



Climate Change in Leon and Wakulla Counties: Exploring and Presenting the Data



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Background

Problem

- Climate change is a well-studied phenomenon with pressing impacts on the future and is a critical, societal threat.
- Educating the public and today's students about this issue and how it has and will impact individuals is crucial to attacking this issue.

Solution

- The NSF-funded project *Developing Elementary Teachers' Self-Efficacy to Teach about Climate Change Using Community-Based Practices* led by Dr. Amal Ibourk aims to support elementary educators in effectively teaching about climate change and its impacts on a community level.
- There is a large body of research surrounding climate change and its impacts on large scales; however, to effectively explain climate change at a community level, we need to examine how the climate is changing in local areas.
- This research focuses on how the climate is changing in Leon and Wakulla counties and how this can be presented in a way that the public and students can understand, interpret, and observe themselves.

Objectives

- Give educators and the public the relevant information and knowledge to be able to understand climate change and how it impacts them and their students.
- Empower the public to understand climate change science and make progress toward tackling this problem.

Methods

- The change and warming of Earth's atmosphere is a widely documented trend observed globally since regular reliable records have been kept (Salinger, 2004). The continually rising interest in climate trends has led to the development of several datasets creating globally complete pictures of climate trends.
- The National Centers for Environment Information (a division of NOAA) have developed the *Climate at a Glance* tool to allow users to see long-term climate anywhere. This tool is especially useful for visualizing changes in climate across the United States.

Leon County, Florida Average Temperature
January-December

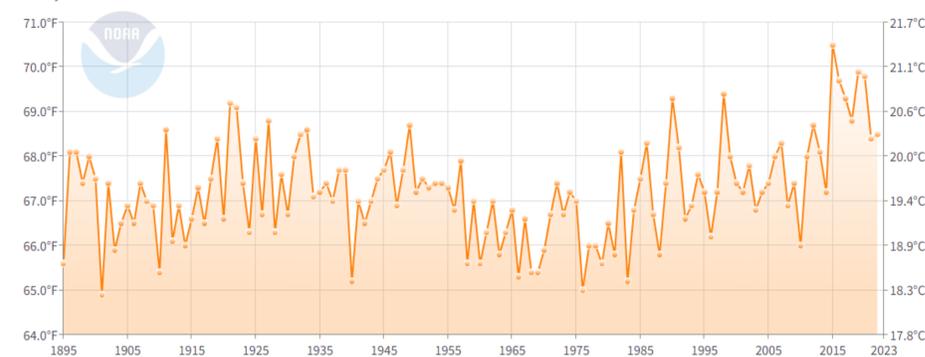


Figure 1 – The annual average temperature in Leon County since 1895, a warming trend is not obvious (NOAA, 2023).

- Sea-surface temperature for the Gulf of Mexico can also be paired with the land data to show how the oceans are also changing.
- The educational utility of this tool can be maximized by pairing it with effective explanations of what the data represents, its sources, and the causes and effects of the trend.
 - To make the data more suitable for presentation to fifth graders, the data was simplified. Removing trend lines and using a simple year-to-year plot of one variable simplifies the data and makes it easier to interpret.
 - This climate data was used in a local Wakulla County classroom to show the community-specific impacts of climate change.

Results

Leon County, Florida Minimum Temperature
60-Month Period Ending in December



Figure 2 – The 5-year rolling average low temperature in Leon County since 1960. The warming trend is much more obvious in low temperatures in a more relevant and quality time scale (NOAA, 2023).

Wakulla County, Florida Precipitation
60-Month Period Ending in December

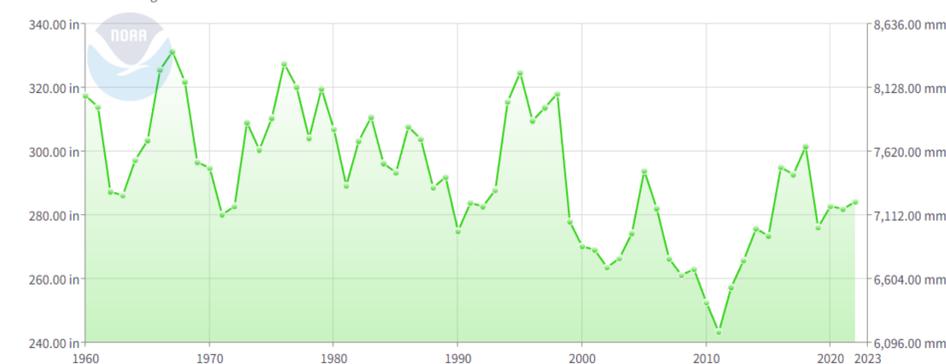


Figure 3 – A 5-year rolling average of precipitation in Wakulla County showing no obvious trend or perhaps a slight decrease in precipitation (NOAA, 2023).

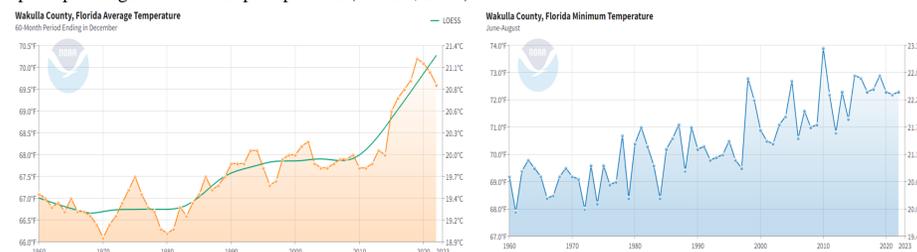


Figure 4 – A comparison of the 5-year rolling average temperature and summertime minimum temperatures in Wakulla County. Showing similar trends but the right is more suitable for use in an elementary classroom (NOAA, 2023).

29.0°N, 84.0°W Temperature Anomalies
60-Month Period Ending in December

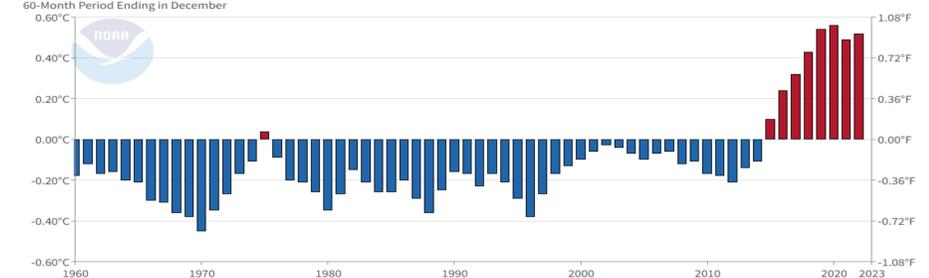


Figure 5 – The 5-year rolling average of temperature anomalies at a point in the Gulf of Mexico near the Big Bend, close inspection reveals that this lines up with the same data for coastal Wakulla County (NOAA, 2023).

Conclusions

- A clear warming trend can be seen in all the temperature data.
- There is no clear trend in precipitation values (Figure 3). The effect of climate change on precipitation is not clear: some work suggests that it could result in drying the subtropics by affecting general circulation (Fu, 2015) while others indicate precipitation organization in the Southeast U.S. could become stronger (Nieto Ferreria et al., 2018).
- A warming gulf (Figure 5) could strengthen hurricanes and have devastating impacts on coastal areas (Trenberth, 2007).
- Data after 1960 (Figure 2) is more complete reliable and offers a clearer, more relevant picture of climate trends.
- This trend becomes more obvious at night with summertime minimum temperature and longer rolling averages that smooth the data.
- Making the data audience-appropriate can be done by making it simpler for younger audiences to understand and use (Figure 4).
- This clear indication of local climate change should encourage community members to take actions to mitigate the impacts of climate change.
- Research in how to formally integrate community-based climate change science into elementary education is the continuing focus of the broader project.

References

Fu, R. (2015). Global warming-accelerated drying in the tropics. *Proceedings of the National Academy of Sciences*, 112(12), 3593–3594. <https://doi.org/10.1073/pnas.1503231112>

Nieto Ferreira, R., Nissenbaum, M. R., & Rickenbach, T. M. (2018). Climate change effects on summertime precipitation organization in the Southeast United States. *Atmospheric Research*, 214, 348–363. <https://doi.org/10.1016/j.atmosres.2018.08.012>

NOAA National Centers for Environmental information, *Climate at a Glance*, published February 2023, retrieved on February 27, 2023 from <https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/>

Salinger, M. J. (2005). Climate variability and change: Past, present and future – an overview. *Climatic Change*, 70(1–2), 9–29. <https://doi.org/10.1007/s10584-005-5936-x>

Trenberth, K. E. (2007). Warmer oceans, stronger hurricanes. *Scientific American*, 297(1), 44–51. <https://www.jstor.org/stable/26069374>