NH Space Grant – Summer 2023 Report

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On September 1st of this year, I officially graduated from the Natural Resources and the Environment master's program at the University of New Hampshire. My worked looked at the changing long-term monthly spatial trends of climate in northeastern US and was advised by Alix Contosta and Scott Ollinger. The NH Space Grant funding was a helpful contribution that lightened the load of seeking funding elsewhere and getting me to where I want to be, graduated! This summer, funding allowed me to spend much of my time finalizing my data analysis and preparing my thesis.

Most of the data analysis used 30-year monthly climate normals, published by the National Oceanic and Atmospheric Administration. Comparing climate normals from two different time periods (1951-1980 and 1991-2020) and their patterns across latitudinal, longitudinal, and elevational gradients of the Northeast (New England and New York) using multiple linear regression helped answer the question of how climate patterns are changing over time and space. The answer, like to many questions in science, is not simple, and leads to many other questions.

During the fellowship award period, I was able to focus on synthesizing results. Monthly precipitation has overall increased, especially in the fall and winter. Spatially, there tends to be higher precipitation amounts to the south, east, and at higher elevation, but these gradients along latitude, longitude and elevation became weaker on average. In other words, precipitation become more even across the Northeast's latitude, longitude, and elevation due to larger increases of precipitation to the north, west, and at lower elevations. Minimum and maximum temperatures tend to be higher to the south, west, and at lower elevations, but these gradients have changed as well. Minimum temperature longitudinal and elevational gradients and maximum temperature longitudinal gradients have weakened on average (became more similar mostly due to larger increases of minimum temperatures to the east and at higher elevations and larger increases of maximum temperature to the east). Minimum and maximum temperature latitudinal gradients and maximum temperature elevational gradients have strengthened on average (became more different mostly due to larger increases of minimum and maximum temperatures to the south and larger increases of maximum temperature at lower elevations). And on a monthly timescale, more variation from the averages discussed above is seen.

These changes are likely due in part to increasing ocean temperatures, changes in atmospheric processes and weather patterns, and increased dewpoint. And changes in climate gradients may impact the spatial distribution of water availability, vegetation, and wildlife. The questions that were spurred from these results involve future research into the mechanisms behind these changes and if and how these patterns are affecting ecosystems and ecosystem processes, especially in seasons where more significant change is seen.

This past summer was a productive and fulfilling time, thanks in large part to the support of the NH Space Grant. As a woman from a small town in NH, I have appreciated this opportunity to advance my studies and have my work be financially supported by the NH Space Grant Consortium.