

Activity 2.2: Expert Group D Worksheet

In your expert group, complete each task answer the questions related to each task. In the next activity, you will explain your phenomenon to your home group members. Be sure to ask questions about anything you don't understand about your phenomenon.

Task A: Read about the Phenomenon: Sea level

- a. *What is sea level?* Sea level is a measurement of the height of the sea with respect to a fixed point on land. It varies around the world and over time due to gravitational forces, ocean currents and tides. Sea levels all over the world are affected by changes in glaciers and ice sheets (like Greenland)—where melting of that ice raises the sea level and freezing of more land ice (such as during an ice age) lowers the sea level. Also, sea level can change as the sea water itself warms up and expands.
- b. *How do we measure sea level?* This is not an easy measurement, because the ocean tides and currents lift the ocean surface up and down and tectonic forces do the same with land. The US currently has a network of over 200 gauges (formerly giant wooden rulers, now using radar sensors attached to piers above the water surface) for measuring coastal sea level. Scientists use satellites to measure changes in sea level for the open ocean (also using radar to emit a microwave, measure the time it takes for the wave to return back, and convert the time into a distance).
- c. *Why does sea level matter?* There are many reasons why sea level rise is problematic. Millions of people live along the coast and sea level rise increases the risk of flooding. Also, the saltwater from the rising seas can mix with freshwater in rivers and lakes making the water undrinkable and unusable for agriculture. Check out this short video from NASA for more information:
<https://youtu.be/msnOHuPep9I>.

Let's be clear about sea level:

(1) Sea level is not the same around the world. This might be confusing because when we talk about elevation, we use the term "meters above sea level", which sounds like there is just one sea level. But meters above sea level refers to a historic, mean sea level at a specific location, which usually differs by country.

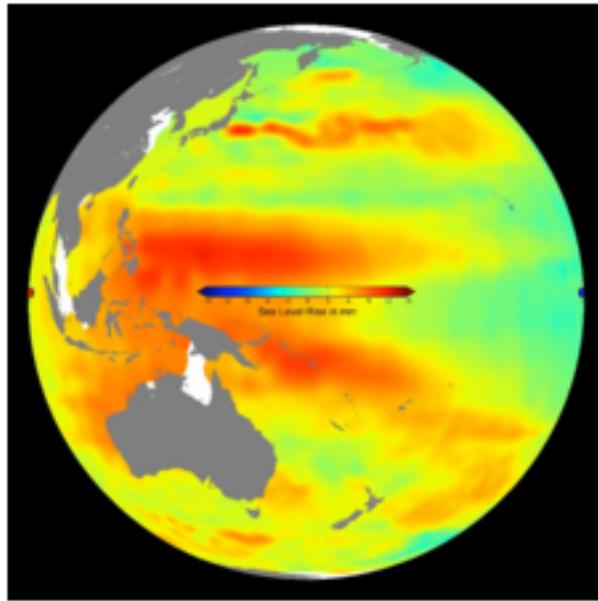
(2) Ice melting in a glass of water does not change the water level (test it yourself!) So, when sea ice melts it does not affect sea level directly. But melting land ice (ice sheets and glaciers) do add to sea level.

Task B: Watch a video about sea level trends by going to <http://sos.noaa.gov/Datasets/dataset.php?id=373>, which represents data about sea level trends from 1993 – 2012. It lasts 1 minute and 57 seconds. In order to watch the video, you will need to download it onto your computer first.

Look For: When you are watching the sea level video, pay attention to these things:

1. *The colors.* The blue indicates anomalies (or changes) in sea level that are below average. The red indicates anomalies (or changes) in sea level that are higher than average.
2. *The picture of the earth.* Note where the colors appear.
3. *The time scale.* The video shows one picture of sea level anomalies (changes) starting in 1993 and going until 2012.

Figure 1: Sea Level Change Video



Questions: Answer these questions about the video.

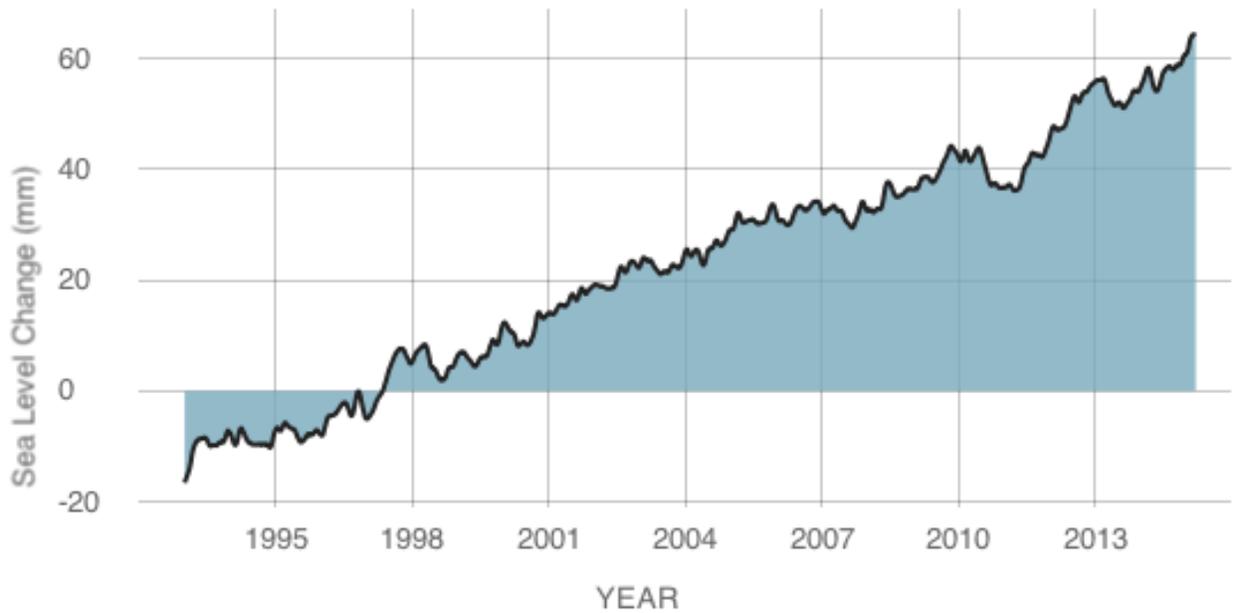
1. This video shows sea level change at different places on the planet. Which regions have the highest sea level change?

2. Does the animation suggest any global patterns in sea level during the period of 1993 – 2012? In other words, was there any overall trend in the data presented in the video?

3. What questions do you have about the video or the data it represents?

□ **Task C:** Interpret a graph about sea level change.

Figure 2: Sea Level Change 1993-2015¹



Questions: Answer these questions about the graph.

4. What was the sea level change in 1998? _____ mm. Circle this place on the graph.
5. What was the sea level change in 2013? _____ mm. Circle this place on the graph.
6. What is the overall trend in global sea level?

¹ Credit: NASA Goddard Space Flight Center <http://climate.nasa.gov/vital-signs/sea-level/>

□ **Task D:** Complete the charts below. Discuss anything you don't understand with your group or teacher. Use this to explain your phenomenon to your home group.

Representation

	What variables are represented?	Which part(s) of the Earth are represented?	What time period is represented?
Video			
Graph			

Generalizability

What information does the video tell us that the graph (Figure 3) leaves out?	What does the graph (Figure 3) tell us that the video leaves out?	Which of Earth's regions are included?	What does this data tell you about global patterns?

Short-Term Variability vs Long-Term Trends

Describe the short-term variability in the data. Is it predictable or unpredictable?	Describe the long-term trend in the data. Is it predictable or unpredictable?