

Is sea level rising?

Yes, sea level is **rising at an increasing rate**.



With continued ocean and atmospheric warming, sea levels will likely rise for many centuries at rates higher than that of the current century. In the United States, almost 40 percent of the population lives in relatively high-population-density coastal areas, where sea level plays a role in flooding, shoreline erosion, and hazards from storms. Globally, eight of the world's 10 largest cities are near a coast, according to the U.N. Atlas of the Oceans.

What's the difference between global and local sea level?

Global sea level trends and relative sea level trends (<http://tidesandcurrents.noaa.gov/sltrends/faq.htm#q1>) are different measurements. Just as the surface of the Earth is not flat, the surface of the ocean is also not flat—in other words, the sea surface is not changing at the same rate globally. Sea level rise at specific locations (<https://tidesandcurrents.noaa.gov/sltrends/sltrends.html>) may be more or less than the global average due to many local factors: subsidence (</facts/subsidence.html>), upstream flood control, erosion, regional ocean currents (</facts/current.html>), variations in land height, and whether the land is still rebounding from the compressive weight of Ice Age glaciers (</facts/glacial-adjustment.html>).

Sea level is primarily measured using tide stations (<https://www.climate.gov/news-features/climate-tech/reading-between-tides-200-years-measuring-global-sea-level>) and satellite laser altimeters (</facts/satellites-ocean.html>). Tide stations around the globe tell us what is happening at a local level—the height of the water as measured along the coast relative to a specific point on land. Satellite measurements provide us with the average height of the entire ocean. Taken together, these tools tell us how our ocean sea levels are changing over time.

Global sea level (<https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>) has been rising over the past century, and the rate has increased in recent decades. In 2014, global sea level was 2.6 inches (67 mm) above the 1993 average—the highest annual average in the satellite record (1993-present). Sea level continues to rise at a rate of about one-eighth of an inch (3.2 mm) per year.

Higher sea levels mean that deadly and destructive storm surges (</facts/stormsurge-stormtide.html>) push farther inland than they once did, which also means more frequent nuisance flooding (</facts/nuisance-flooding.html>). Disruptive and expensive, nuisance flooding is estimated to be from 300 percent to 900 percent more frequent within U.S. coastal communities than it was just 50 years ago.

The two major causes of global sea level rise are thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting of land-based ice, such as glaciers and ice sheets. The oceans are absorbing more than 90 percent of the increased atmospheric heat associated with emissions from human activity.

With continued ocean and atmospheric warming, sea levels will likely rise for many centuries at rates higher than that of the current century. In the United States, almost 40 percent (/facts/population.html) of the population lives in relatively high-population-density coastal areas, where sea level plays a role in flooding, shoreline erosion, and hazards from storms. Globally, eight of the world's 10 largest cities are near a coast, according to the U.N. Atlas of the Oceans.

Sea level rise at specific locations (http://tidesandcurrents.noaa.gov/sltrends/sltrends.html) may be more or less than the global average due to local factors such as land subsidence from natural processes and withdrawal of groundwater and fossil fuels, changes in regional ocean currents, and whether the land is still rebounding from the compressive weight of Ice Age glaciers. In urban settings, rising seas threaten infrastructure necessary for local jobs and regional industries. Roads, bridges, subways, water supplies, oil and gas wells, power plants, sewage treatment plants, landfills—virtually all human infrastructure—is at risk from sea level rise.

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- Sea Level Rise Learning Module (NOS Education Video) (/education/sea-level-rise/welcome.html)
- Inundation Dashboard (http://tidesandcurrents.noaa.gov/inundationdb/)
- Global Sea Level Rise (Ocean Today Video) (http://ocean today.noaa.gov/globalvslocalesealevel/welcome.html)
- Sea Level Rise Viewer (https://coast.noaa.gov/digitalcoast/tools/slr)
- Intergovernmental Panel on Climate Change (https://oceanservice.noaa.gov/goodbye.html?url=https%3A%2F%2Fwww.ipcc.ch%2F)
- Sea Levels Online (http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml)
- Sea Level Rise (NOAA Science on a Sphere®) (http://sos.noaa.gov/Datasets/dataset.php?id=184)

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