



# Using Image Data to Explore Paleoclimate

## Teacher Guide

Credits: Jennifer Field, IODP Expedition 395, Reykjanes Mantle Convection and Climate

### Objective

By the end of this lesson, students will be able to create an argument that supports their use of climate proxies to determine that climate has changed from glacial to interglacial through geologic time.

### Additional Resources

- *Introducing the International Ocean Discovery Program*
  - <https://www.youtube.com/watch?v=0nydKlpZdlU&list=PLroDmZEKRHPMCtFMzjx-Zg7plqnIqWMjl&index=2&t=242s>
- *How Science Works*
  - <https://www.youtube.com/watch?v=i9tsdAQBcfM&list=PLroDmZEKRHPMCtFMzjx-Zg7plqnIqWMjl&index=3&t=0s>
- *PNN Special Report Life on Board*
  - <https://www.youtube.com/watch?v=n0bcloALDFg&list=PLroDmZEKRHPMCtFMzjx-Zq7plqnIqWMjl&index=4&t=341s>
- *How Cores are analyzed on Board*
  - [https://youtu.be/WetPXqH60rs?list=PLroDmZEKRHPO05KlfNTk8jFHbOpPaRT\\_S](https://youtu.be/WetPXqH60rs?list=PLroDmZEKRHPO05KlfNTk8jFHbOpPaRT_S)
  - [https://youtu.be/HnKzW5550Ng?list=PLroDmZEKRHPO05KlfNTk8jFHbOpPaRT\\_S](https://youtu.be/HnKzW5550Ng?list=PLroDmZEKRHPO05KlfNTk8jFHbOpPaRT_S)

### Activity Summary

Students will read a short background paragraph about two different ways that scientists can learn about paleoclimate. They will then use images from IODP Expedition 395/395C and a reading about micropaleontology to infer whether the earth was in a glacial or interglacial period at the time of sedimentation and use the CER method to explain why they think so.

Students will then analyze a graph of CO<sub>2</sub> levels and determine the pattern of glacial and interglacial cycles in earth's history. Using their new knowledge, they will match the images to a place on the graph when it could have been deposited.



## Next Generation Science Standards

### HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics

Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

### HS-ESS3-5 Earth and Human Activity

Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

### Target Audience

High School - 9-12

### Time Required

Two 55 minute periods

### Materials Needed

Students will need access to color images either on a personal device or color copies

Students will need either digital or paper copies of the assignment

Students will need access to research materials and craft materials to do the extension activity

### Activity Description

#### Day 1:

1. **Potential Do Now:** Students can turn and talk, or use white boards to see if they can explain/draw a fossil.
2. Students will read a short background reading with vocabulary that is bolded.
3. Students will then look at three separate images and count the components present. They will approximate the percent composition.
4. Students will compare and contrast the images with a Venn Diagram

#### Day 2:

1. Students will review and reflect on their work from the previous class.
2. Students will read a blog from the JOIDES Resolution site
3. They will then use this new information to create a short CER about glacial/interglacial periods and foraminifera
4. Students will interpret a graph of CO<sub>2</sub> and temperature and visualize how the Earth has moved through Glacial and Interglacial Periods in its history.
5. Students will infer where the different layers in the photos could have been deposited based on the presence or absence of foraminifera.
6. Students may choose to do the extension activity or it can be assigned as homework.