

Is the weather getting weirder?

A physical and statistical study of trends in weather variability



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Motivation

Extreme weather swings are driving New Yorkers nuts



Motivation

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- As the Earth continues to warm overall, changes in the Earth's climate are being observed
 - extreme weather events, such as heat waves and heavy precipitation events

How extreme are these events and are they occurring more frequently today than in the past?

Objective

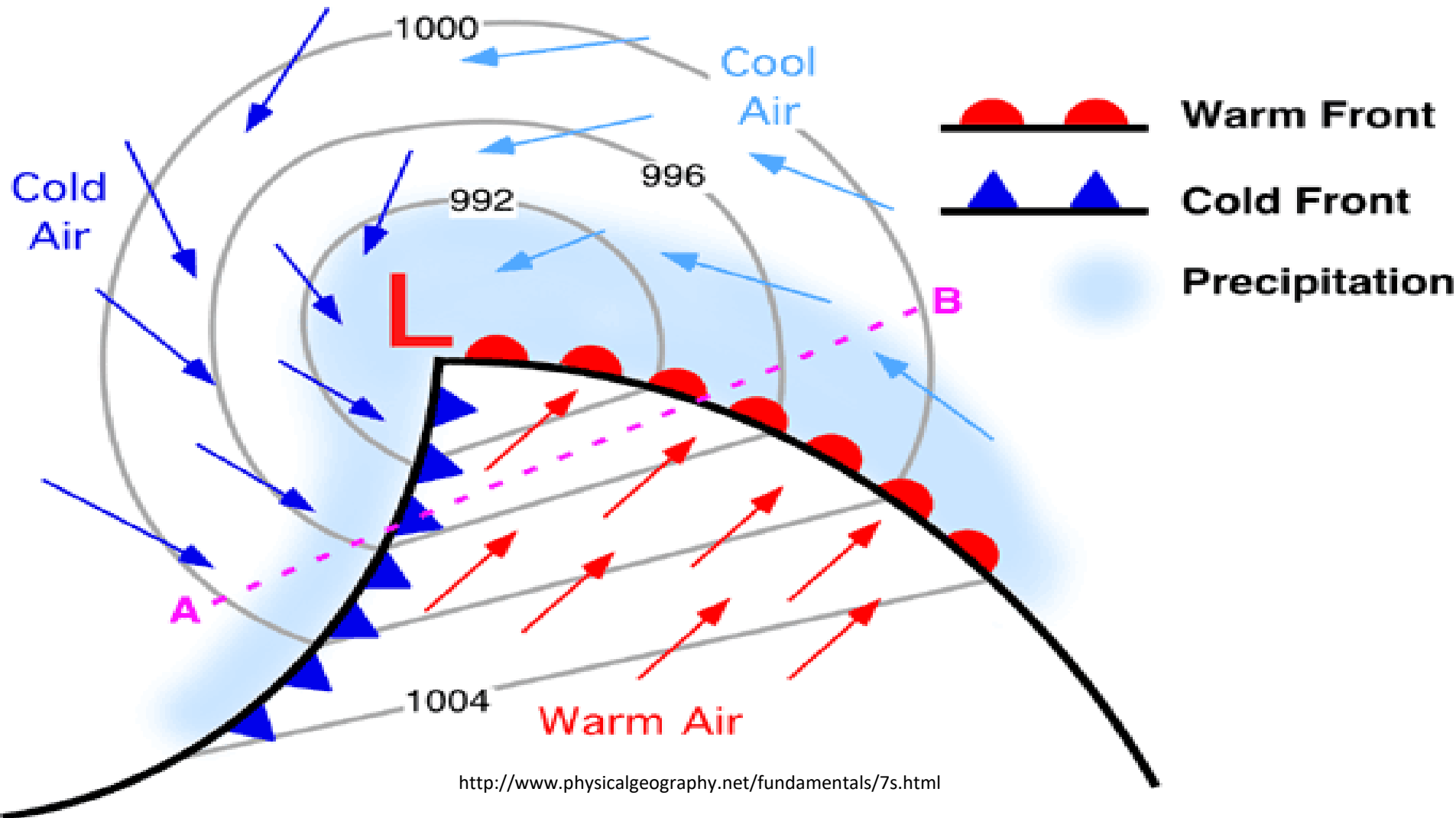
- Examine the annual cycle of temperature and precipitation as well as their associated extremes in the greater NYC region
 - Relationship between temperature fluctuations and precipitation
- Learn some coding techniques (MATLAB)
- Understand statistics and atmospheric physics

Methods

- Precipitation and temperature observations are obtained from weather stations
- Using MATLAB, write computer code to analyze time series data
 - Create climatology of temperature and precipitation
 - Calculate day-to-day temperature fluctuations
 - Determine if significant temperature variations are related to precipitation events associated with extratropical cyclones

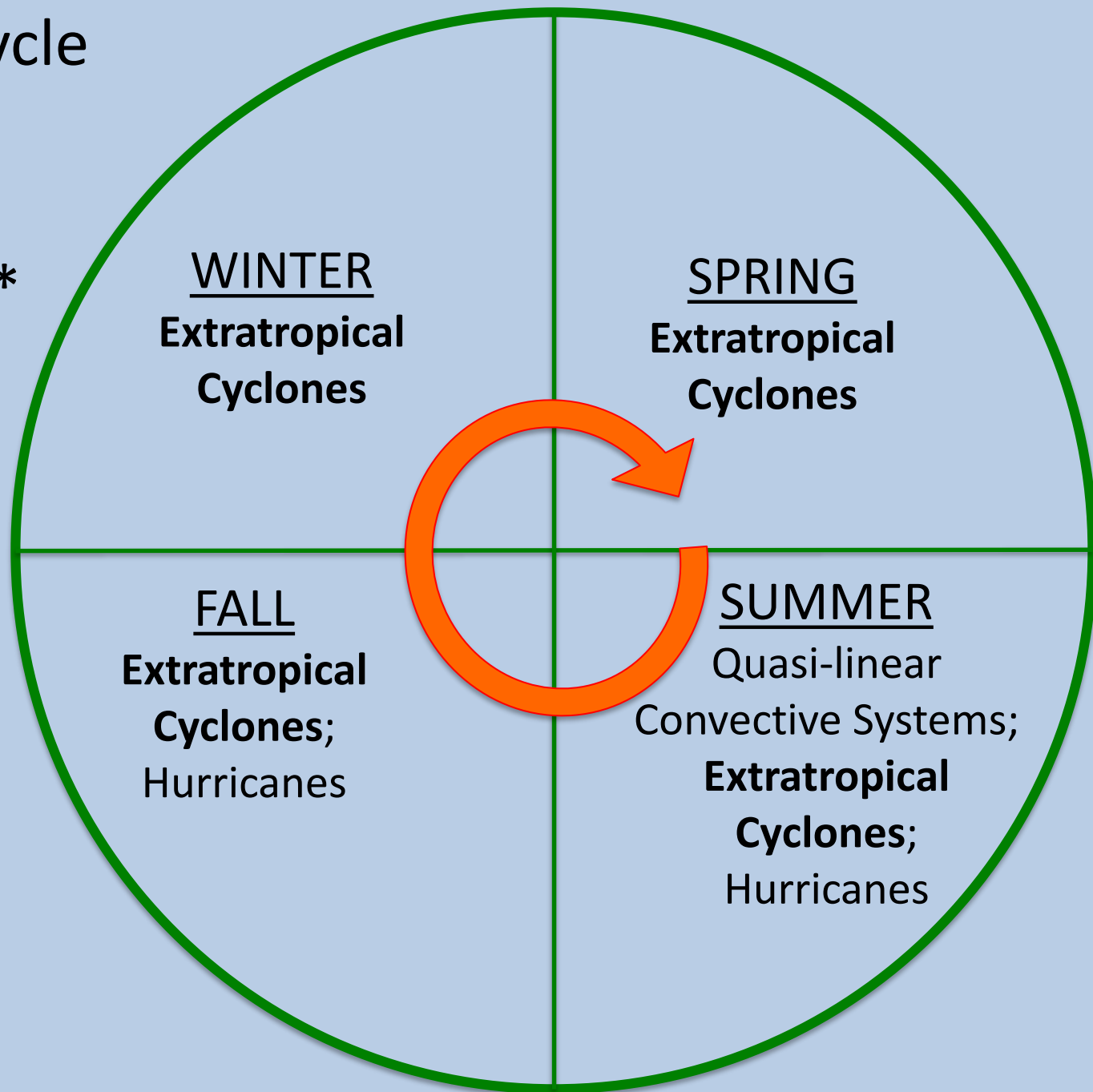


EXTRATROPICAL CYCLONES



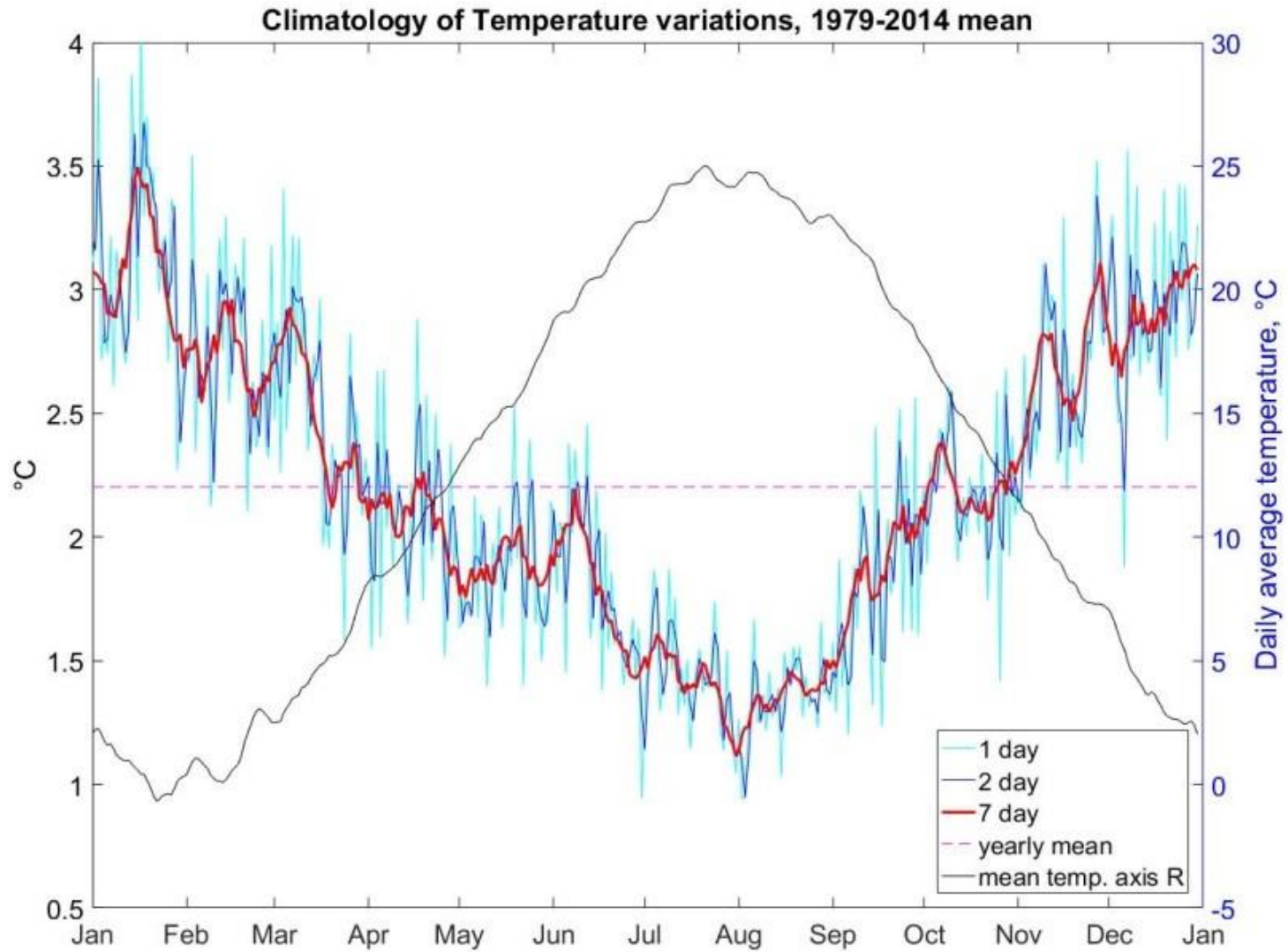
What generates the precipitation: **equator to poleward temperature difference**

The annual cycle
for NYC
Weather
Disturbances*



*not including heat waves

TEMPERATURE VARIATIONS



Clyde Thomson

Largest day-to-day temperature variations found to occur during winter

Summary

Research questions:

- (1) How are day-to-day temperature variations and precipitation events related?**
- (2) Are these types of extreme events occurring more frequently today than in the past?**

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