Climate/Air Quality Lab

Task

Your task is to work with your groups to analyze air quality data. Example questions can include, but are not limited to, the following:

- The impact of distance to pollution sources;
    - See the Blue Sky Zero Notebook for some potential inspiration
- Diurnal or temporal patterns in pollution emissions;
- Tree cover or other aspects of "green" or "gray" infrastructure and impacts on pollution;

You will work collaboratively as a group to analyze air quality data from Purple Air. Additionally, in class, you will gain some hands-on experience collecting these data using the PocketLab Air units. However, we will not use any PocketLab data in this lab for the analyses.

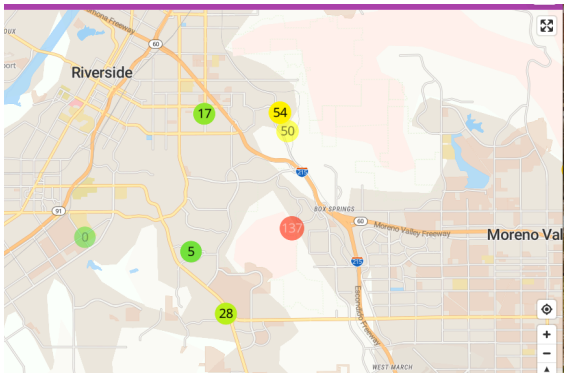
In your poster, you will briefly synthesize background information (e.g. at least 3-5 scientific peer-reviewed articles) pertinent to your topic and ideally to your study region. You will then include results from your own group exploration of the topic using Purple Air data. Finally, you will offer your interpretation of your data and a discussion of future directions.

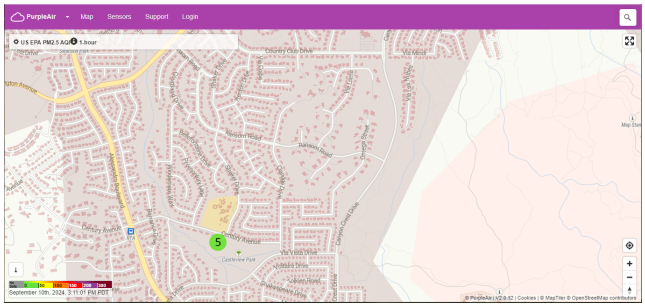
My grades will be based on the poster and presentation. To that end, one helpful adage is that "the perfect is the enemy of the good." Focus on something feasible and interesting rather than something that is intractable but super cutting-edge. I have designed this project to explicitly incorporate group work because that is how real-world environmental science is performed: in collaborative teams of individuals working together to collect and analyze data for a common goal. Finally, your poster should be word-processed and checked for spelling and grammar.

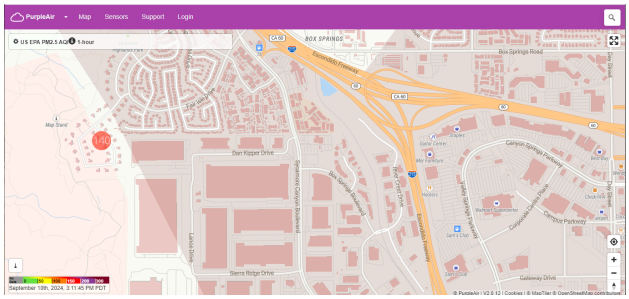
Collecting air quality data from PurpleAir

- Instructions fr om PurpleAir
- Navigate to https://map.purpleair.com
    - NB: We will use 1-hour resolution, which will give us PM 2.5 data for the past 6 months

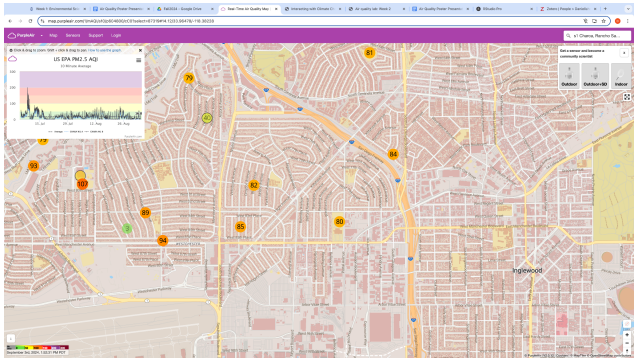
- Download the data for your sites as a CSV file
    - Ruth, Sy'Vanna, Jeremy -> Riverside

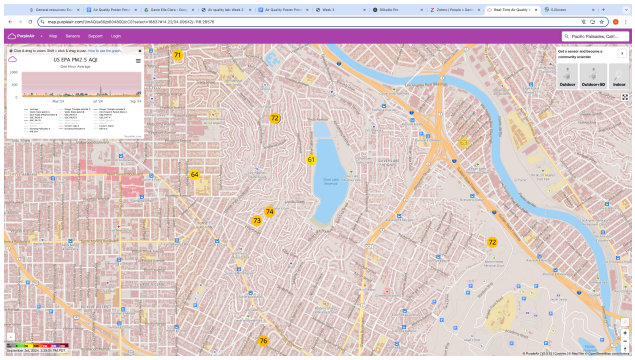


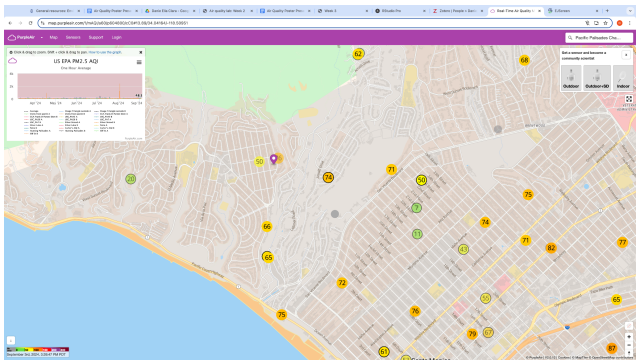




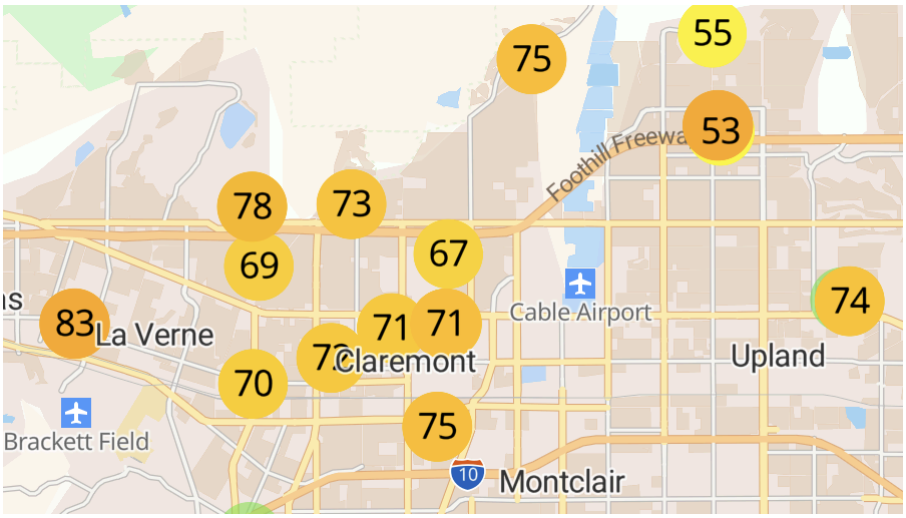
    - Ella, Danie, Clara: LA County -> air quality depletion from vehicle idling: https://drive.google.com/drive/folders/1TsFHvAl5lzRbZsNb9s5bmWFJ4pUQKjdD



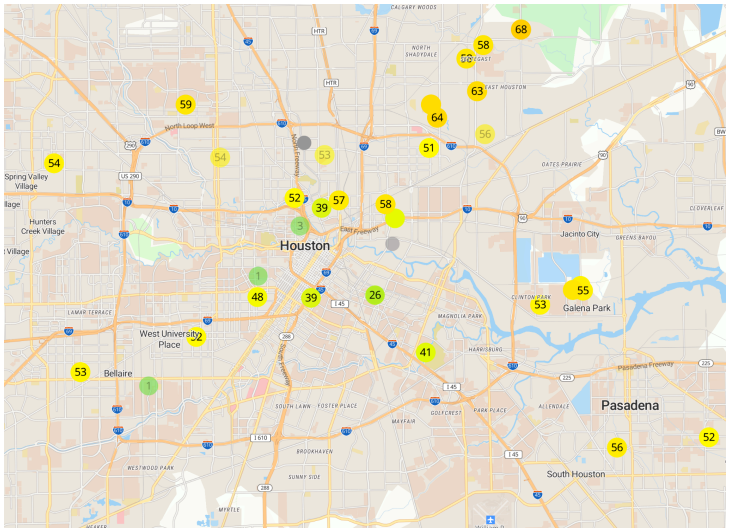




- Elisa, Nico, George, Mari - Air quality differences at certain distances from 10 freeway below Claremont + Pomona (I-605 Corridor Improvement Project freeways)



- Willa, Anna, Sophia - How does distance from a major freeway affect air quality, specifically PM2.5?



- [I-605 Corridor Improvement Project - LA Metro]
- Karl, Fiona, Evan, Misha -
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Timeline

- Week 1: Setting up the PocketLab Air units and collecting example air quality data.
- Week 2: Collecting air quality data and designing a study using PurpleAir sensor data
    - **Library tour → how can one efficiently use library and Internet search tools?**
    - Create a sub-folder for your group in this Week 2 folder
    - Upload your PurpleAir data to that folder in a CSV format
    - *Co-developing peer review and rubric guidelines*
- Week 3: Finalizing data collection and analyzing data
    - Time permitting, interpreting scientific articles.
    - Lookahead to creating rubric
- Week 4/5: Poster presentations in class
    - Tuesday lab: finalizing posters, performing peer review, providing rubric suggestions

Group Questions

- Ruth, Sy'Vanna, Jeremy -> Across two different locations in Riverside, is there a correlation between population racial demographics and the air quality? (note the specific station name and the trait of interest)

    - Station #1: Box Springs (Cannich Rd, Riverside CA)
        - Weber Logistics warehouse- mass manufacturer of charcoal gas
    - Station #2: Kitchin Street/Jaclyn St
- Ella, Danie, Clara: LA County -> air quality from vehicle idling (+reflection of environmental injustice→ EJ USEPA screen tool for demographic information)
- Elisa, Nico, George, Mari - Air quality differences at certain distances from 10 freeway below Claremont + Pomona (I-605 Corridor Improvement Project freeways). Dependent variable is air quality, independent variable is distance from the 10 freeway.
- Willa, Anna, SophiaI-605 Corridor Improvement Project - LA Metro
- Karl, Fiona, Evan - Assessing whether population sizes of four major US cities affects the air quality there

Class consideration of sampling practices

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Assessment

- Background and context (20%)
    - How well do you establish relevant background information on your topic?
    - Do you clearly convey its significance for the environment and/or humans?
    - How do you use the literature to contextualize your observations?
- Results (20%)
    - What have you found? What have you learned?
    - Do you describe your data clearly and accurately?
        - **NB: For this first lab, you only need to generate 1 visualization and 1 descriptive summary (e.g. a numeric summary or a statistical measure)**
- Discussion/Developing a community monitoring scheme (20%)
    - If you elect to focus on interpretation in light of future research:
        - Do you develop a sensible monitoring plan?
        - What aspects of the literature and course materials (if appropriate) inform the monitoring scheme that you have initially tested out?
        - How do your results inform future monitoring schemes?
    - If you elect to focus on interpreting your results only:
        - Does your interpretation reflect your results accurately?

        - Does it link back out to larger questions or concepts from the course and environmental science?
- Presentation components (40%)
    - In every section of the poster and presentation, can I clearly understand all components of the presentation?
    - Can I understand what you sought to do and what you found?
    - Can I understand your interpretation of your findings and the implications for your proposed monitoring scheme?
    - Do you speak clearly and project your voice so that we can easily hear you?
    - Does your group use visual and text communication effectively?
    - Does your group show evidence of coordination and an even distribution of communication?

Co-developed peer review and rubric guidelines

Be specific with your comments. What line/section/paragraph/bullet point is unclear and why? What would be a way to go about fixing it? Use this space to modify or add elements you'd like me to consider in the Assessment section above.
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Submission

Please have **one member of your group** submit your poster at the Canvas assignment. You can either download and submit your lab report **as a .pptx file** (in the "Attachment" field) or you can share the **sharing link to your Google slides document** in the inline "Assignment Text" box.

Additionally, please share your assessment of your team effectiveness with Prof. Chang here at this Gradescope assignment (forthcoming). Everyone should do the Gradescope assignment individually.

Troubleshooting PocketLab Air data collection

Problem: My PocketLab Air won't turn on

- When you plug in the unit, if it is on, you will see it flash green and red, then intermittently red from the diode on top.

- If it has been a long time (>3 days) since you've charged the unit, you may need to turn it OFF when charging.
- First, plug in the unit so that it has some juice (1 minute or so should be fine).
- Second, unplug the unit and long hold the power button on top until you see it flash solid red for 2-3 seconds.
- Third, release the power button when it has flashed solid red for 2-3 seconds. The unit is now powered off.
- Fourth, plug the powered off unit back in to the USB micro cable and let it charge for 2 hours or so.

Question: How do I collect data from the PocketLab Air using Google Chrome on my laptop?

- Log in to https://app.thepocketlab.com/
- Use class code: "5ACMNE"
- Make sure you record data in a notebook I assigned, such as "Lab Report Data Collection Placeholder".
- Make sure that you SAVE ("Save ^" button) and EXPORT ("Download .csv" option or "Google Drive" option) your recorded data each time you make a recording.
- Note: You **do not need to use this PocketLab Air Google Chrome notebook** but if you wanted to collect data using Google Chrome on a laptop, I hope this notebook option is a safer choice.
- Do make sure you consistently and continually download and save your data though and upload it to somewhere like Google Drive.
- **If you have or plan to collect your PL Air data via phone, disregard this PocketLab Notebook information - this is only for people collecting data using Google Chrome on a laptop**.
    - I do NOT recommend collecting PL Air data via iPhone or iOS device unfortunately.

Question: How do I use PocketLab Notebook again on my phone or computer to record data from the device?

- Log in to app.thepocketlab.com
- You can look at the instructions for the past assignments:
    - Start using PocketLab Notebook (introduction to the online software)
    - Getting to know the PocketLab Air Units (my instructions on recording data from a device to a computer or a phone)

    - Week 2 - Climate/Air Quality Lab has some guidance on using the process we did in Week 2 to clean up iPhone-collected data.
        - If you have issues with cleaning up iPhone data, please let me know.

Template for poster presentation

Feel free to disregard if you already have a working draft. You can find a Google Slide poster template here.

Introduction

- Introduction: What is the relevant background for the question you are seeking to address? What is the local context that is relevant?

Methods

- Methods: How did you collect your data? How did you analyze it?

Results

- Results: What did you find? How would you interpret your results in light of the background literature and the course materials?

Discussion

- Discussion: What are the implications of your findings? How do your findings extend, contrast with, or contest existing theories or ideas for air quality?

Author contributions

- Author contributions: Please explicitly make note of how you all contributed to the report. One example could be: “BB, KD, and CC identified the research topic and co-developed the design. BB and KD led the introduction drafting and background literature search. CC and BB performed the statistical analysis. All of the authors contributed to the interpretation of the results and the recommendations for future monitoring schemes.”

References

(*an example*:) Beattie, B. R., & LaFrance, J. T. (2006). The law of demand versus diminishing marginal utility. *Review of Agricultural Economics*, **28**(2), 263–271.

FMI please see this resource from the University of Arizona. I generally recommend following the conventions of the American Psychological Association (helpful resource from Purdue University) for citations.