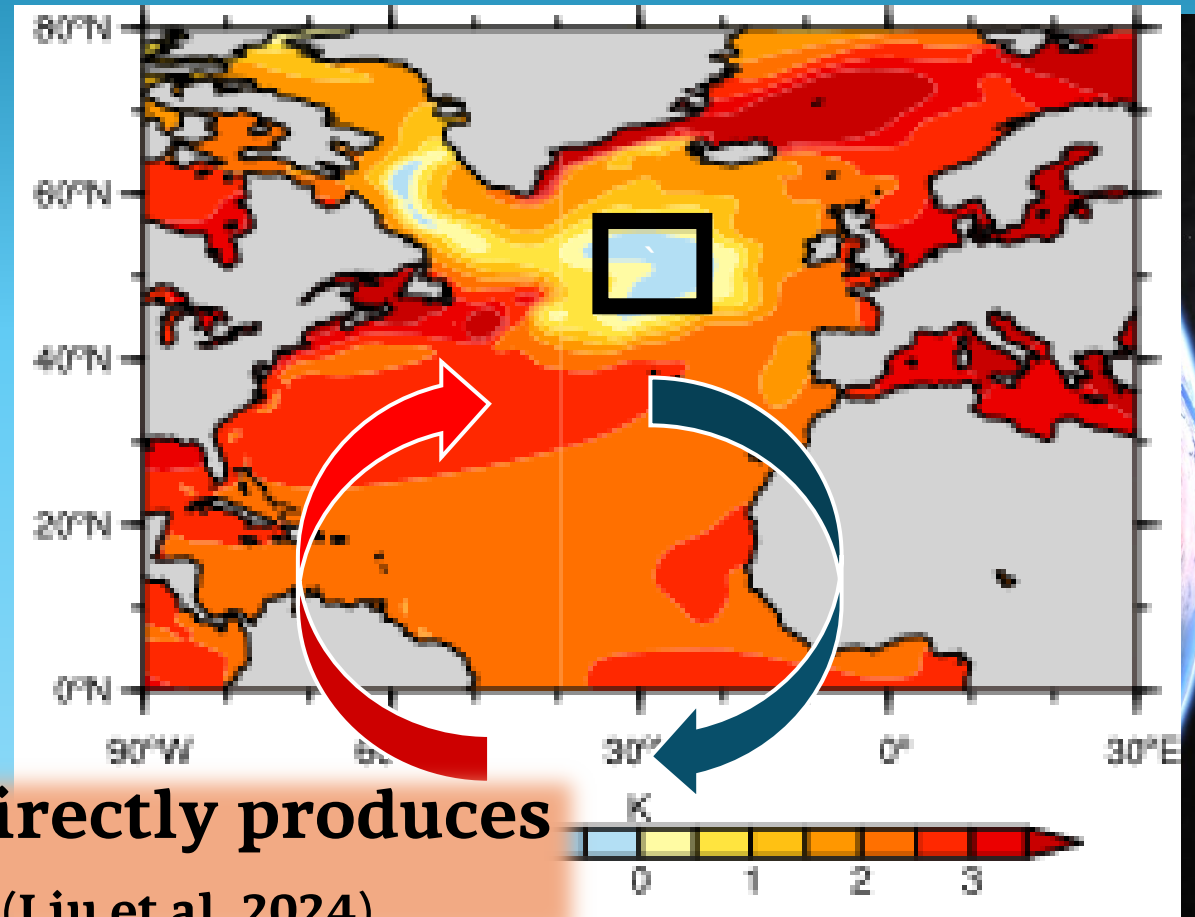
Calculating the Relationship Between Extreme Weather Conditions and Climate Modes Across the North Atlantic Ocean

Presented by: Tyrell Cooper
Advised by: Dr. Meagen Pollock

Global Significance of the North Atlantic Ocean

- [Atlantic] Meridional Overturning Circulation
- Deep water formation **drives** global ocean currents
- Climate change **reduces** circulatory strength

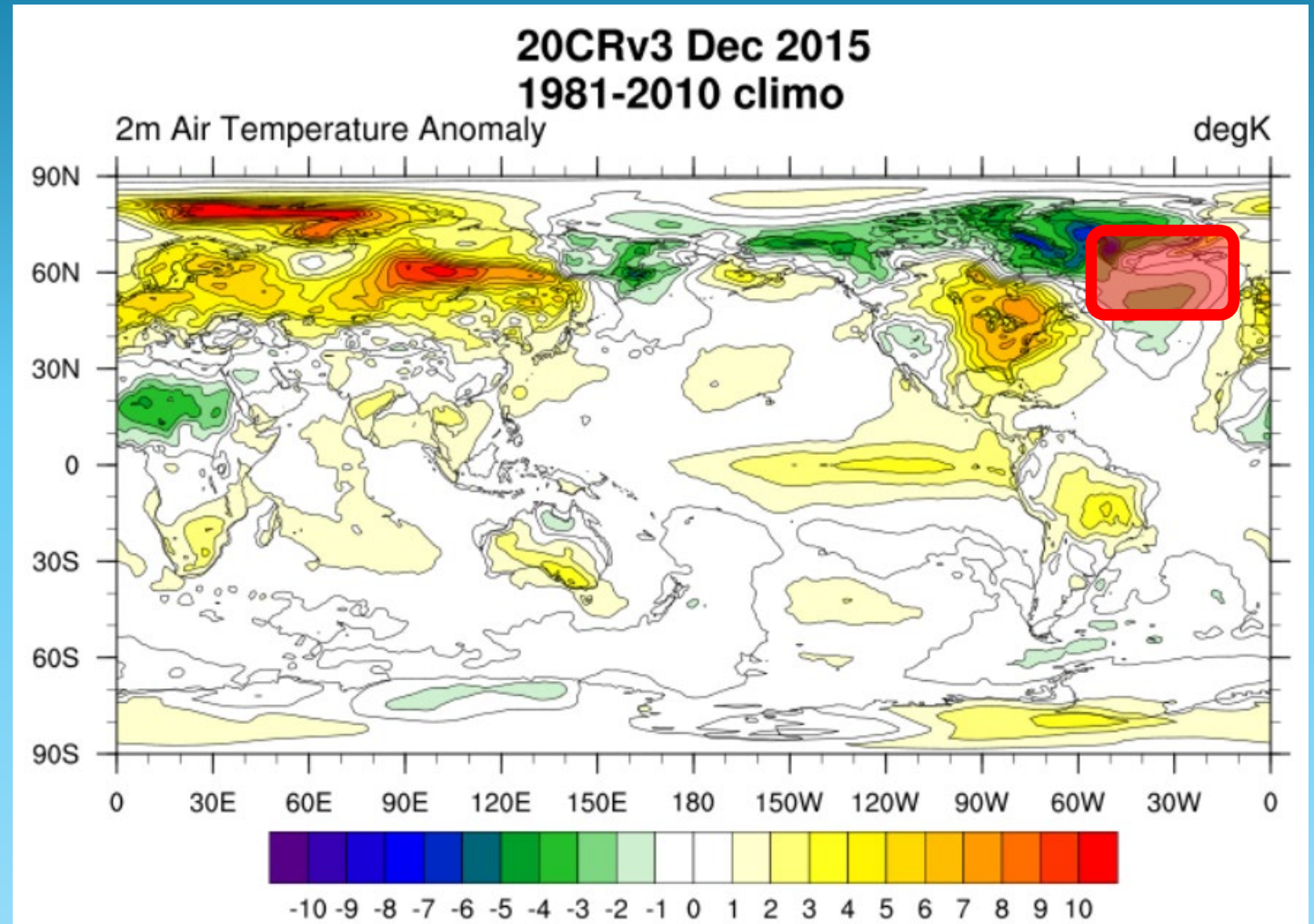
❖ Weakened AMOC strength directly produces anomalous regional cooling (Liu et al. 2024)



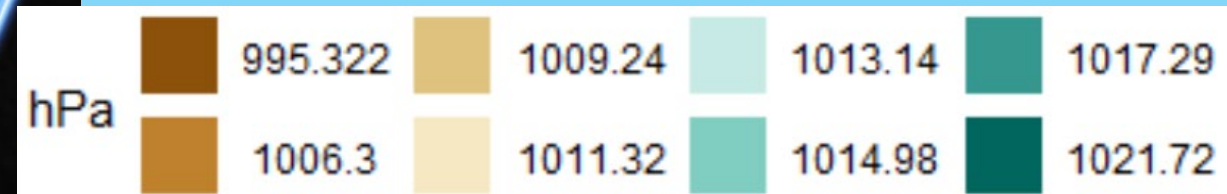
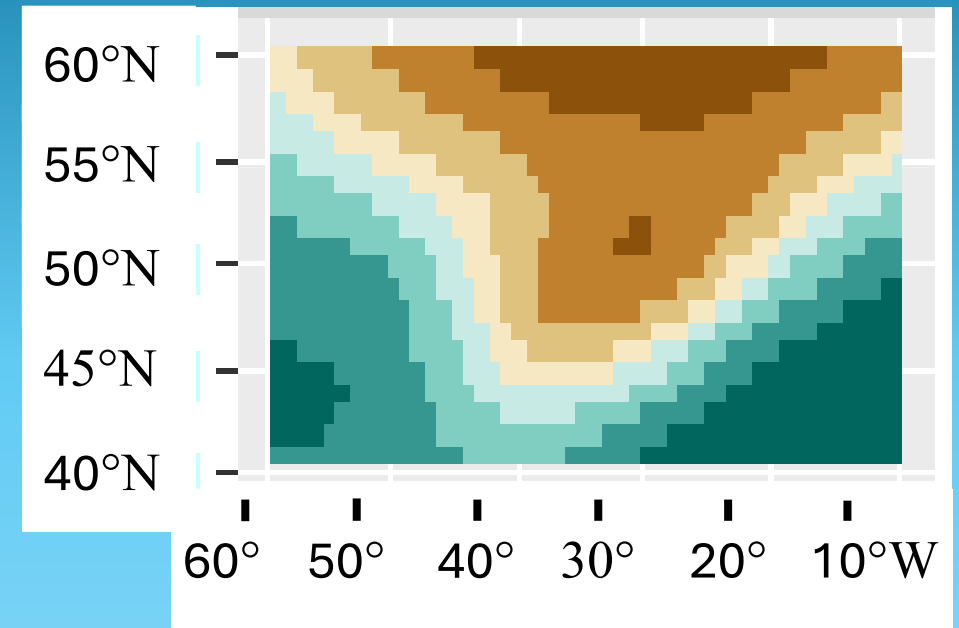
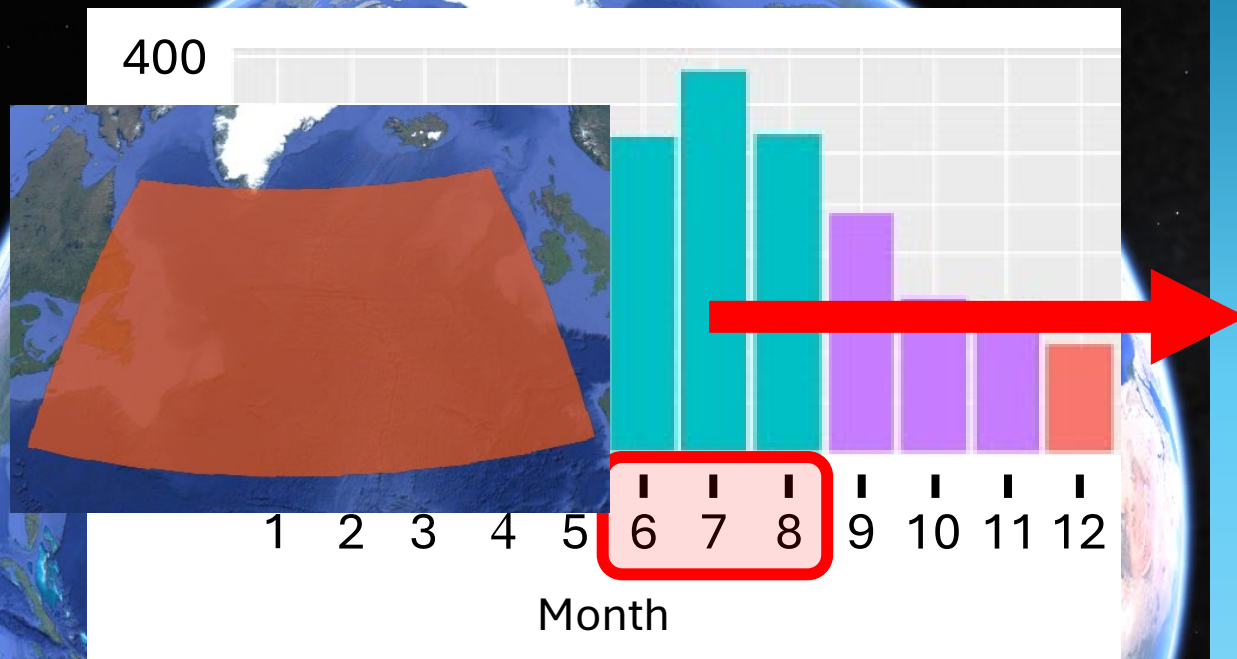
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Image IBCAO
Image U.S. Geological Survey

Finding Appropriate Data Can Be Tough

- Data sets used:
NOAA/CIRES/DOE 20th Century Reanalysis (V3)
- Made with **historical** observed data and **strengthened** with computer models



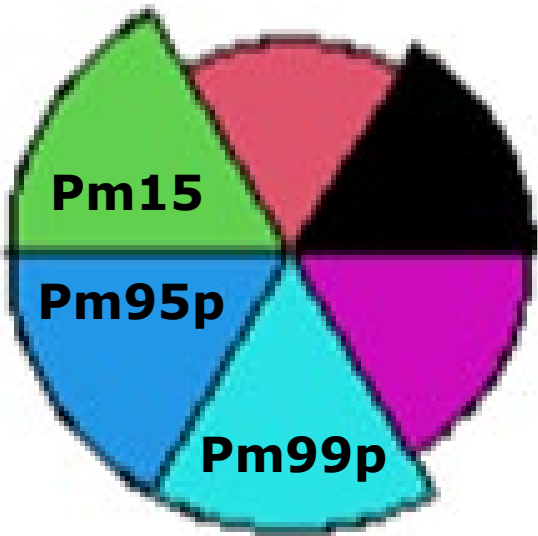
Identification of Historical Patterns



Atmospheric pressure patterns have **distinct** temporal (time) and spatial (distance) **occurrences**

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Image IBCAO
Image U.S. Geological Survey

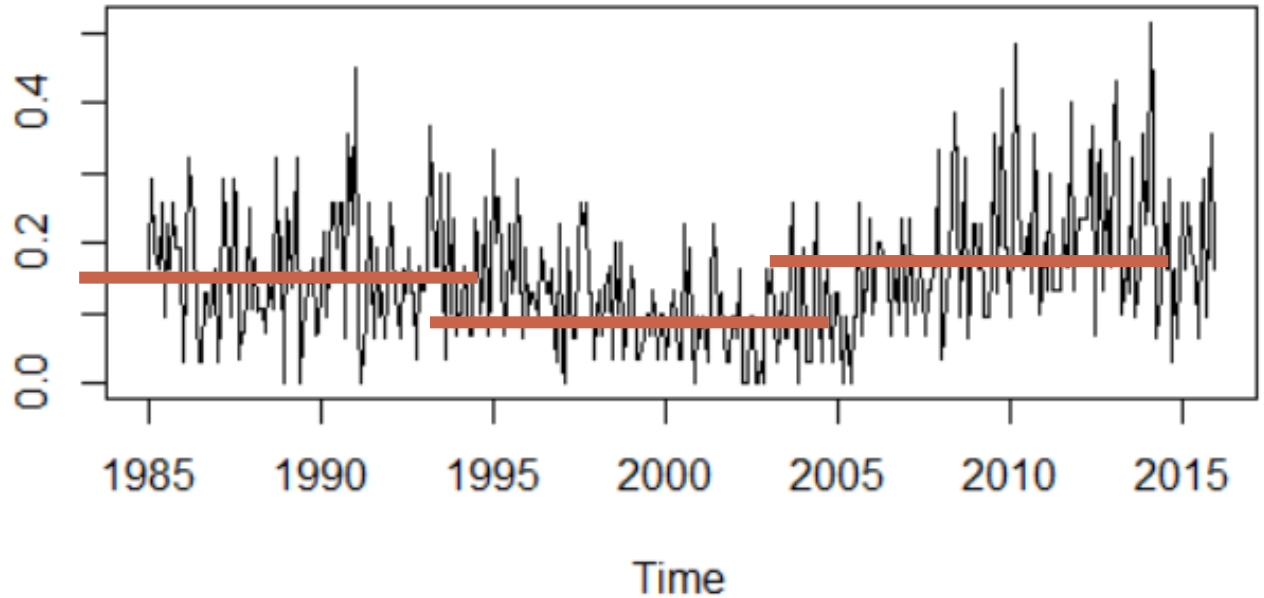
Trends are Found in Extreme Weather Conditions



Index Na

Icing Day

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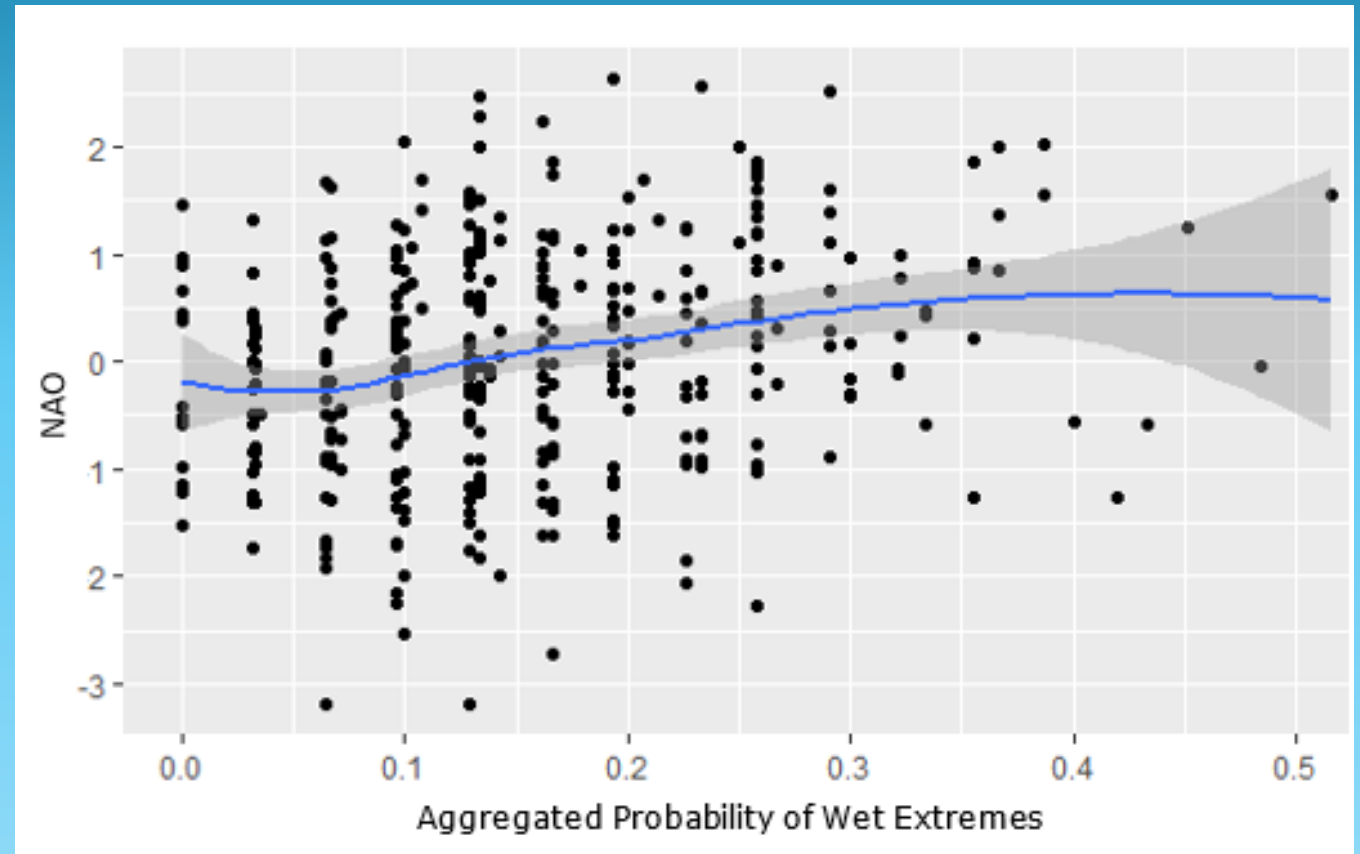
high

little

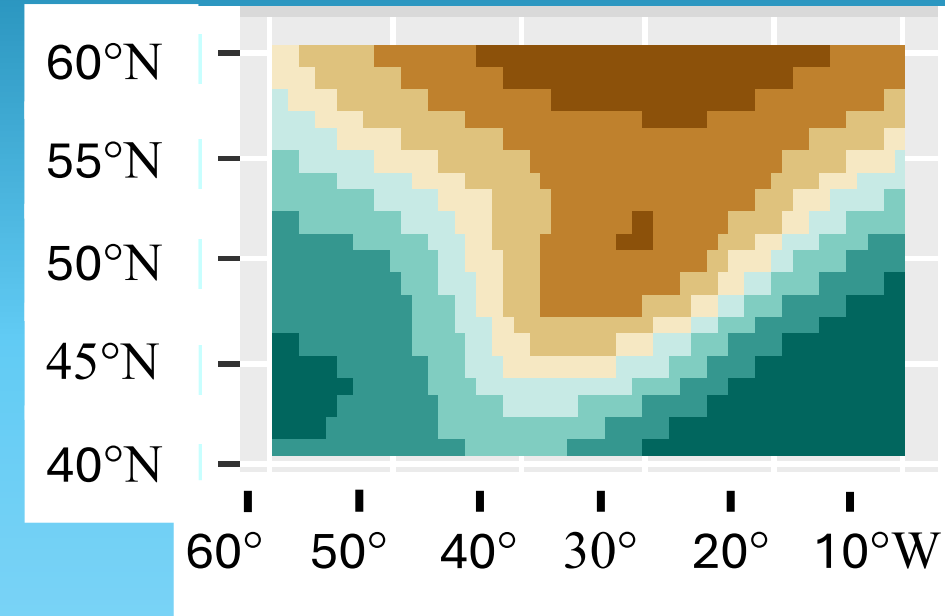
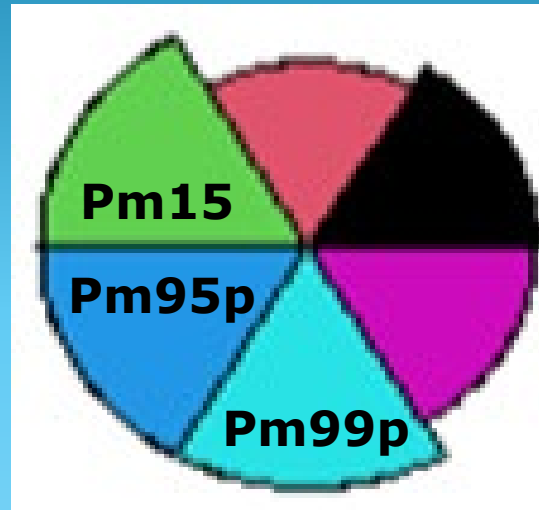
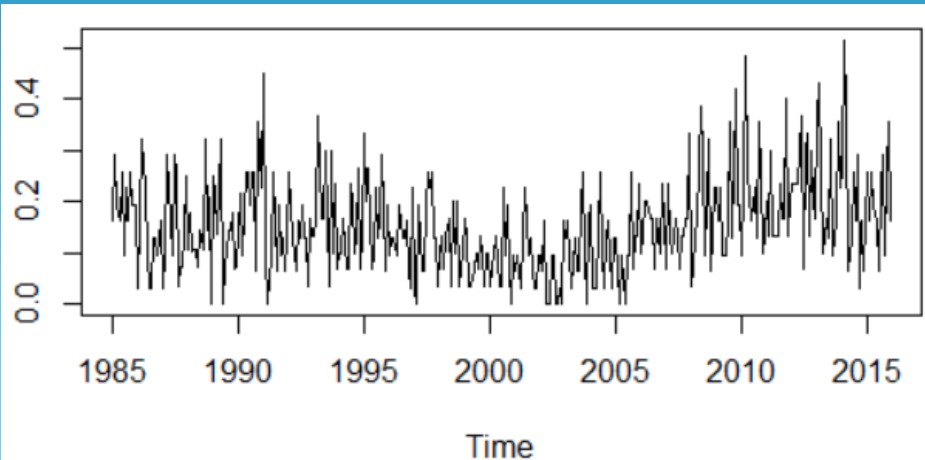
- Increased probability of higher-than-average precipitation events in recent decades
- Precipitation (Duration)
- entile for the year
- t of events when mean
- precipitation is less than 0mm
- least 5 days

Significance of a Pressure System

- The region's leading climate mode is North Atlantic Oscillation (NAO)
- **High correlation** is found between the NAO and temperature and rainfall patterns



Making Useful Interpretations



In conclusion, there is an **increased likelihood** for events of **high precipitation** to occur during **summer months** across the North Atlantic Ocean when there's a strong **northward low-pressure system**.

Thank You for Attending

- Shout-out to my advisor Dr. Pollock and the rest of the Earth Sciences Department for their continued support and encouragement.
- Greatly appreciate Dr. Dong Liang at the University of Maryland for the code support.

Any Questions or Comments?

