Eastern United States, West to East Transect Temporal Trends in Dew Point Temperature (1973-2024)

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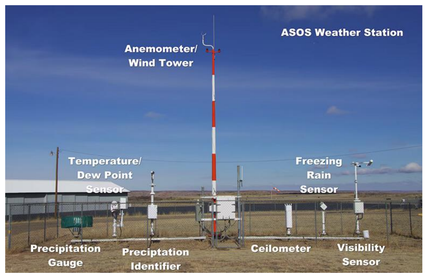
Introduction

BACKGROUND:

- Dew point temperature (Td) are a key indicator of atmospheric moisture.
- Td is a component in climate change and is related to air temperatures, sea surface temperatures, and evaporation.
- Climates have been warming over the past century long-term trends in Td might exist.
- The
- Eastern United States offers a variety of climates as well as temporal and spatial trends on from the Rocky Mountains to the Atlantic Coast in a west to east transect.



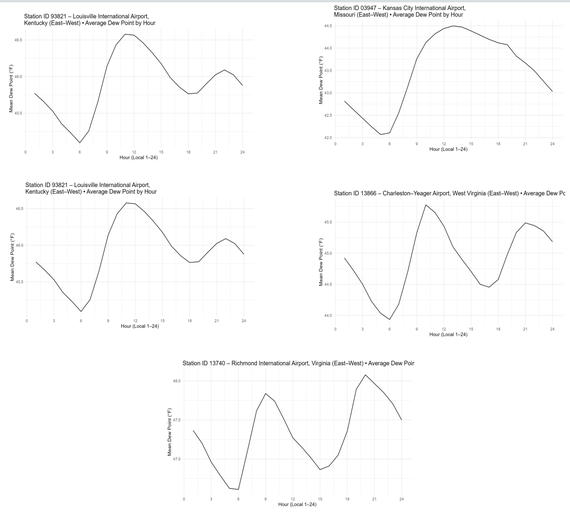
OBJECTIVES:

- Are Td temperatures increasing over time as the climate warms.
- Are Td's increasing in specific seasons?
- How do Td's change during a course of a day (the diurnal cycle), and
- what is the spread in dew point temperature by month. This research will address these questions for 5 stations in a west-to-east transect.

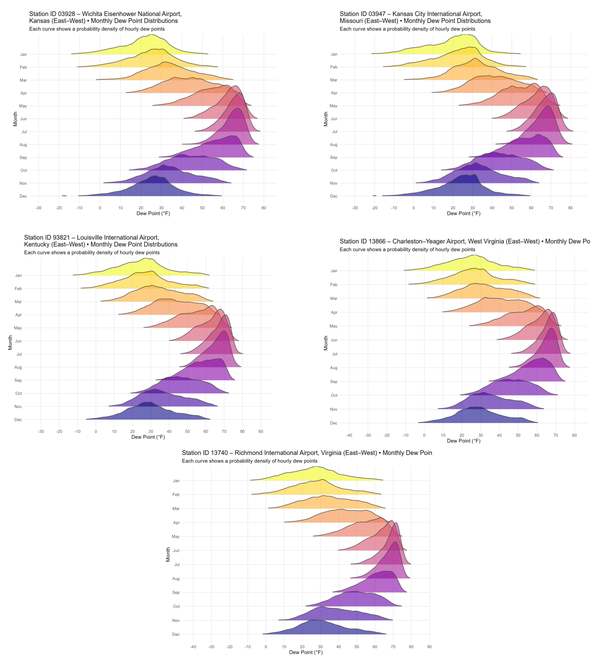
METHODS:

- Hourly Td records were extracted from the National Oceanic and Atmospheric Administration (NOAA) website from the National Centers for Environmental Information (NCEI)
- The time period from 1973-2024
- The stations selected include; Richmond Virginia, Charleston West Virginia, Louisville Kentucky, Kansas city Missouri, and Wichita Kansa.
- Statistical tests include tests for trends (Mann-Kendell) and t-tests. Spatial variability will also be discussed.

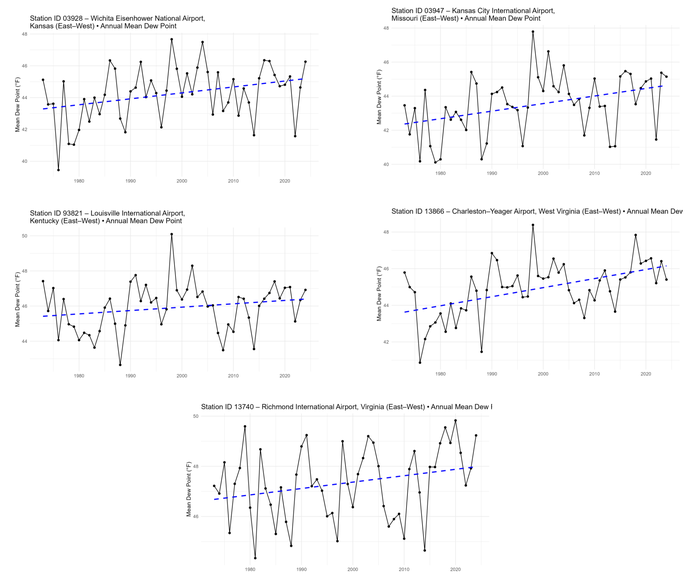
Average Diurnal Data



Monthly Distributions



Annual Mean



Results

- Central US/ western stations such as Kansas and Missouri remained relatively stable
- Easternmost sites like Virginia and West Virginia showed more drastic Td changes
- Wichita, Charlston, and Kansas City showed long term annul upward trends

Seasonal Mean

Conclusion

- Td increases were most pronounced at eastern stations and closer to the coast
- Indicates possible climate-driven shifts in atmospheric moisture due to the costal surface and water temperature
- More moisture in the air.

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