Sea level

How is sea level changing?

As we burn fossil fuels such as coal, peat, oil, and methane gas, we add carbon dioxide to our atmosphere which acts like a heat trapping blanket. This burning adds more and more carbon dioxide to our atmosphere causing rampant levels to build up like thickening the blanket and trapping in more heat. This excess heat is causing temperature to increase around the world. As air and ocean temperatures warm, ice on land from glaciers and ice sheets melt and seawater expands causing sea levels to rise around the world. Changes in sea level are also driven by changes in the density of seawater, land movements (i.e., subsidence, uplift, and tectonics), and changes in land water storage.

Why does sea-level rise matter?

Sea-level rise is a concern because it increases the threat of flooding. Increasing water levels allow tides and storm surge to reach further inland and flood more frequently. More frequent tidal flooding and amplified storm surges can disrupt everyday life, cause damage, and lead to injury or death. Understanding the probability of local sea-level rise can help inform the design of protective strategies to reduce flood threats.

Observations used in the Outlooks

At locations around the world, tide gauges are measuring changes in sea-level. This global network of tide gauges is collected, analyzed, and published by the Permanent Service for Mean Sea Level (PSMSL) (PSMSL, 2021; Holgate et al., 2013). The *Local Hazard Outlooks* use the closest PSMSL tide gauge to the county of interest for local sea level observations.

Projections used in the Outlooks

Projections of sea level rise have advanced over the past decade as the scientific community continues to improve these projections over time. As such, there are a variety of projections available at the local level. The sea-level rise projections chosen for the *Local Hazard Outlooks* were selected to match those used by each state for official planning purposes.

- Delaware sea level projections (Callahan et al., 2017)
- Maryland sea level projections (Boesch et al., 2018)
- Philadelphia region sea level projections (Office of Sustainability, 2015)
- Virginia sea level projections (Sweet et al., 2017)
- Washington, DC sea level projections (Wells et al., 2015)

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