

Warmer Oceans & Rising Sea Level

Adapted from "A Student's Guide to Global Climate Change" from EPA.gov

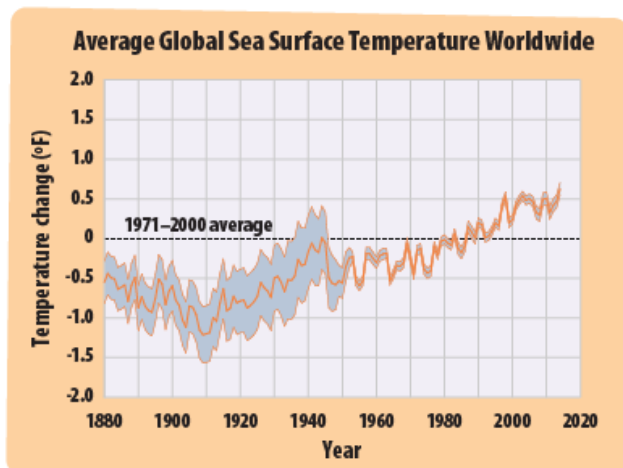


Warmer Oceans

The atmosphere affects oceans, and oceans influence the atmosphere. As the temperature of the air rises, oceans absorb some of this heat and also become warmer.

What's happening now?

Overall, the world's oceans are warmer now than at any point in the last 50 years. The change is most obvious in the top layer of the ocean, which has grown much warmer since the late 1800s. This top layer is now getting warmer at a rate of 0.2°F per decade.



The surface of the world's oceans has become warmer overall since 1880. In this graph, the shaded band shows the likely temperature range, which depends on the number of measurements and the methods used at different times.

Source: EPA's Climate Change Indicators (2016).

What will happen in the future?

Oceans are expected to continue getting warmer—both in the top layer and in deeper waters. Even if people stop adding extra greenhouse gases to the atmosphere now, oceans will continue to get warmer for many years as they slowly absorb extra heat from the atmosphere.

Why does it matter?

Warmer oceans affect weather patterns, cause more powerful tropical storms, and can impact many kinds of sea life, such as corals and fish. Warmer oceans are also one of the main causes of rising sea level.

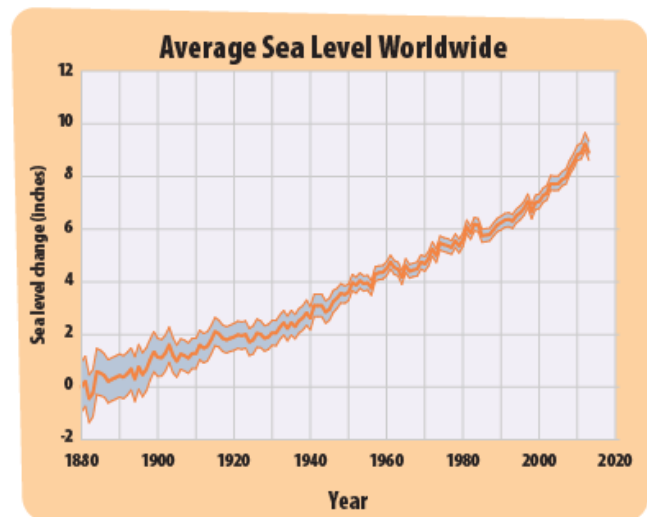
Rising Sea Level



As water gets warmer, it takes up more space. Each drop of water only expands by a little bit, but when you multiply this expansion over the entire depth of the ocean, it all adds up and causes sea level to rise. Sea level is also rising because melting glaciers and ice sheets are adding more water to

the oceans.

Average sea level around the world has been rising for many years. In this graph, the shaded band shows the likely range of sea level, which depends on the number of measurements and the methods used at different times. Source: EPA's Climate Change Indicators (2016).



What is happening now?

Over the past 100 years, the average sea level around the world rose by nearly 7 inches. Did you know that sea level can change by different amounts in different places?

What will happen in the future?

If people keep adding greenhouse gases to the atmosphere, the average sea level around the world by the end of this century (the year 2099) could be anywhere from 7 to 23 inches higher than it was in 1990. Sea level could rise even more if the big ice sheets in Greenland and Antarctica melt faster.

Why does it matter?

Rising sea level is a threat to people who live near the ocean. Some low-lying areas will have more frequent flooding, and very low-lying land could be submerged completely. Rising sea level can also harm important coastal ecosystems like mangrove forests and coral reefs.

Warmer Oceans & Rising Sea Level Questions

1. What is happening to the ocean temperature?
2. The change to ocean temperature means there is:
 - a. Less heat energy
 - b. More heat energy
 - c. No change to heat energy
3. How does the change to heat energy affect the ocean water particles? Draw or explain in the boxes below.

Water particles before	Water particles after the oceans are warmer

4. How does the change to ocean water particles explain the rise in sea levels?
5. Why does it matter that sea levels are rising?