

Do weather changes matter?

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1 Introduction

According to the Inter-Governmental Panel on Climate Change or IPCC, the temperature has been changing about 2 degrees C per 100 years (check this) – but this global average is not evenly distributed across the globe.

How can we appreciate potential changes across the whole globe? An average temperature increase for the globe is somewhat abstract. Perhaps, we should evaluate how temperature (and/or rainfall) might be changing on local scales.

Thus, for this project, we'll try to understand how temperature changes "map" onto a community that we care about? But to do this we need obtain and analyze temperature data and determine if weather changes have compelling impacts on local communities.

In other words, do weather changes matter?

1.1 Goals of this Document

1. Describe the goals and approach for the project;
2. Provide or point to resources to prepare for and conduct the project; and
3. Describe how we will evaluate the project process and products.

2 Project Description

2.1 Driving Question(s)

Projects can often be structured as questions, but sometimes it is worth phrasing the questions in a number of ways – this might help you find ways that you might find the question more provocative and interesting. For example,

- Is my region's climate changing?
- How is climate change affecting my community?

But you can modify these questions to develop the project that you might find compelling.

In addition, we may develop "sub-questions" that can be developed or answered as chunks, which will be used to answer the main question or questions. For example,

- Are there biases in weather data? Can these biases be corrected? If so, how?
- How can we evaluate trends? What are the most appropriate statistical tools to test for trends?
- What is the best way to display visual data? Are there best practices to guide a public product to make it more compelling or interactive?

2.2 Public Product

Science is a social project. From the questions we ask, to the results and their presentation, science is embedded in a culture of norms. Thus, as part of this project, students will produce a narrative blog with the following characteristics:

- time series data in a plot using R;
- description of what the data tells about about the region,
- a few short paragraphs describing how data can be interpreted; pitfalls of unintentional and intentional misinterpretations; and
- narrative that describes the climate and climate implications for a community that you care about.

3 Approach

Students will have the following tools available:

- Servers where stored weather data can be downloaded;
- R Studio Server with some scripts & libraries to help develop analyses;
- Github to store project codes; and
- Student presentations on various climate change criticisms.

3.1 Learning Goals

For this project, you will use weather data to the question "do weather changes matter". How you answer the question is largely up to you, however, there are some learning goals associated with this project:

Skills

- Ability to download and process weather data;
- evaluate temporal trends in weather data;
- evaluate environmental impacts on human or non-human communities; and
- communicate conclusions to the public with special attention to guide how data misinterpretations should be considered.

Content

- Understand how data climate data is curated;
- Analyze climate impacts from around the world.

Throughout this project, your team and instructor will develop the strategies and skills to address this question and help you make some conclusions and present the results to the public.

4 Project Stages

4.1 Expert Groups

NOTE: We already did this with our short presentations on the 1st of December. (The topics below were place holders before each of you selected topics of interest.)

Each of us form an essential component for the effort. Organized as teams and expert groups, we will disassemble the project into chunks that each of us will contribute in specific and effective ways.

For this project, the following students have been assigned to the teams below:

| | Member | Team |
|----|--------|------|
| 1 | Frank | 1 |
| 2 | Leah | 1 |
| 3 | David | 2 |
| 4 | Olivia | 2 |
| 5 | Wendy | 3 |
| 6 | Sophia | 3 |
| 7 | Erin | 4 |
| 8 | Val | 4 |
| 9 | Ana? | 5 |
| 10 | Clare | 5 |
| 11 | Nicole | 5 |

We will develop expert groups on to present the following topics:

1. Temperature Record
2. Radiative Gases
3. Emissions
4. Water
5. Warming

| Product | % of Project | Due Date |
|-------------------------|--------------|-----------|
| Background Presentation | 15% | Dec. 1st |
| Report | 85% | Dec. 13th |

4.2 Regional Climate Analysis

1. Download and analyze data (i.e. make inferences) to create an public product;
2. Evaluate peer reviewed articles to determine potential ecological, economic, and sociological implications of climate patterns;
3. Write report to describe results; and
4. Propose what makes a good public product with respect to criticisms of climate science debates and criticisms. In other words, describe (2-3) ways that climate change skepticism might misuse the data analysis and how one might prevent the misuse.

5 Product

The Project Report will be due 2 pm, December 13th! :-)

- Time series graph of temperature data from a specific region using R;
- Evaluation of data to determine if trends exists;
- Compare results to model predictions and possible ecological and economic implications to the region;
- Describe how the data should be presented, e.g. how the data should be interpreted, and how to avoid misinterpretations that are present in the popular culture.

6 Grading

6.1 Background Presentation

- Prepare an outline to summarize the data and citations as a reference for peers (2017);
- Make an organized presentation that effectively communicates how various scientific arguments have been distorted and politicized;
- Identify how conventional scientific standards have been compromised; and
- Use the allotted time effectively.

6.2 Report (2016)

- Describe the economic, cultural, and physical geography of the region;
- Describe climate patterns;
- Effectively display climate patterns from NOAA repositories, with at least 6 decades of data. Be sure all graphics are appropriately labeled and have captions that the reader can use to interpret the data;
- Analyze the data using a linear model using R (i.e. `lm`);
- Describe the methods used to obtain and analyze the data; and
- Evaluate peer review literature to determine potential regional impacts from climate change – be sure to include ecological and economic impacts;
- Cite instances of how various scientific arguments have been distorted and politicized;
- Identify how conventional scientific standards have been compromised and how arguments that might be based on distortions can be countered.

6.3 Blog (2017)

To be developed

6.4 Letter to Editor (2017)

To be developed

6.5 Oral Presentation–Peer Evaluation

Evaluator: _____

Presenter: _____

1. Describe two items you learned.
2. Describe one concept or fact you would like to learn in more detail.

Table 1: Please circle the best response, where one is inadequate and five is outstanding—i.e. should be teaching the topic!

| | | | | | |
|---------------------------------|---|---|---|---|---|
| How clear was the presentation? | 1 | 2 | 3 | 4 | 5 |
| Suggestions: | | | | | |
| Did the analysis seem valid? | 1 | 2 | 3 | 4 | 5 |
| Suggestions: | | | | | |
| Was information missing? | 1 | 2 | 3 | 4 | 5 |
| Suggestions: | | | | | |