Everything we know about the planet Earth is because of data collected empirically or experimentally. As such, to teach about our planet, my approach to using data in the classroom is to use data as frequently and often as I can. When teaching about the history of the Earth, instead of focusing purely on theories and hypotheses, I strive to also include the data and quantitative reasoning that brought us-the scientific community-to our consensus. When teaching about current conditions and state of the environment, I discuss and show students up-to-date scientific papers and figures.

In the introductory laboratory courses I teach, there are a number of laboratory exercises where students download data from online databases, import into excel, and analyze to answer questions. In some, there are pre-subscribed questions and analyses that are asked for them. For example, when discussing past and current climate change, I modified the Project EDDIE Climate Change Module, where students analyze current and past CO2 data. In this laboratory, all students are utilizing the same datasets to compare current trends of temperature and CO2 with pre-historic rates. However, in other laboratories, students have the opportunity to choose a data from an area of interest to them. In one of these, students download discharge and stream gage data in order to calculate the magnitude of a 100-year flood and assess the area that would be inundated in a flood of that volume. In these types of activities, I am hoping students understand how data are collected, analyzed, interpreted and used to answer questions.

In the introductory lecture component of courses I teach, I try to include as many examples of authentic data as possible. Most of these are in the form of discussing graphs and figures taken from primary literature. Particularly when teaching about current and past climate change, I include historical and current data on sea level rise, temperature, CO2, pH, etc. from locations all over the world. In doing this, it is my goal that they identify similar trends place-to-place, but also recognize that exact degrees of change vary from location-to-location. In these discussions, I also show data at a range of different scales to emphasize that trends and interpretations can vary based on the length of time selected. This also allows for a discussion of variability vs. change in data interpretation.

At the introductory level, challenges I’m facing are how to use authentic data in a large classroom environment. Beyond showing and highlighting examples of how data leads us to understand the Earth and the current environment, how can students use data in this format? Datasets could be uploaded online, and students can bring laptops to class, but what would be the best assessment for this? I’ve thought about using jigsaws and would like to try having different students analyze data from different sources/methods and come together to discuss. Again, what would be the best assessment of this? In these large format classes, how do you keep students focused on the classroom activity and avoid other temptations on the internet?