

# Macroclimate Analysis

## INTRODUCTION

This lab will develop your understanding of large scale (temporal and spatial) variability in climate, ask and test a scientific question, manage and present data.

## OBJECTIVES

Students will:

1. develop their personal experiences with weather and climate into a question for investigation.
2. Search and analyze georeferenced, web-based datasets
3. Enter data into Excel (or Google Sheets), manipulate data, calculate means, and create quality data figures (including secondary axes).
4. Create and evaluate climate diagrams to understand a site and region's climate variability
5. Examine the potential impacts of weather and climate on community assembly.

## GETTING STARTED

Think of physical factors which affect, or are correlated with climate (i.e. latitude...) in the United States.

*List of factors (independent variables):*

_____	_____
_____	_____
_____	_____

You will use the two climate variables, temperature and precipitation, as your dependent (or response) variables of interest.

Use this as a starting point to come up with a question or hypothesis which you would like to examine.

*\*Hypothesis – “a prediction with a causal statement”*

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*\*Be sure to identify and include the response and independent variable in this statement.*

<http://www.ncdc.noaa.gov/customer-support/partnerships/regional-climate-centers>

Use the websites listed below to identify weather stations to compare and answer your question(s). In essence what you are doing is setting up a digital transect of 3 – 5 (at least one per group member) weather stations.

*\*\*Station names and ID*

_____	_____
_____	_____
_____	_____
_____	_____

*\*\*Be sure to examine the station metadata (when available) to control “extraneous sources of variability”.*

## Procedure

1. Retrieve data for the mean temperature and mean precipitation by month (you may also calculate this from larger datasets if needed).
2. Retrieve station/site metadata and organize into a table to be included in your report. The table should include the station names, IDs, Latitude/Longitude, Elevation, Mean Annual Temperature and Precipitation.
3. In Microsoft Excel, convert data into metric units (mm and °C).
4. Use monthly values of mean temperature and mean precipitation to create a “climate diagram” for each weather station.
5. Dual y-axis (left and right sides) should scaled 2:1 for precipitation (mm) and temperature (°C).
6. Create a set of figures or a table which relates the response (temperature and precipitation) and independent variable (latitude, altitude, etc...).
7. Assemble all of the climate diagrams (appropriately numbered and captioned) into a Word document.
8. Use the following questions to start your thinking of how to address your findings in your report.  
NOTE: you do not need to address these explicitly in your report, but they may aid in thinking more deeply about what your study.
  - a. What conclusions can you make - based on your data - as they relate to the hypothesis, or question asked?
  - b. Are there additional variables that should be considered as potential sources of error?
  - c. Were there odd or surprising data?
  - d. Can you explain the data that were collected?
  - e. Can you relate how climate has influenced the biotic environment of these locations? Specifically when does adequate soil moisture exist and what adaptations would you expect as a result?