



This is the print version of the [Skeptical Science](http://sks.to/sealevel) article '[Sea level rise is exaggerated](http://sks.to/sealevel)', which can be found at <http://sks.to/sealevel>.

How much is sea level rising?

What The Science Says:

A variety of different measurements find steadily rising sea levels over the past century.

Climate Myth: Sea level rise is exaggerated

"We are told sea level is rising and will soon swamp all of our cities. Everybody knows that the Pacific island of Tuvalu is sinking. ...

Around 1990 it became obvious the local tide-gauge did not agree - there was no evidence of 'sinking.' So scientists at Flinders University, Adelaide, set up new, modern, tide-gauges in 12 Pacific islands.

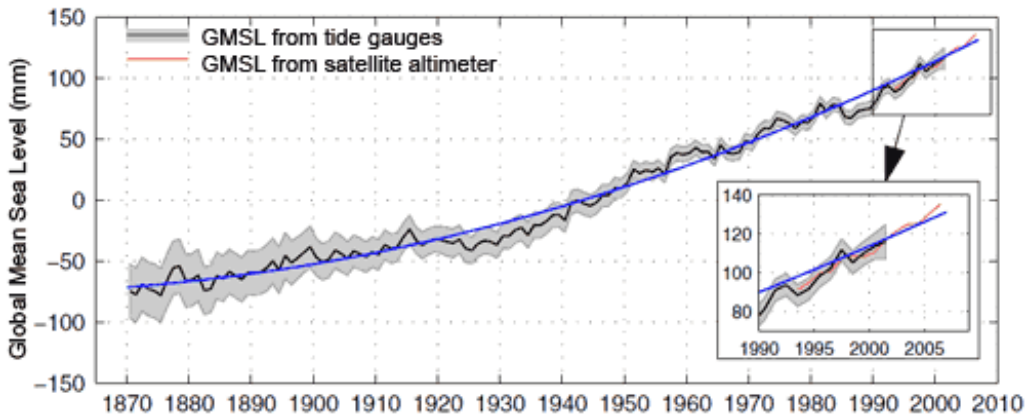
Recently, the whole project was abandoned as there was no sign of a change in sea level at any of the 12 islands for the past 16 years." ([Vincent Gray](#)).

[Gavin Schmidt investigated](#) the claim that tide gauges on islands in the Pacific Ocean show no sea level rise and found that the data show a rising sea level trend at every single station. But what about global sea level rise?

Sea level rises as ice on land melts and as warming ocean waters expand. As well as being a threat to coastal habitation and environments, sea level rise corroborates other evidence of global warming

The blue line in the graph below clearly shows sea level as rising, while the upward curve suggests sea level is rising faster as time goes on. The upward curve agrees with global temperature trends and with the accelerating melting of ice in Greenland and other places.

Because sea level behavior is such an important signal for tracking climate change, skeptics seize on the sea level record in an effort to cast doubt on this evidence. Sea level bounces up and down slightly from year to year so it's possible to cherry-pick data falsely suggesting the overall trend is flat, falling or linear. You can try this yourself. Starting with two closely spaced data points on the graph below, lay a straight-edge between them and notice how for a short period of time you can create almost any slope you prefer, simply by being selective about what data points you use. Now choose data points farther apart. Notice that as your selected data points cover more time, the more your mini-graph reflects the big picture. The lesson? Always look at all the data, don't be fooled by selective presentations.



graph from [Church 2008](#)

Other skeptic arguments about sea level concern the validity of observations, obtained via tide gauges and more recently satellite altimeter observations.

Tide gauges must take into account changes in the height of land itself caused by local geologic processes, a favorite distraction for skeptics to highlight. Not surprisingly, scientists measuring sea level with tide gauges are aware of and compensate for these factors. Confounding influences are accounted for in measurements and while they leave some noise in the record they cannot account for the observed upward trend.

Various technical criticisms are mounted against satellite altimeter measurements by skeptics. Indeed, deriving millimeter-level accuracy from orbit is a stunning technical feat so it's not hard to understand why some people find such an accomplishment unbelievable. In reality, researchers demonstrate this height measurement technique's accuracy to be within 1mm/year. Most importantly there is no form of residual error that could falsely produce the upward trend in observations.

As can be seen in an inset of the graph above, tide gauge and satellite altimeter measurements track each other with remarkable similarity. These two independent systems mutually support the observed trend in sea level. If an argument depends on skipping certain observations or emphasizes uncertainty while ignoring an obvious trend, that's a clue you're being steered as opposed to informed. Don't be misled by only a carefully-selected portion of the available evidence being disclosed.

Current sea level rise is after all not exaggerated, in fact the opposite case is more plausible. Observational data and changing conditions in such places as Greenland suggest if there's a real problem here it's underestimation of future sea level rise. IPCC synthesis reports offer conservative projections of sea level increase based on assumptions about future behavior of ice sheets and glaciers, leading to estimates of sea level roughly following a linear upward trend mimicking that of recent decades. In point of fact, observed sea level rise is already above IPCC projections and strongly hints at acceleration while at the same time it appears the mass balance of continental ice envisioned by the IPCC is overly optimistic ([Rahmstorf 2010](#)).

Basic rebuttal written by doug_bostrom

Update July 2015:

Here is a related lecture-video from [Denial101x - Making Sense of Climate Science Denial](#)



Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a [college textbook on climate change](#) and the book [Climate Change Denial: Heads in the Sand](#). Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.



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