

PDAT 622: Signature Assignment

All Climate is Local

Assignment 1

While we certainly worry about “Global Climate Change,” we also know that “all change is local.” Check out the climate in a place that you care about. Has it changed?

- 1) Get some weather data that you are interested in: Go to the NOAA Climate Data page at: <https://www.ncdc.noaa.gov/cdo-web/> You have to “buy” the data (at no cost), which is weird, but this is common on government data sources.
 - a) Click on **Search Tool**, then select **Daily Summaries**, and a search term you like. (You can change the date range later.) If you don’t have a particular favorite place, use Kirksville. Near your location, pick an airport or other site with a very long record
 - b) **Add to Cart**, then click on the cart: Select **Custom GHCN-Daily CSV** as your download format (you certainly don’t want a .pdf file). Select a beefy time range, maybe 1960–2020 or whatever. Click **Continue**. Select **Data Types**. It’s fine to click them all, since it’s not that many columns, but you definitely need Air Temperature and Precipitation. Enter in your e-mail address (twice), then **Submit Order**.
 - c) It takes a few minutes, but you’ll get an e-mail with a link to click to download your data set. Be sure to save it somewhere handy for you to get it into R.
- 2) Make a new RMarkdown (or Quarto) file and maybe spend an hour checking out your dataset, but only for high and low temperatures.
 - a) Load your libraries (tidyverse, colorspace). Use `read.csv` to load your dataset.
 - b) Make a simple scatterplot in ggplot (with `smooth = "lm"`) for both high and low temperatures to see if there is an uphill temperature trend. Make a simple regression model against time to look more deeply. Does a linear model make sense? Remember that there are 365.25 days in a year, so a tiny daily slope will add up over time. (0.0001°F per day tracks closely to the Global Climate change worry of 2°C per century)

c) Do a couple of the ideas below, or something fancier.

- Filter the data to select a single month (maybe January or August, since that's when weather is most interesting)
- Pick two random years and look at the difference between them, day by day.
- Look at your birthday (or whatever date) across all the years.
- No, really. Play around and see what you can find.

3) Write a short technical report, about 500 words (as sections inside your same RMarkdown File) Imagine your audience is local officials who are using your analysis as part of a larger one about whether their local services may have to change in the future due to climate change (more snowplowing, different pool usage). You are only talking here about high and low temperature (but might add more later). Make sure your reasoning is clear to the observer (and me, so that I can grade it). Upload the pdf output of your RMarkdown file. Make sure everything requested is visible.

Foreshadowing: While people like to talk about “Global Warming,” many of the warnings about climate change actually have to do with change in variation, not averages. That is, the standard deviation is increasing, and more extremes are happening in both high and low temperature, as well as precipitation, etc. This will be the subject of a future assignment, but while you have the dataset open, maybe check that out a bit.

Assignment 2

Revisit the climate data you explored in Module 3.

- 1) In addition to changes in the actual high and low temperature, take 30 minutes to explore how the variation has changed. You might look at standard deviation or IQR (remember what that is?) for each year, and you might make some box plots to explore those differences.
- 2) Next week, you'll explore changes in precipitation, but you could start that now if you wanted.
- 3) Expand your technical report into either:
 - a) a 1000-word White Paper, where you actually give some suggestions about what they might do differently as a result of your analysis.
 - b) a 1000-word technical paper, if you don't think any change is necessary, do your best to explain the variation you've found and how it has changed over time. Imagine your audience is local officials who are using your analysis as part of a larger one about whether their local services may have to change in the future due to climate change (more snowplowing, different pool usage). Upload the pdf output of your RMarkdown (or Quarto) file. Make sure everything requested is visible.

Foreshadowing: In the next assignment, we'll explore changes to precipitation.

Assignment 3

Revisit the climate data you explored in Module 3.

- 1) In addition to changes in the actual high and low temperature and its variation, explore changes in precipitation.
- 2) Use last week's paper and your new information to generate ten slides that illustrate what you have. Imagine your audience is local officials who are using your analysis as part of a larger one about whether their local services may have to change in the future due to climate change (more snowplowing, different pool usage). Upload the pdf output of your RPres, RMarkdown, or Quarto file. Make sure everything requested is visible.

Foreshadowing: Think about how you want to build your actual talk. You will be allowed to choose a different audience if you'd like, so think about how you want to angle it.

Assignment 4

Think about how your local climate report will turn into a talk.

- 1) Choose an audience for your talk. Here are some options:
 - Those local officials using your analysis as part of a larger one about whether their local services may have to change in the future due to climate change (more snowplowing, different pool usage).
 - Something else (make sure your audience is clearly identified).
- 2) Spend another hour or so figuring out what you know from your local climate analysis. Again, you don't need to find something "significant," but hopefully, you've found something interesting. Tidy up your slides to match anything new in your analysis. Make an outline or notes for an actual talk.
- 3) Upload the pdf output of your RPres, RMarkdown, or Quarto file, as well as a .pdf of your talk outline. Make sure everything requested is visible.

Foreshadowing: Next week is all about recording the actual talk for your imaginary audience. Think about what you're missing. Anything you can solve by next week?

Assignment 5

It's time to actually finish your "All Climate is Local" video. Then, go ahead and upload it in the nearby discussion post, so that the rest of the class can see and comment on it.

- 0) This assignment slot is for a short self-critique. How do you think you did? If we had more time, what would you want to add? (The actual video and slide should be uploaded to the discussion board below.)
- 1) Your talk should be 10–12 minutes long, with either slides or a handout (or both), aimed at a specific audience. I won't formally have a stopwatch, but too short won't cover enough, and too long will be boring.
- 2) Audience—Two choices:
 - a) Imagine your audience is local officials who are using your analysis as part of a larger one about whether their local services may have to change in the future due to climate change (more snowplowing, different swimming pool usage, increased electricity bill for heat/AC, etc.).
 - b) Some other audience that you've clearly defined.
- 3) You can use any format you want, Zoom, your phone, it doesn't matter. If you use your iPhone, know that the native format is sometimes annoying to share (.mp4 is often the best). Talk to me if you need a hand with the technology.
- 4) You may record your talk multiple times if you'd like. My experience is that it almost never gets better after the third time, and usually the second time is the best.
- 5) While you may upload the actual mp4 file into Blackboard, you can also just share a link from Zoom, Google Cloud, iCloud, Dropbox, or wherever. Again, let me know if you need a hand with it. (I can even host it here if you don't have anywhere that's convenient for sharing.)
- 6) Deadlines in this class are pretty mellow, but this one isn't. The video must be uploaded by Friday, October 7, in order to allow others in the class time to watch it. Videos submitted after noon on Saturday, October 8, will lose 1 point per hour (that's 24 points per day).

Foreshadowing: Once you've finished your talk, you'll critique the others and they'll watch yours.

Grading Criteria (8 criteria, each worth 50 points)

- Data Stuff: Did you do correct statistics, make correct graphs, and proper interpretations You don't need to be necessarily fancy, but you need to not be wrong
- Purpose: Is the Exigency Clear?

- Thesis: Does your talk demonstrate coherence and Fidelity?
- Consistency: Internal and external
- Reasoning: Inductive, Deductive, and Statistical Arguments, used correctly
- Audience: Was the talk appropriate for the intended audience?
- Visual Takeaways: Were the slides and Handouts useful and appropriate?
- Language: Did the video use language to enhance audience interest in the subject?