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Investigating Convective Patterns and Favorability in New England: A Preliminary Climatology

Max Sasser

Motivation

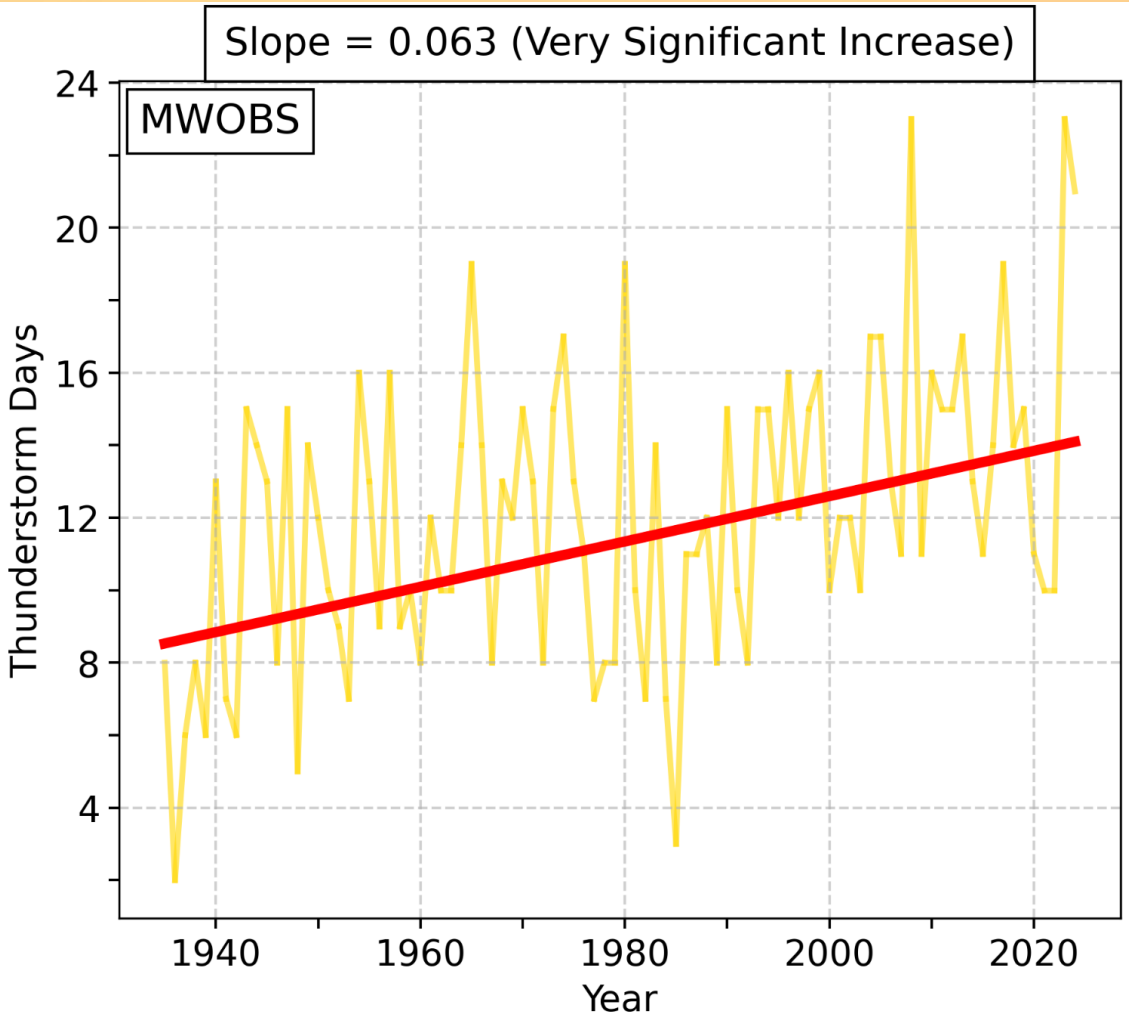
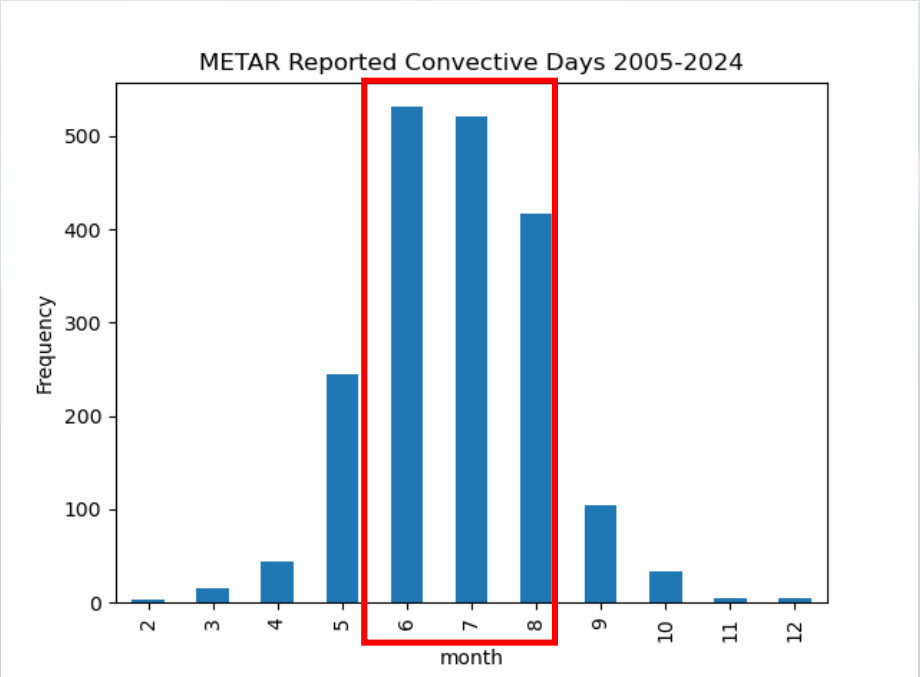


Image borrowed from Frank Vazzano

- Thunderstorm activity has increased in the White Mountains and New England
- Peak convective activity occurs during the June July August (JJA) season
- Changing climate favors an increase in the frequency of convective events (Hoogewind et al. 2017)
- Climatological trends are most noticeable on the fringe of peak activity (Clark et al. 2016)



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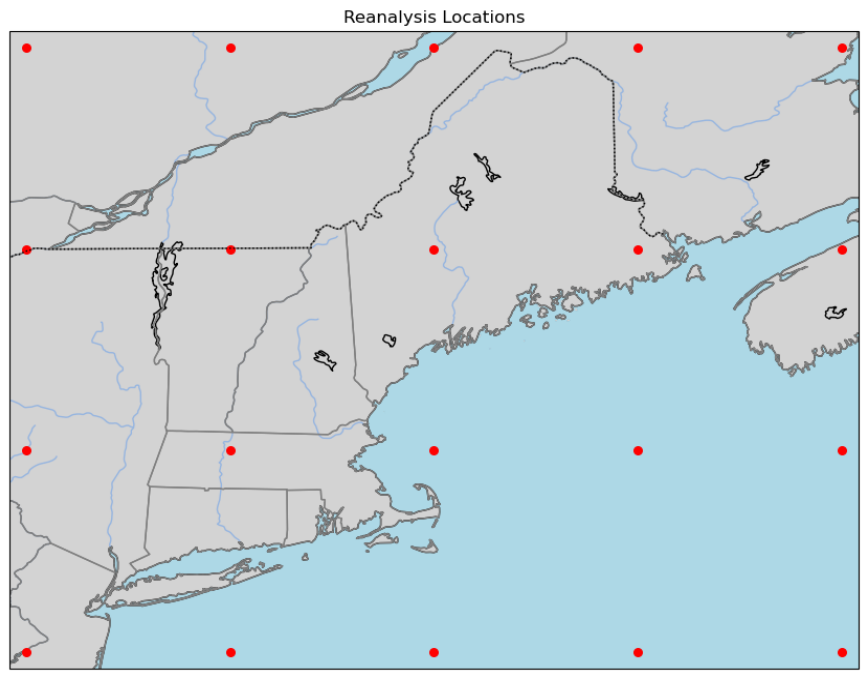

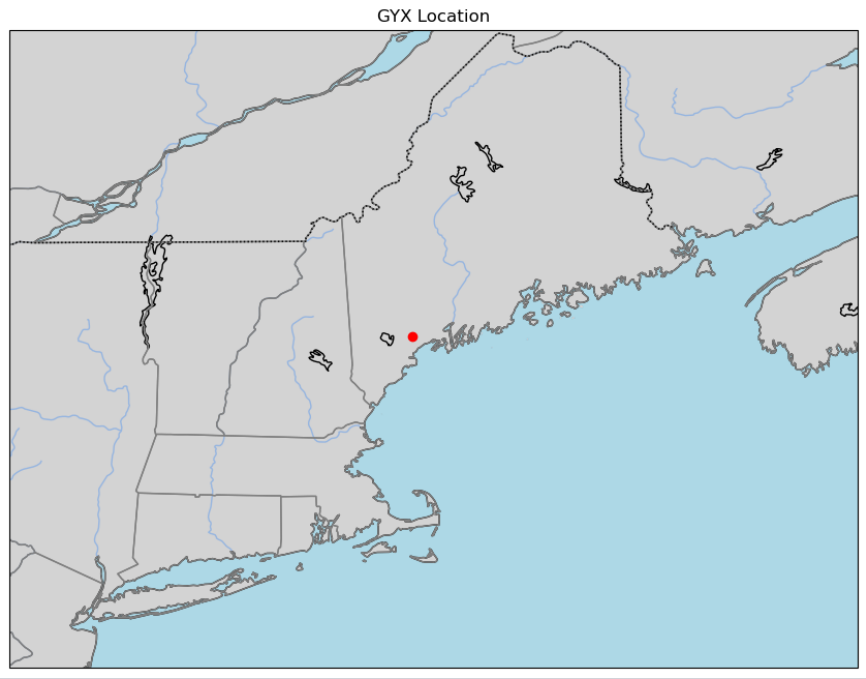

Parameters of Interest

- Convective available potential energy (CAPE)
- 2-m temperature
- 2-m dewpoint temperature
- 0-6 km bulk wind difference (BWD)

Datasets

- Reanalysis data
  - NCEP Reanalysis Version 1
  - 4x daily, 2.5 degree resolution
- Radiosonde data
  - Gray, ME (GYX)
  - 2x daily, singular location

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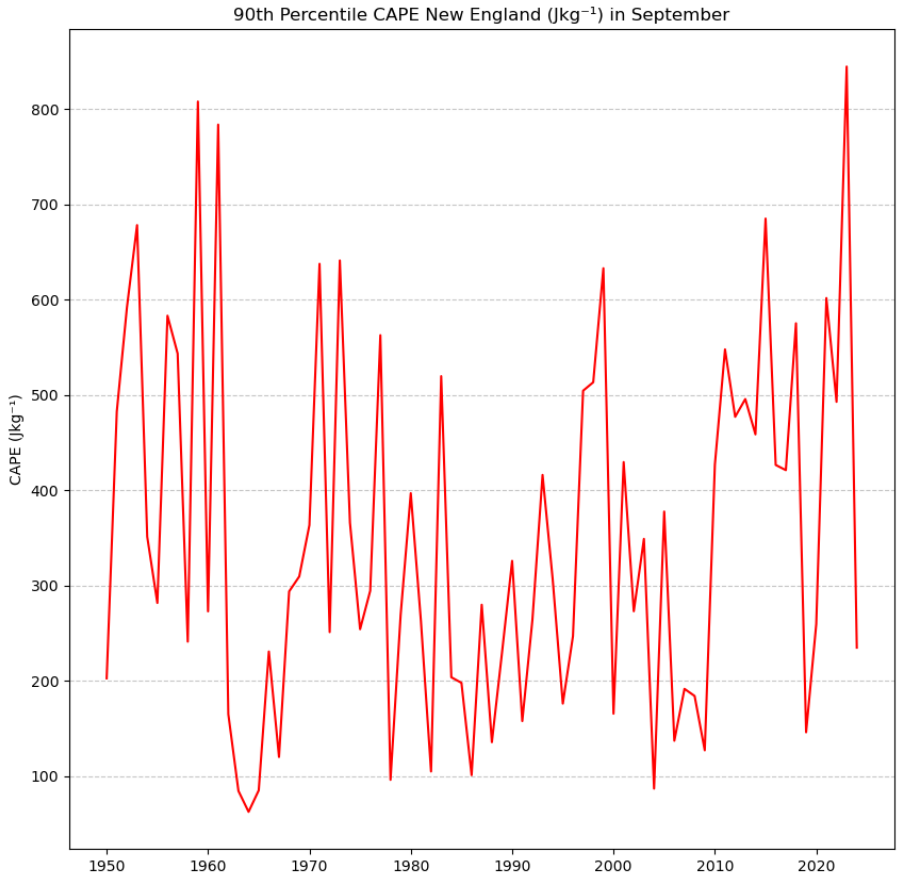
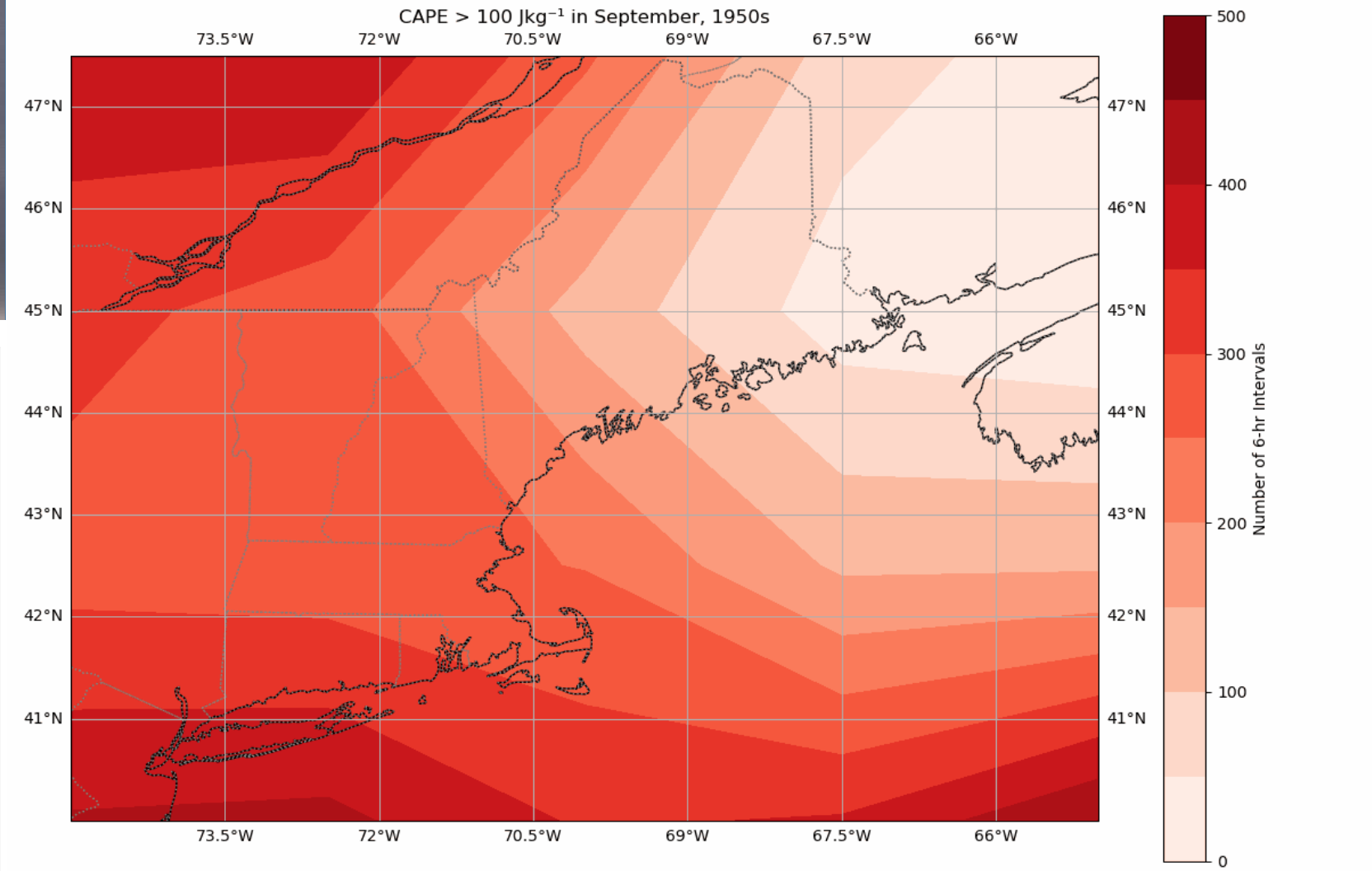
CAPE NCEP Reanalysis Trends





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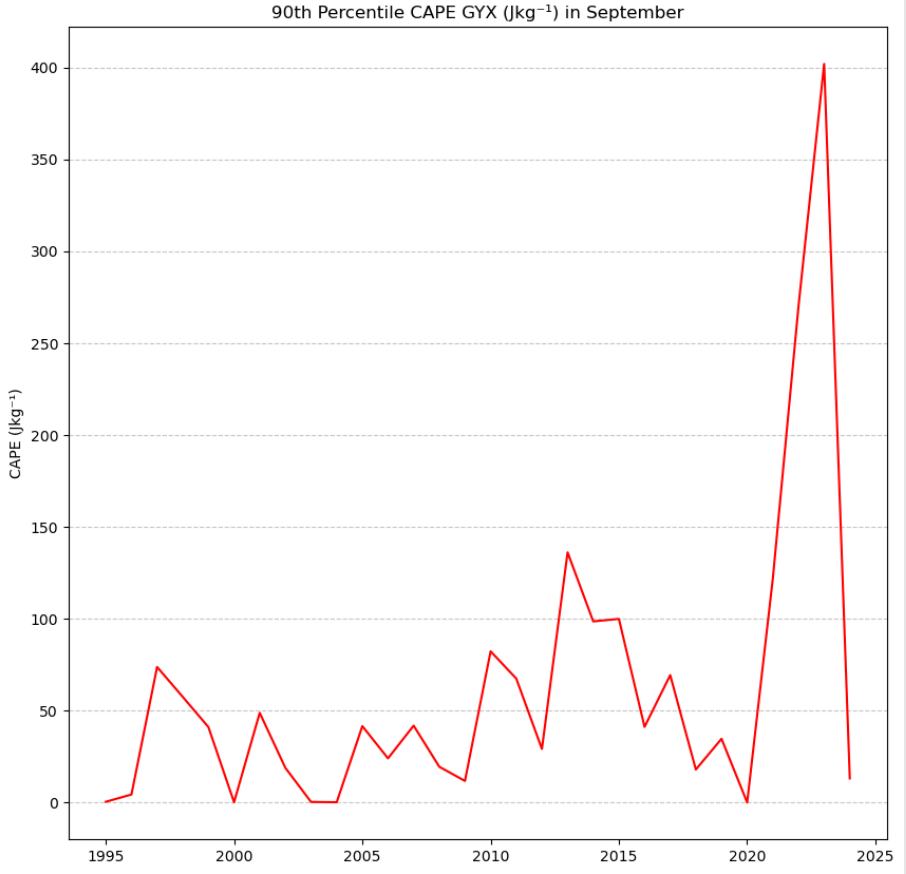
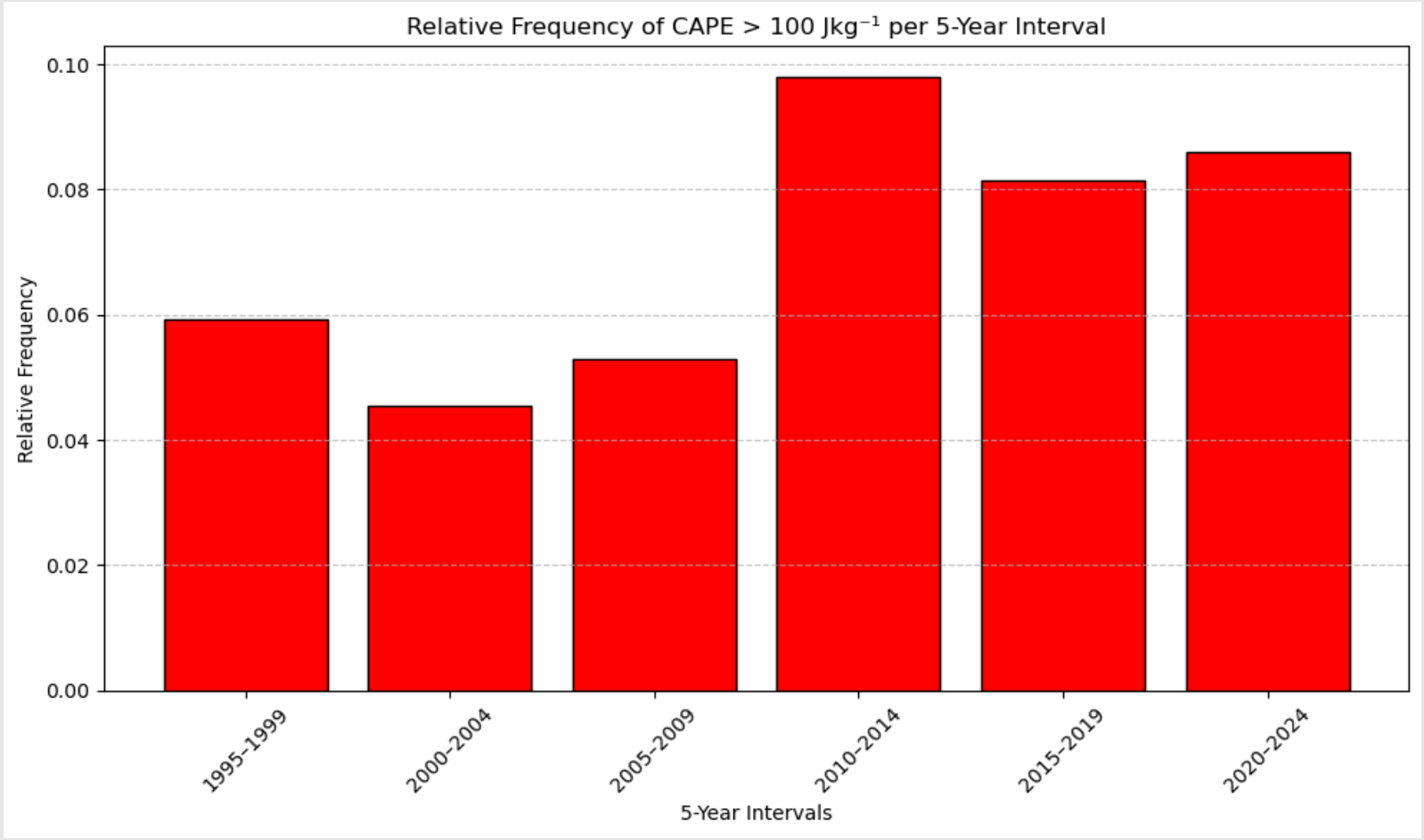
CAPE GYX Radiosonde Trends





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Conclusion

- CAPE, 2-m temperature, and 2-m dewpoint temperature have increased since 1980s
- Reanalysis data and radiosonde data have a moderate correlation
  - Correlation is stronger in cases of widespread instability
- Wind shear remains constant, which indicates convection may not become more organized

Future Work

- Investigate relationship between environmental parameters and convective phenomena type
- Investigate relationship between increase in CAPE and severity of thunderstorms
- Use a reanalysis dataset that has a higher resolution (ERA-5)

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Thank You!