

SEA LEVEL RISE

Core samples, tide gauge readings, and, most recently, satellite measurements tell us that over the past century, the Global Mean Sea Level (GMSL) has risen by 10 to 20 cm. Over the past century, the burning of fossil fuels and other human and natural activities has released enormous amounts of heat-trapping gases into the atmosphere. These emissions have caused the Earth's surface temperature to rise, and the oceans absorb about 80 percent of this additional heat.



The rise in sea levels is linked to three primary factors, all induced by this ongoing global climate change:

Thermal expansion: When water heats up, it expands. About half of the past century's rise in sea level is attributable to warmer oceans simply occupying more space.

Melting of glaciers and polar ice caps: Large ice formations, like glaciers and the polar ice caps, naturally melt back a bit each summer. But in the winter, snows, made primarily from evaporated seawater, are generally sufficient to balance out the melting.

Recently, though, persistently higher temperatures caused by global warming have led to greater-than-average summer melting as well as diminished snowfall due to later winters and earlier springs. This imbalance results in a significant net gain in runoff versus evaporation for the ocean, causing sea levels to rise.

Ice loss from Greenland and West Antarctica: As with glaciers and the ice caps, increased heat is causing the massive ice sheets that cover Greenland and Antarctica to melt at an accelerated pace. Scientists also believe meltwater from above and seawater from below is seeping beneath Greenland's and West Antarctica's ice sheets, effectively lubricating ice streams and causing them to move more quickly into the sea. Moreover, higher sea temperatures are causing the massive ice shelves that extend out from Antarctica to melt from below, weaken, and break off.

Consequences

When sea levels rise rapidly, as they have been doing, even a small increase can have devastating effects on coastal habitats. As seawater reaches farther inland, it can cause destructive erosion, flooding of wetlands, contamination of aquifers and agricultural soils, and lost habitat for fish, birds, and plants. When large storms hit land, higher sea levels mean bigger, more powerful storm surges that can strip away everything in their path. In addition, hundreds of millions of people live in areas that will become increasingly vulnerable to flooding. Higher sea levels would force them to abandon their homes and relocate. Low-lying islands could be submerged completely.



FUTURE PREDICTIONS (below)

(above) DISTRIBUTION OF HAZ-

- Sea levels will continue to rise
- Predicted rise of 0.26 - 0.98 metres in sea level by 2100. 150 million people around the world live less than one metre above sea level.
- Melting of Greenland's ice would cause a 7 metre rise in sea level. This could happen with a 2 to 4C rise in temperature.
- There will be an increase in the frequency and intensity of storms



(Left) Low-lying coral atoll islands, such as Tuvalu (Pacific) are at high risk. (Centre) Greenland's ice calving into the ocean. (Right) Low-lying cities such as Venice (photographed) and New York will have to plan for rising sea levels.