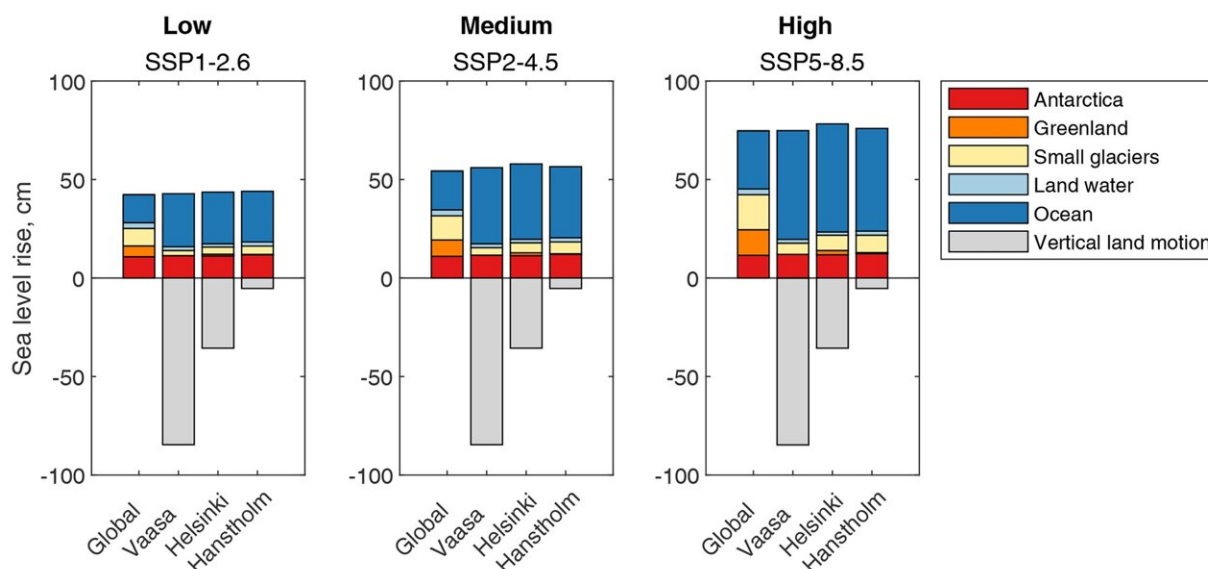


Land uplift protects the Finnish coast from rising sea levels, but not endlessly

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Median sea level rise projections of IPCC AR6 (medium confidence, 2100 relative to 1995–2014) divided into different components, for three emission scenarios. The ocean component includes thermal expansion and ocean dynamical effects. The global projection is shown together with three local projections: Vaasa and Helsinki at the Finnish coast, Hanstholm at the North Sea coast of Denmark. Credit: *Natural Hazards and Earth System Sciences* (2023). DOI: 10.5194/nhess-23-1613-2023

A recent study calculated new projections for mean sea level rise on the Finnish coast by 2100. In the worst-case scenario, the sea level in

Helsinki would rise by more than half a meter.

The [sea level](#) is rising at an increasing rate due to the melting of glaciers and ice sheets caused by [global warming](#) and the thermal expansion of sea water. In Finland, the phenomenon of land uplift protects the coast from rising sea levels, but in the future, the speed of land uplift will not be enough to completely compensate for [sea level rise](#). The coastal flood risk is expected to increase, particularly on the southern coast of Finland, by the end of the century.

The newly published joint study between the Finnish Meteorological Institute and Aalto University has calculated new projections for future mean sea level in Finland by 2100. Sea level rise will increase flood risks on Finland's southern coast in the coming decades. On the coast of the Bothnian Bay, the rate of land uplift is faster, but there too, the decline in sea level will slow down.

However, the greatest effects of sea level rise will only be felt after 2100. If we do not succeed in mitigating [greenhouse gas emissions](#), sea level may rise by several meters over the following centuries. Such a great increase would have significant impacts in Finland as well. The work is published in the journal *Natural Hazards and Earth System Sciences*.

Emission trends affect future projections

The new projections are based on extensive international research data and climate model results. In addition to rising sea levels and land uplift, they have taken into account special characteristics of the Baltic Sea region, such as the effect of changes in the wind climate on water exchange between the Baltic Sea and the Atlantic Ocean in the Danish straits.

The projections have been calculated for three different emission scenarios representing different future pathways of how greenhouse gas emissions by humanity may develop. If global emissions could be mitigated quickly, the sea level in Helsinki would rise by about 9 cm by the end of this century. The corresponding figure under the medium emission scenario would be 25 cm and under the high emission scenario 54 cm.

On the coast of the Bothnian Bay, land uplift is stronger, so in Vaasa, for example, according to the most probable scenario, the sea level is not yet expected to rise during this century.

Glaciers and ice sheets may melt faster than expected

There are major uncertainties associated with the projections of sea level rise, especially as regards the melting of the ice sheets of Greenland and Antarctica. The melting of Greenland would only have a minor effect on the sea level in Finland, as the change in the [gravity field](#) related to the melting of glaciers and ice sheets overrules the rise in the proximity of where it takes place. The melting of Antarctica, on the other hand, would have a full effect in our region.

The possibility of the glaciers and ice sheets of West Antarctica melting faster than expected cannot be completely ruled out. Therefore, the new sea level rise projections have been calculated comprehensively for different probability distributions so that the possibility of higher sea level rise can also be taken into account in high-risk applications.

More information: Havu Pellikka et al, Probabilistic projections and past trends of sea level rise in Finland, *Natural Hazards and Earth System Sciences* (2023). [DOI: 10.5194/nhess-23-1613-2023](https://doi.org/10.5194/nhess-23-1613-2023)

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