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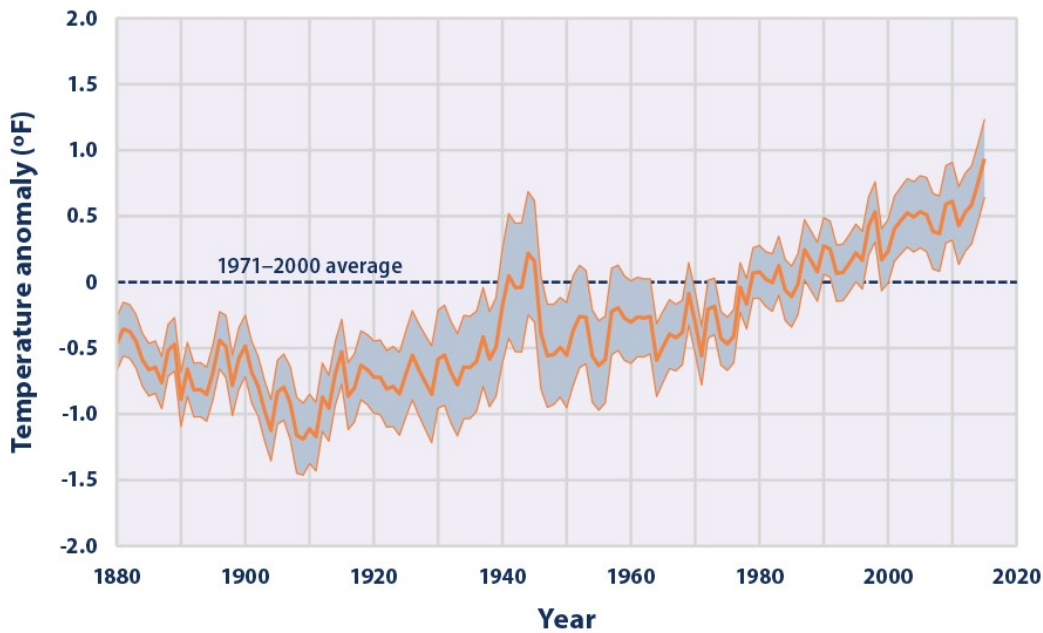


# Climate Change Indicators: Sea Surface Temperature

This indicator describes global trends in sea surface temperature.

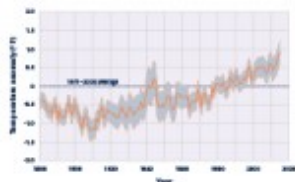


Figure 1. Average Global Sea Surface Temperature, 1880–2015

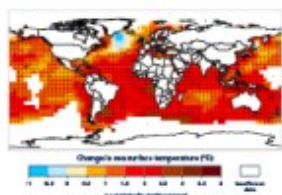


This graph shows how the average surface temperature of the world's oceans has changed since 1880. This graph uses the 1971 to 2000 average as a baseline for depicting change. Choosing a different baseline period would not change the shape of the data over time. The shaded band shows the range of uncertainty in the data, based on the number of measurements collected and the precision of the methods used.

Data source: NOAA, 2016<sup>6</sup>  
Web update: August 2016



**Figure 1.** Average Global Sea Surface Temperature, 1880–2015



**Figure 2.** Change in Sea Surface Temperature, 1901–2015

Key Points

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## Key Points

- Sea surface temperature increased during the 20<sup>th</sup> century and continues to rise. From 1901 through 2015, temperature rose at an average rate of 0.13°F per decade (see Figure 1).
- Sea surface temperature has been consistently higher during the past three decades than at any other time since reliable observations began in 1880 (see Figure 1).
- Based on the historical record, increases in sea surface temperature have largely occurred over two key periods: between 1910 and 1940, and from about 1970 to the present. Sea surface temperature appears to have cooled between 1880 and 1910 (see Figure 1).
- Changes in sea surface temperature vary regionally. While most parts of the world's oceans have seen temperature rise, a few areas have actually experienced cooling—for example, parts of the North Atlantic (see Figure 2).

## References

- <sup>1</sup>. For example, see: Ostrander, G.K., K.M. Armstrong, E.T. Knobbe, D. Gerace, and E.P. Scully. 2000. Rapid transition in the structure of a coral reef community: The effects of coral bleaching and physical disturbance. *P. Natl. Acad. Sci. USA*. 97(10):5297–5302.
- <sup>2</sup>. Pratchett, M.S., S.K. Wilson, M.L. Berumen, and M.I. McCormick. 2004. Sublethal effects of coral bleaching on an obligate coral feeding butterflyfish. *Coral Reefs* 23(3):352–356.
- <sup>3</sup>. IPCC (Intergovernmental Panel on Climate Change). 2013. *Climate change 2013: The physical science basis. Working Group I contribution to the IPCC Fifth Assessment Report*. Cambridge, United Kingdom: Cambridge University Press. [www.ipcc.ch/report/ar5/wg1](http://www.ipcc.ch/report/ar5/wg1).
- <sup>4</sup>. IPCC (Intergovernmental Panel on Climate Change). 2013. *Climate change 2013: The physical science basis. Working Group I contribution to the IPCC Fifth Assessment Report*. Cambridge, United Kingdom: Cambridge University Press. [www.ipcc.ch/report/ar5/wg1](http://www.ipcc.ch/report/ar5/wg1).
- <sup>5</sup>. Trtanj, J., L. Jantarasami, J. Brunkard, T. Collier, J. Jacobs, E. Lipp, S. McLellan, S. Moore, H. Paerl, J. Ravenscroft, M. Sengco, and J. Thurston. 2016. Chapter 6: Climate impacts on water-related illness. *The impacts of climate change on human health in the United States: A scientific assessment*. U.S. Global Change Research Program. <https://health2016.globalchange.gov>.
- <sup>6</sup>. NOAA (National Oceanic and Atmospheric Administration). 2016. Extended reconstructed sea surface temperature (ERSST.v4). National Centers for Environmental Information. Accessed March 2016. [www.ncdc.noaa.gov/data-access/marineocean-data/extended-reconstructed-sea-surface-temperature-ersst](http://www.ncdc.noaa.gov/data-access/marineocean-data/extended-reconstructed-sea-surface-temperature-ersst).
- <sup>7</sup>. IPCC (Intergovernmental Panel on Climate Change). 2013. *Climate change 2013: The physical science basis. Working Group I contribution to the IPCC Fifth Assessment Report*. Cambridge, United Kingdom: Cambridge University Press. [www.ipcc.ch/report/ar5/wg1](http://www.ipcc.ch/report/ar5/wg1).
- <sup>8</sup>. NOAA (National Oceanic and Atmospheric Administration). 2016. NOAA Merged Land Ocean Global Surface Temperature Analysis (NOAAGlobalTemp): Global gridded 5° x 5° data. National Centers for Environmental Information. Accessed June 2016. [www.ncdc.noaa.gov/data-access/marineocean-data/noaa-global-surface-temperature-noaaglobaltemp](http://www.ncdc.noaa.gov/data-access/marineocean-data/noaa-global-surface-temperature-noaaglobaltemp).

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LAST UPDATED ON DECEMBER 17, 2016