

Models without volcanic forcing underestimate sea level rise

May 28 2013

Volcanic eruptions spew sulfur dioxide into the atmosphere, which tends to block incoming sunlight, sometimes cooling the planet for several years. This cooling leads to a decrease in the heat stored in the ocean and thus in the rate of ocean thermal expansion and sea level rise. These effects can be seen in simulations that include variations in volcanic aerosol.

It is common practice in climate modeling to omit volcanic forcing in the control simulations that are used as a reference state to compare with simulations of modern times. But this omission can lead modelers to underestimate the recent increase in ocean thermal expansion, Gregory et al. show.

They find that [global sea level](#) rise due to thermal expansion in the past 150 years is underestimated by 5 to 30 millimeters (0.2 to 1.2 inches) in a range of models. This underestimate represents a substantial portion of sea level rise over that time period; models that include only anthropogenic forcing show a mean total [sea level rise](#) of 50 millimeters (2 inches).

The authors also developed and tested a method to correct for this underestimation of ocean thermal expansion.

More information: "Climate models without pre-industrial volcanic forcing underestimate historical ocean thermal expansion", *Geophysical Research Letters*, [doi:10.1002/grl.50339](https://doi.org/10.1002/grl.50339), 2013.

Provided by American Geophysical Union

Citation: Models without volcanic forcing underestimate sea level rise (2013, May 28) retrieved 26 April 2024 from <https://phys.org/news/2013-05-volcanic-underestimate-sea.html>

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