



# North Carolina's Climate: *Risks to Public Health*

**Ryan Boyles**  
**Climate & Public Health in North Carolina**  
**August 19, 2011**

# About the State Climate Office

- Public Service Center at NCSU
- Statewide public resource for weather and climate information and services
  - Research on NC weather and climate
  - Extension of research to community applications
  - Outreach, Education
- Focus on service to the state

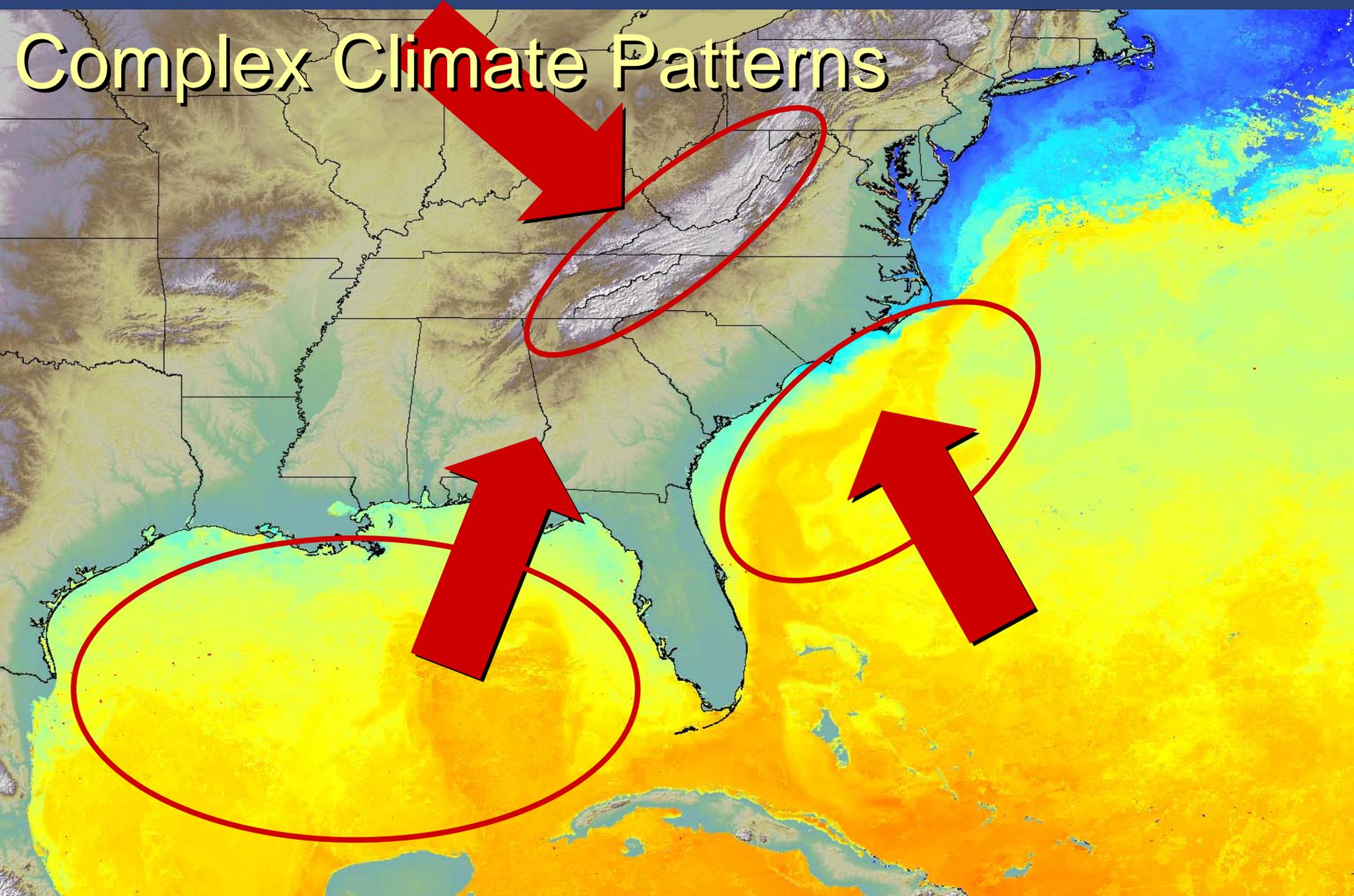


# Challenging Climate of NC

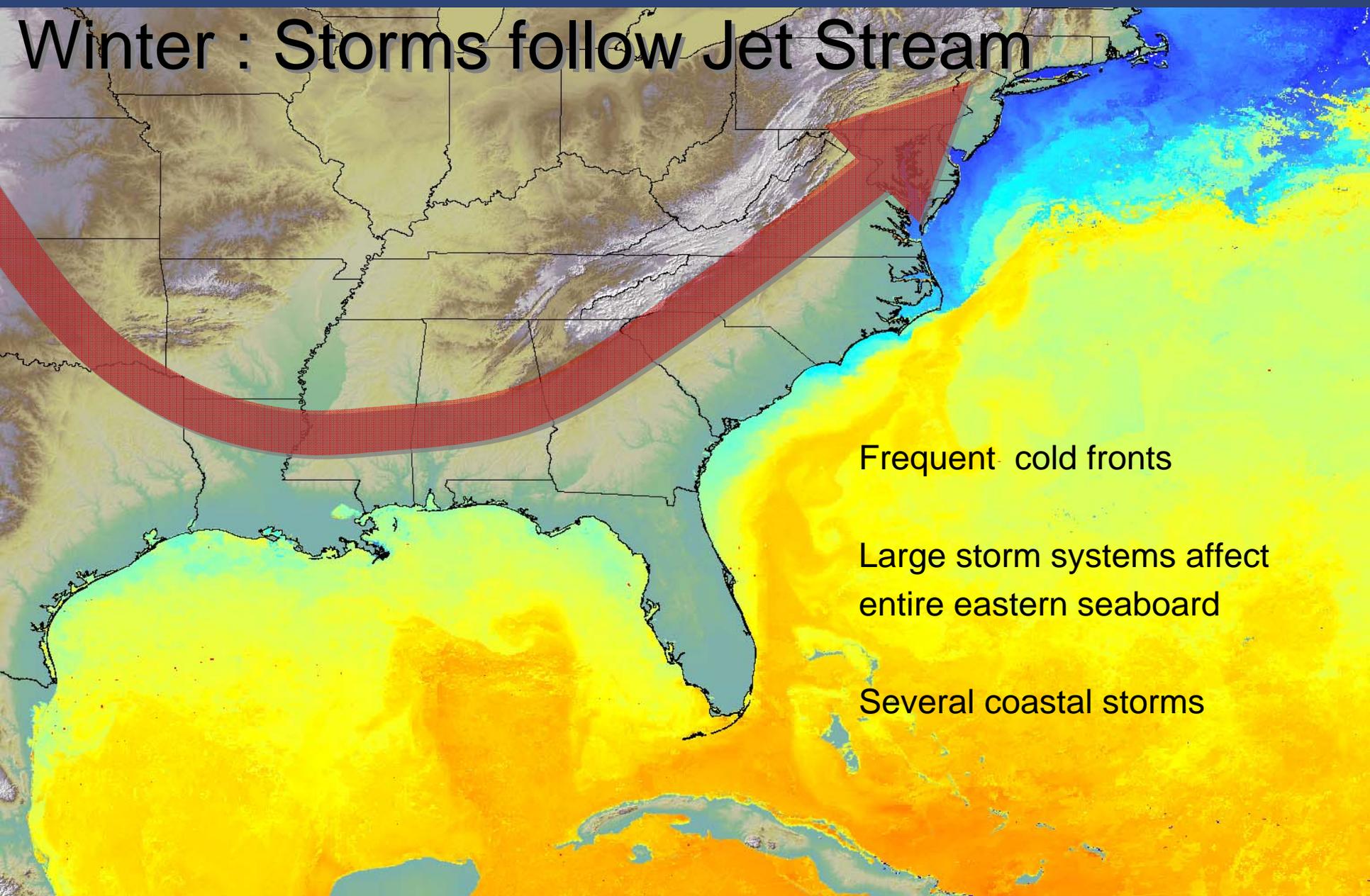
- Most complex climate in eastern US:
  1. Location: Latitude
  2. Location: Topography
  3. Location: Proximity to warm water
- Background signal for all our extreme weather



# Complex Climate Patterns



# Winter : Storms follow Jet Stream

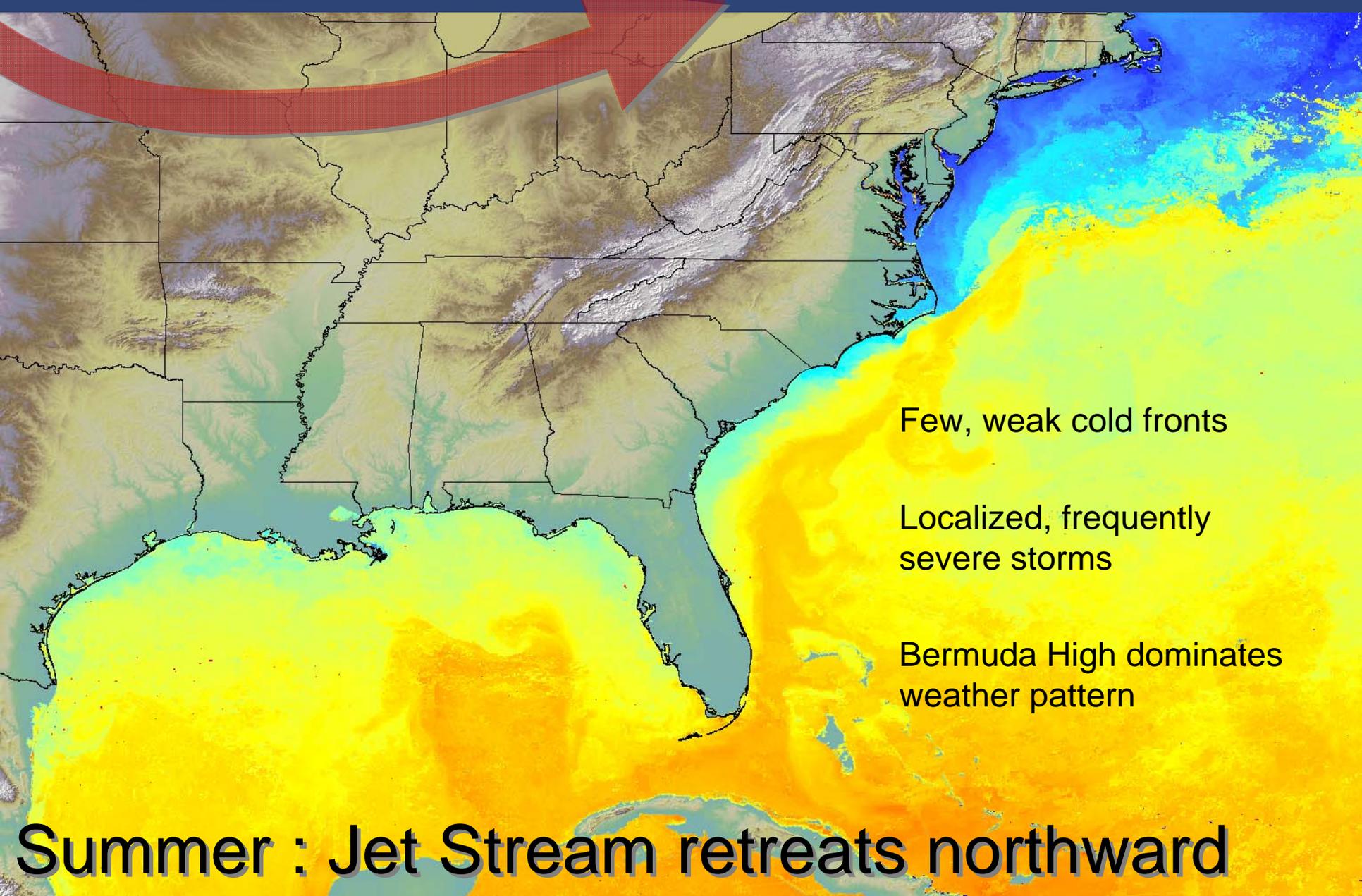


Frequent cold fronts

Large storm systems affect entire eastern seaboard

Several coastal storms

STATE CLIMATE OFFICE OF NORTH CAROLINA



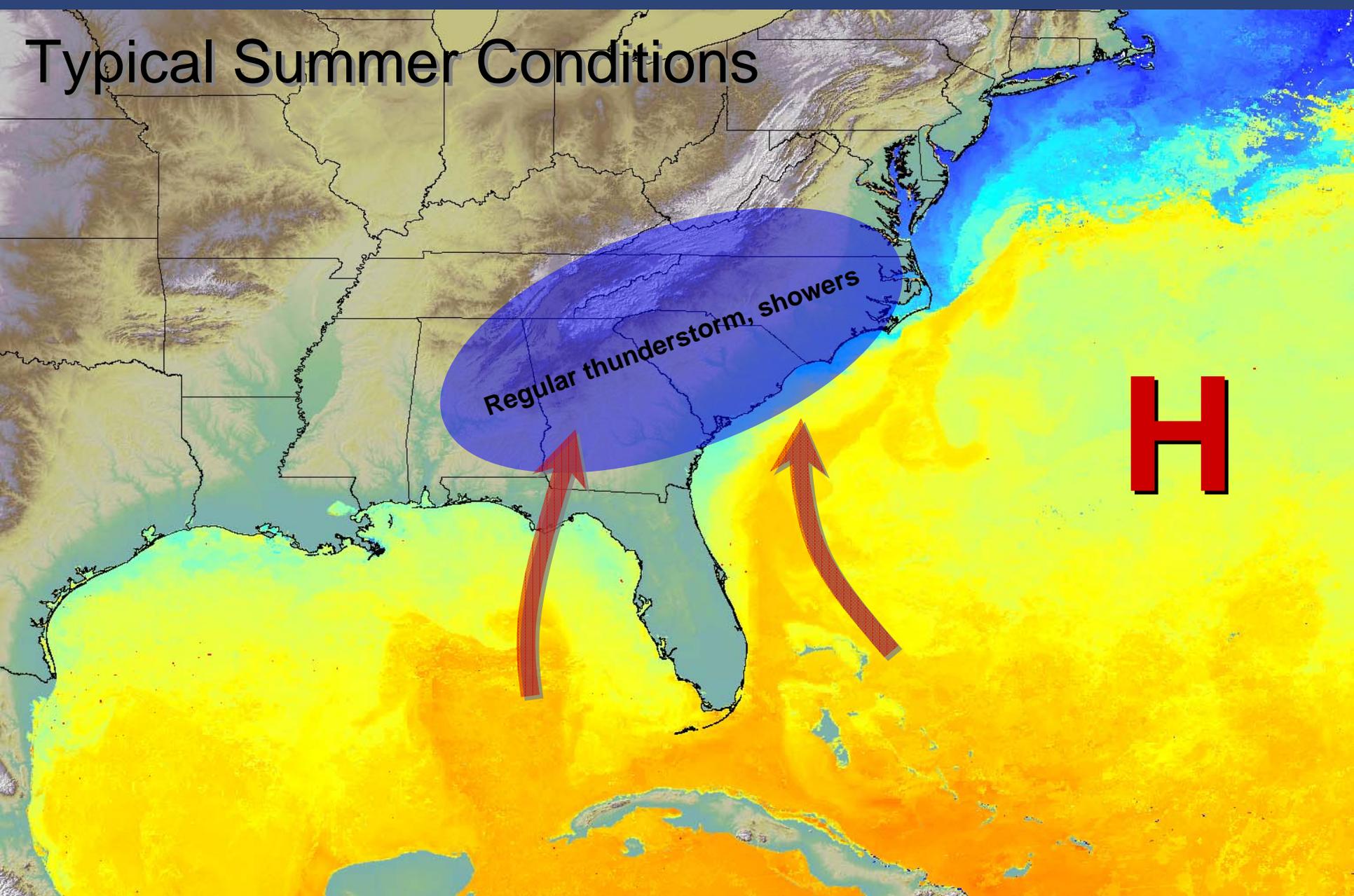
Few, weak cold fronts

Localized, frequently severe storms

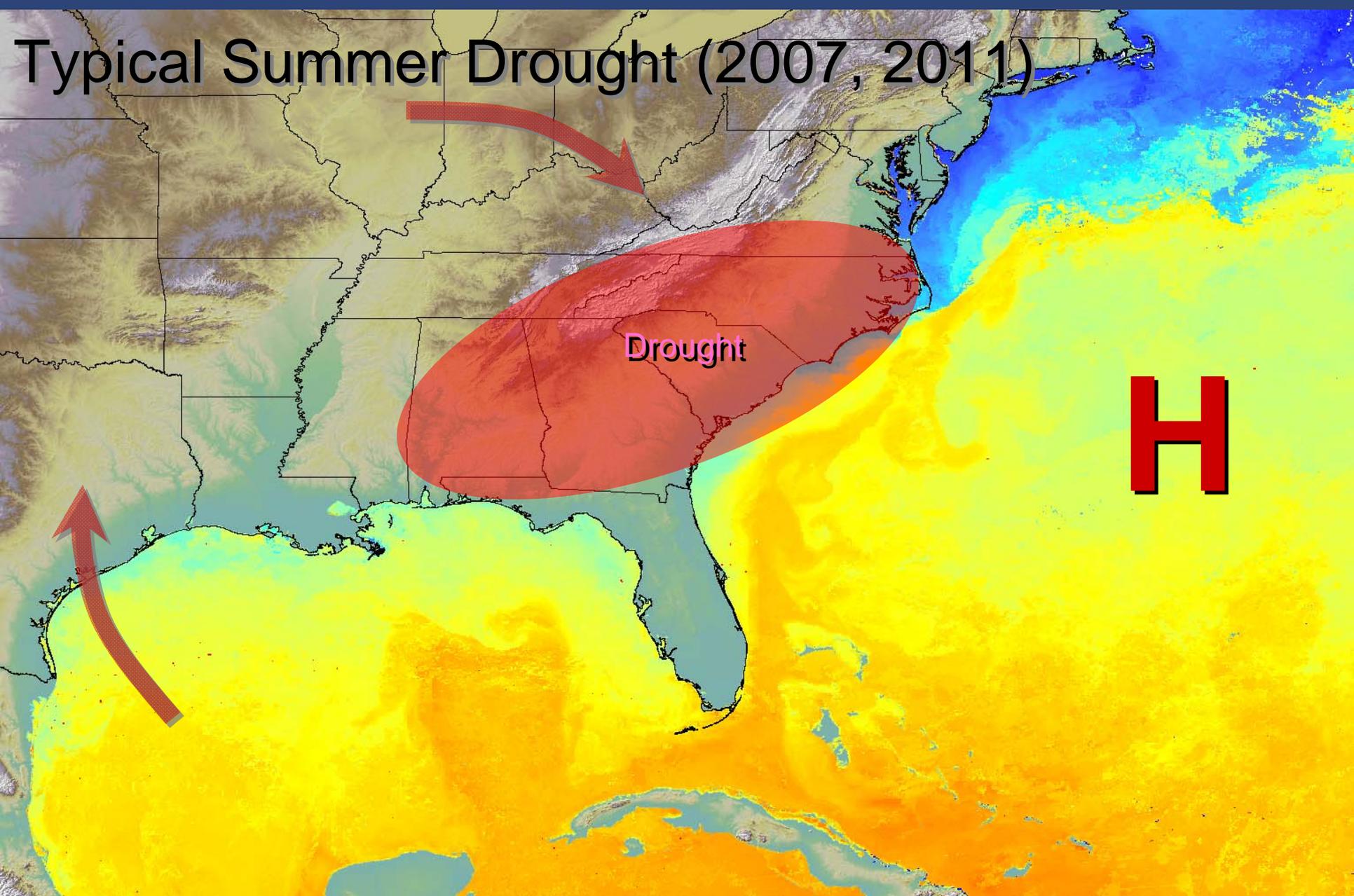
Bermuda High dominates weather pattern

Summer : Jet Stream retreats northward

# Typical Summer Conditions



# Typical Summer Drought (2007, 2011)



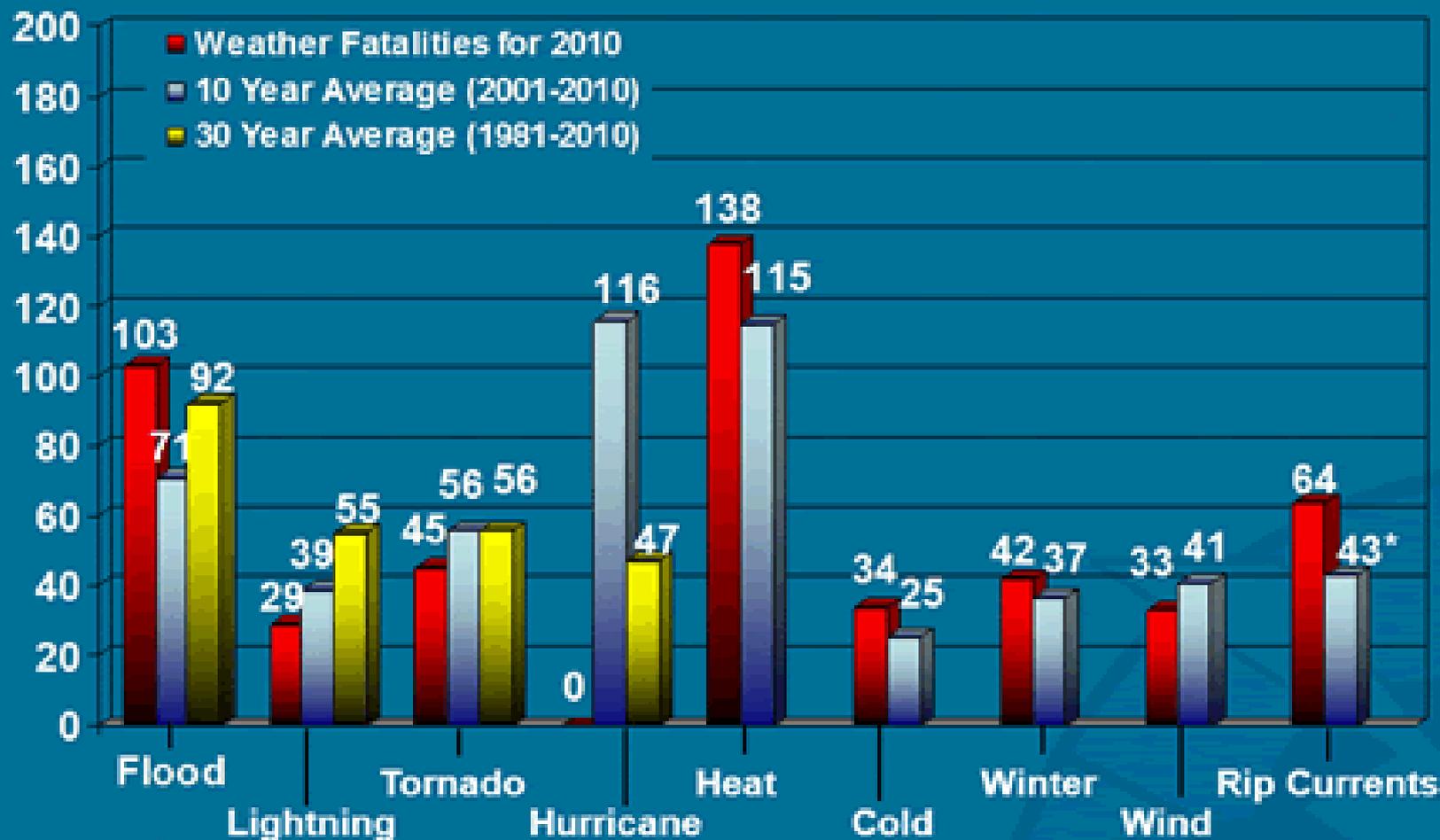
# Challenging Climate

- Highly variable climate
  - Daily, seasonal, multi-year, decadal variations
  - Only cool season has any predictability
- You name the weather, NC experiences it
  - Every kind of severe weather
  - Few other locations face these challenges





# Weather Fatalities



\*9 year average

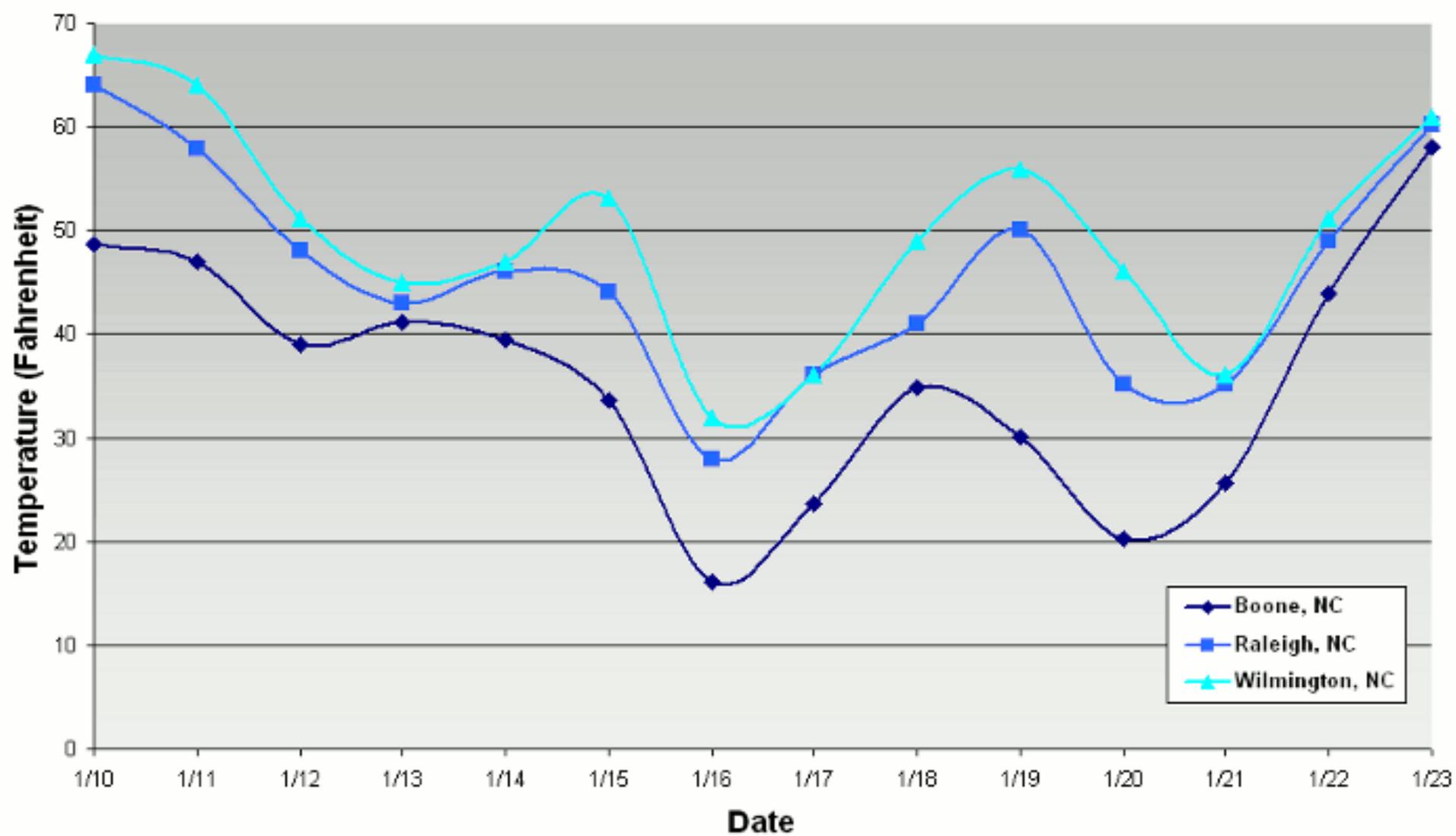
# Winter Storms

- Freezing Rain, Sleet, Snow



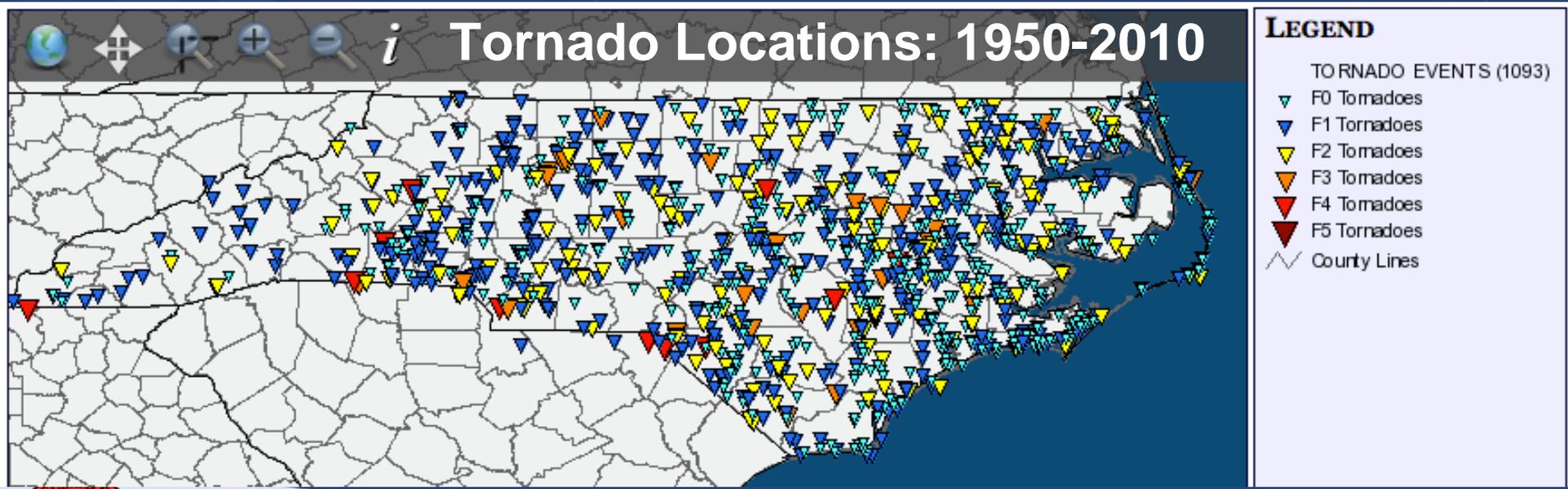
Photo by: Wayne Nalbandian

# January 10-23, 2009 Maximum Temperatures

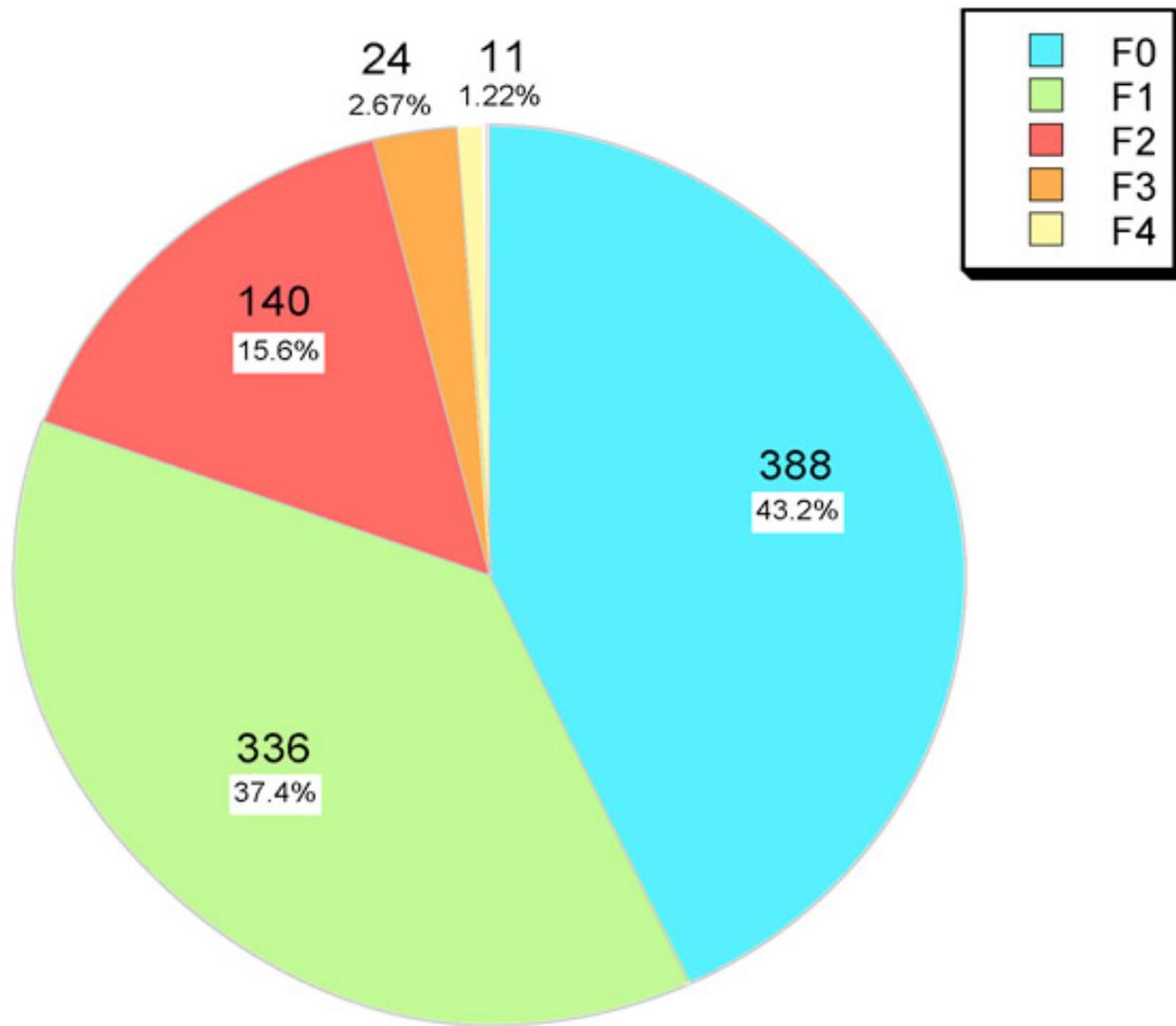


# Severe Thunderstorms

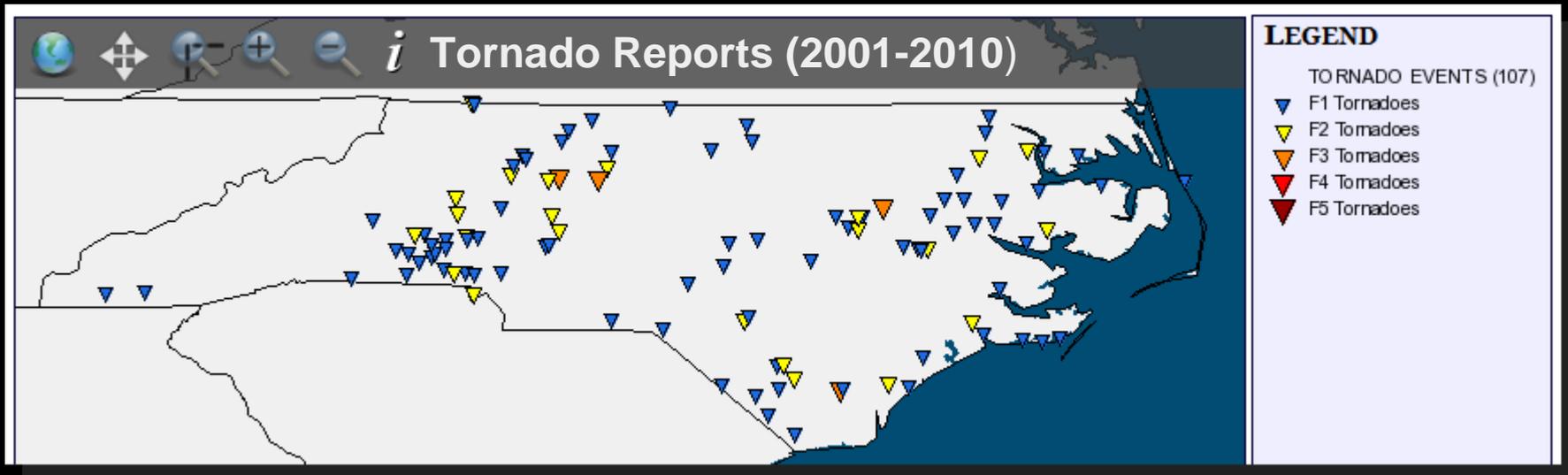
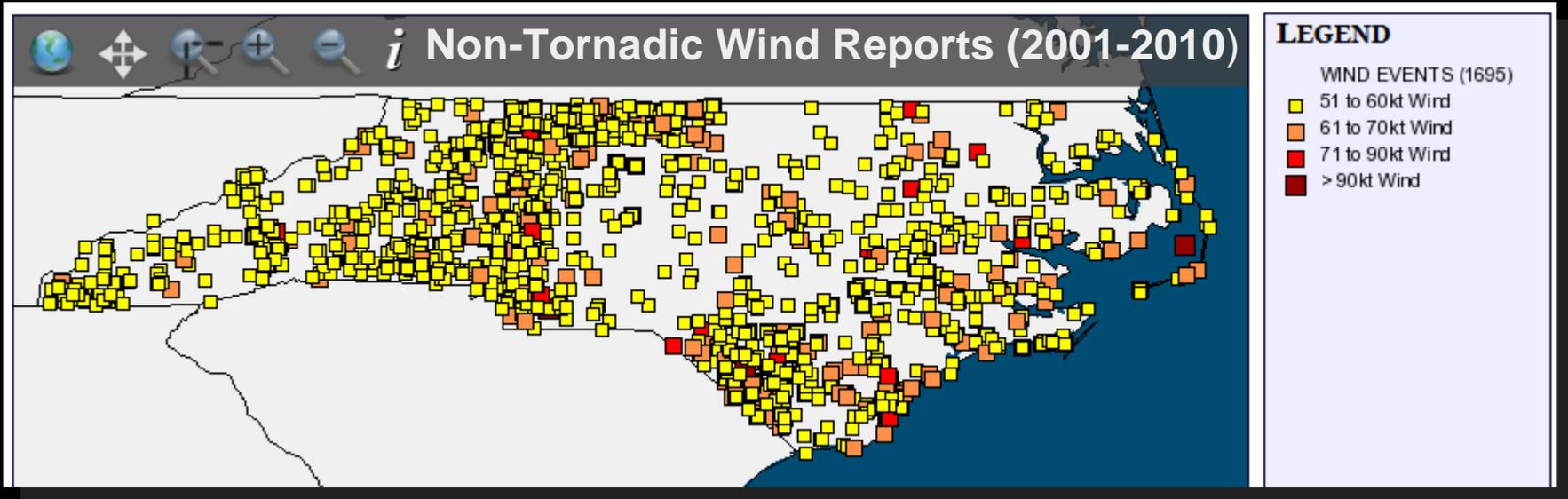
- Flooding, lightning, tornadoes
- Damaging winds



# Tornadoes per F - Scale in North Carolina

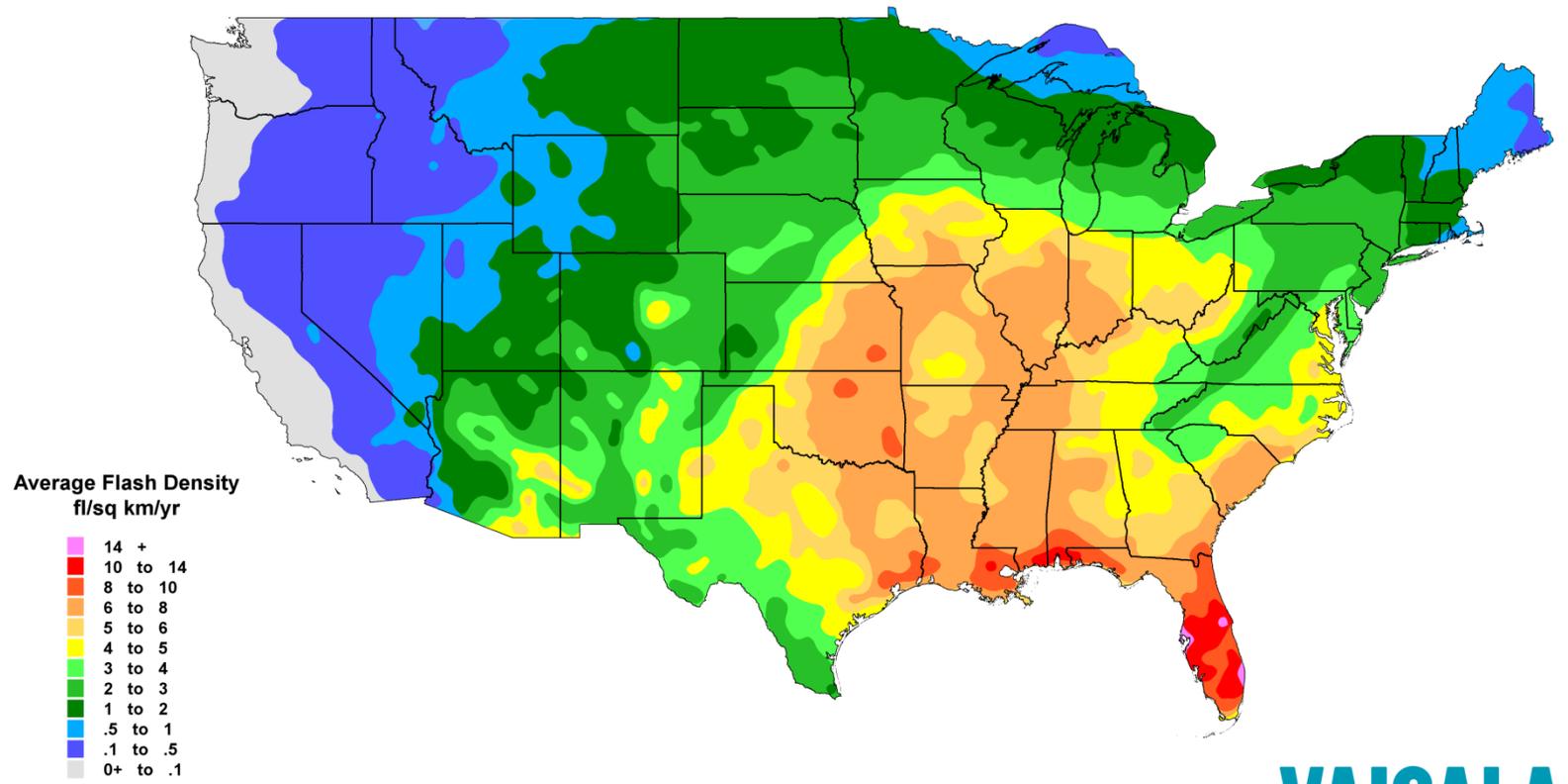


Number and Percent of Tornadoes



# Lightning: Apr - Oct

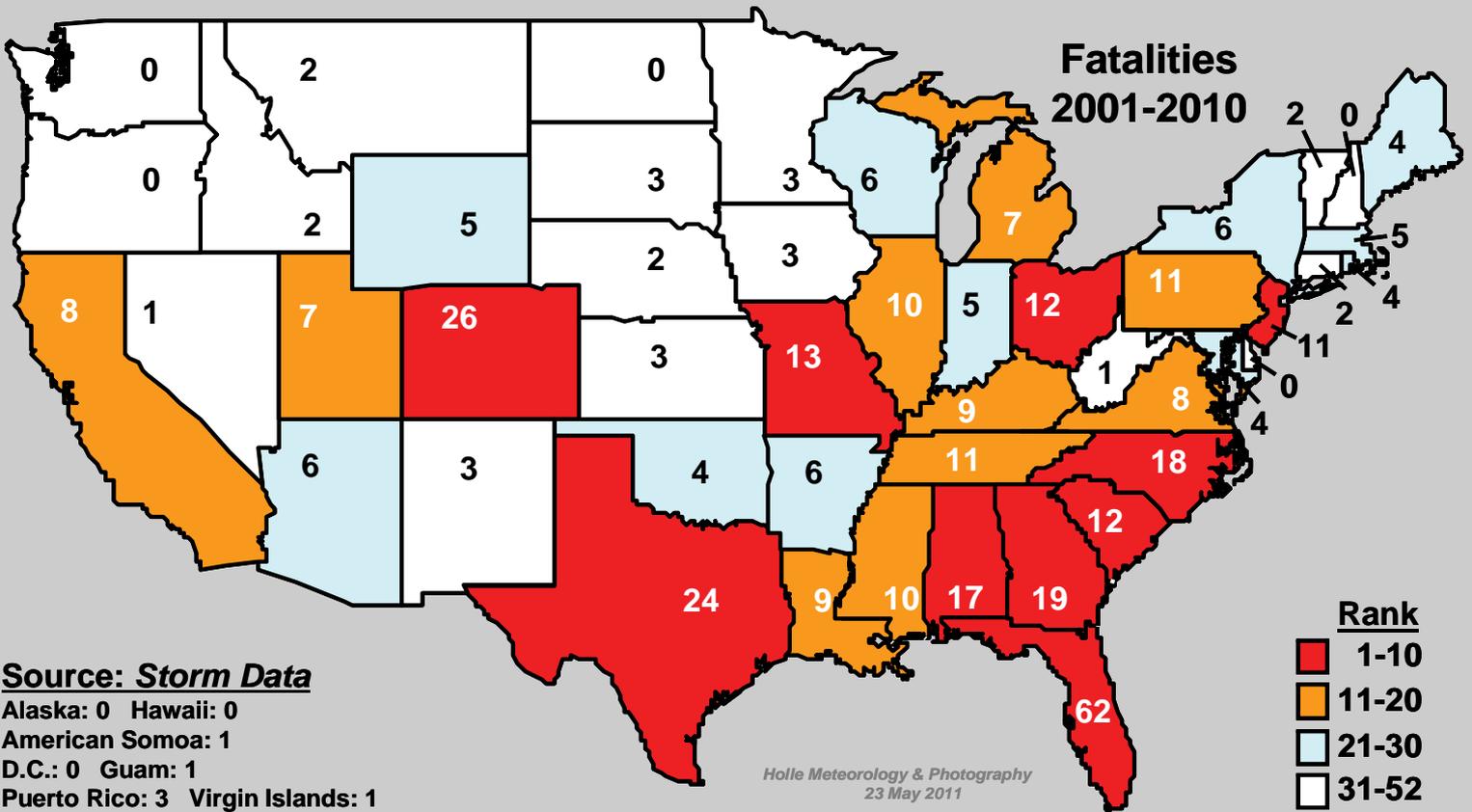
Vaisala's National Lightning Detection Network® (NLDN®)  
Cloud-to-Ground Lightning Incidence in the Continental U.S. (1997 - 2010)



© Vaisala 2011. All rights reserved. For display purposes only - any other use is prohibited without prior written consent from Vaisala.



# Lightning Fatalities by State, 2001-2010



Source: Storm Data

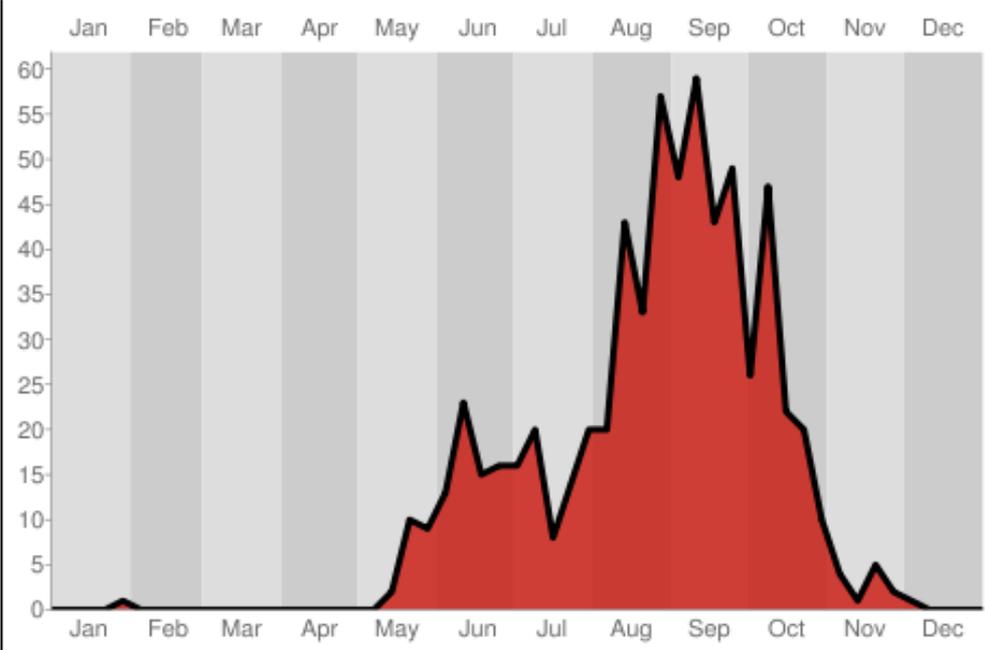
Alaska: 0 Hawaii: 0  
American Somoa: 1  
D.C.: 0 Guam: 1  
Puerto Rico: 3 Virgin Islands: 1

Holle Meteorology & Photography  
23 May 2011

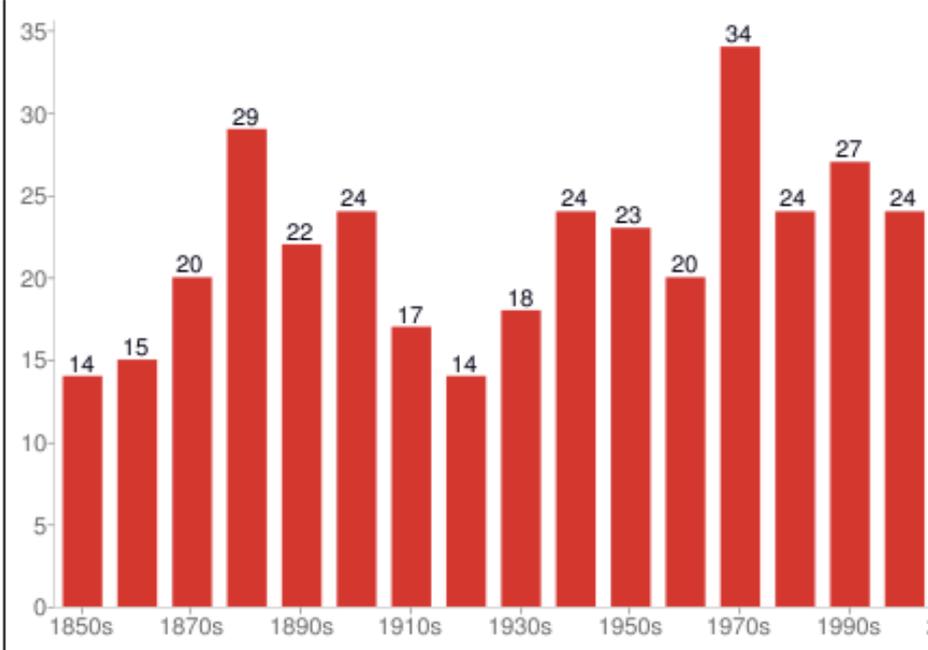


# Hurricanes

### Total Storm Days by Week for NC Within 150 Miles (1851 - 2010)



### Total Storms Affecting NC by Decade Within 150 Miles (1851 - 2010)

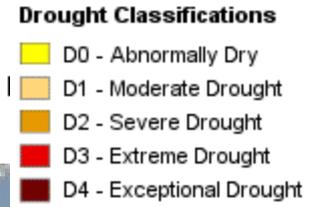
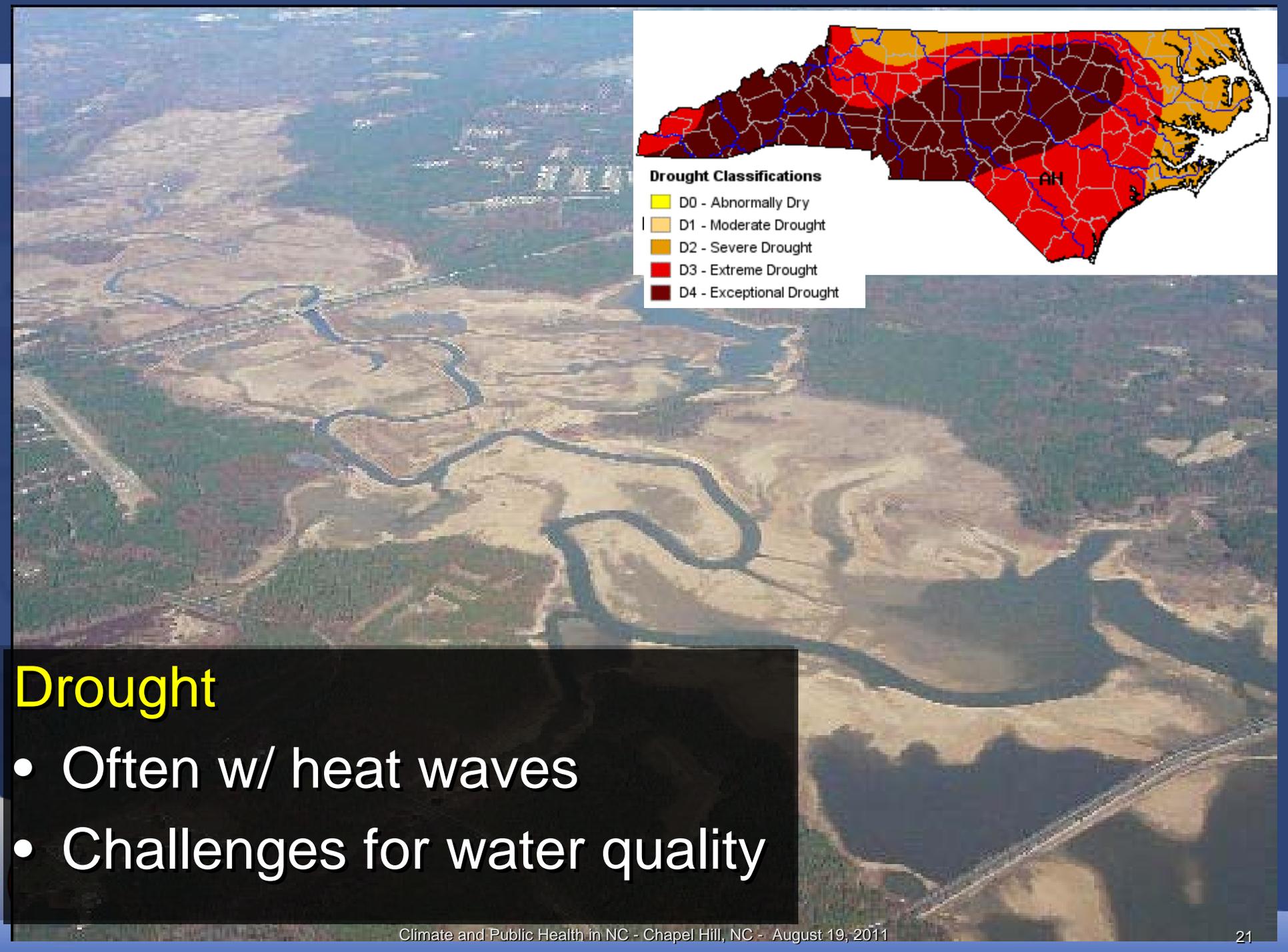


# Every County at Risk



Back-to-back storms are common





# Drought

- Often w/ heat waves
- Challenges for water quality

# Climate Challenges in NC

- Challenges in monitoring, predicting impacts
  - Hourly, daily decision making
  - Seasonal, long term planning
- NC is vulnerable to our extreme weather and climate
  - Good planning can increase resilience



# Climate Science Needs

- Observations
  - Source for all scientific advancement
  - Must be local, accurate
- Applications & Engagement
  - Tools to let public, businesses use science
- Education
  - Lots of climate awareness, little climate education





ryan\_boyles@ncsu.edu

<http://www.nc-climate.ncsu.edu>

919-515-3056 or 877-718-5544