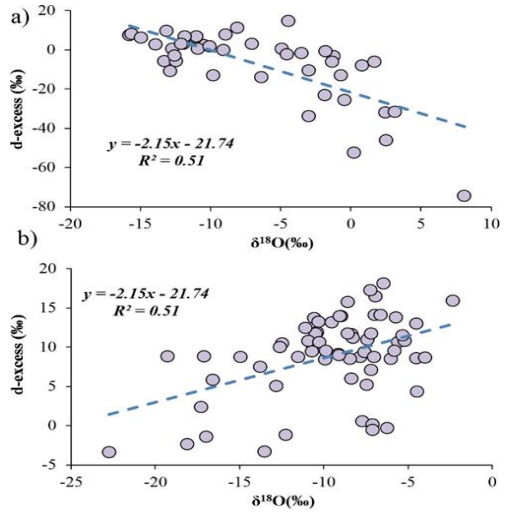
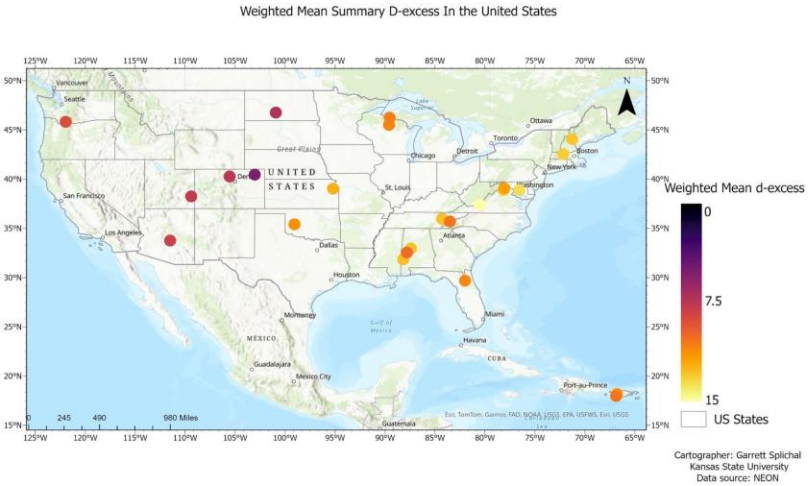
Decoding Water's Journey: Precipitation Isotopes and Weather Interactions

Zane Barrow, Garrett Splichal, & Skyler Medlin
Kansas State University – NRES



a) δ18O and d-excess relationship showing sub-cloud evaporation b) δ18O and d-excess relationship showing moisture recycling



Weighted mean spatial distribution of d-excess

BACKGROUND:

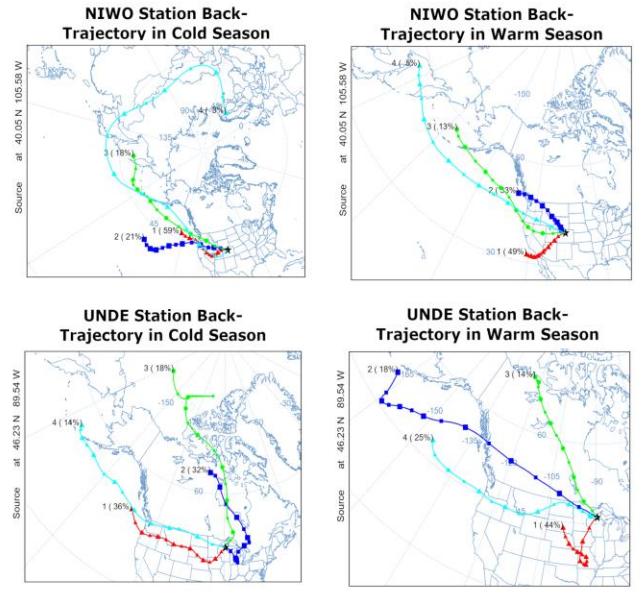
- Isotopes help understand more about past climates.
- Different oxygen and hydrogen isotopes can be collected from ice cores, tree ring, surface water, and precipitation.
- These values tell a story about the climate of that location.

OBJECTIVES:

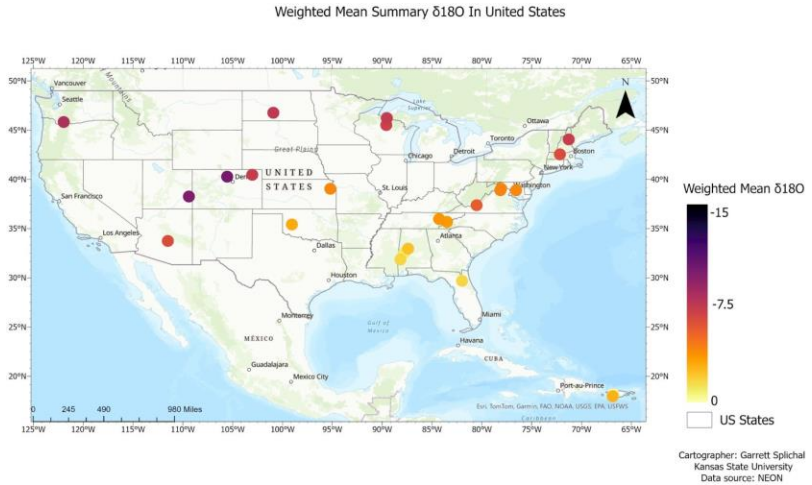
- Analyze the spatial variation of $\delta^{18}O$ and d-excess in precipitation across the CONUS, and their linkages to moisture sources and meteorological variables.

CONCLUSION/FINDINGS:

- Relationship of d-excess and $\delta^{18}O$ indicates sub-cloud evaporation is impacting regional area of data stations
- Diverse regional climate factors influence isotopic values and create high variation across the CONUS
- Moisture source changes seasonally, which aligns with our current understanding of how moisture moves in conjunction with isotopic data (d-excess and $\delta^{18}O$) tracking
- Continued sampling of water isotopes will provide a more complete understanding of what past and future climates will look like



HYSPLIT Back-Trajectories comparing moisture sources during warm and cold seasons.



Weighted mean spatial distribution of $\delta^{18}O$