Century-long trend of global ocean warming identified

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One of the largest sources of uncertainty in reconstructing the warming of the past century stems from problems with historical ocean temperature records. Inconsistencies in method or technology or gaps in observation caused by two world wars mean that long-term records of sea temperature need to be interpreted with care.

Drawing on two historical sets of ocean temperature observations—one of the sea surface and the other of the upper 20 meters (66 feet)—Gouretski et al. find that the 20th century saw a long-term trend of ocean warming. The two data sets were mostly collected independently, using different tools and techniques, and were subjected to different post processing. The authors suggest that, owing to the distinct ways in which the data were gathered, the presence of a similar trend could mean that it is not a spurious finding.

Before the middle of the twentieth century, sea temperatures were predominantly measured from water collected in ships' engine rooms. At the end of World War II, bucket-collected water became the tool of choice, a shift that caused a sharp dip in measured temperatures. Instrumental biases from subsequent (and earlier) shifts in technology were accounted for to varying degrees. Drawing from a number of databases, the authors compiled more than 7 million subsurface temperature profiles, together with 244 million sea surface temperature measurements from the International Comprehensive Ocean Atmosphere Data Set, representing observations back to 1900.

The authors find that sea surface and upper 20 meters (66 feet) temperatures generally tracked each other throughout the study period, though surface temperatures were higher than those of the subsurface. Both records show warming from 1900 to 1945, a decrease until the mid-1970s, and then a return to warming. Additionally, the authors find that, on average, the upper 400 meters (1,312 feet) of the ocean warmed by 0.5 degrees Celsius (0.9 degrees Fahrenheit) to 0.6 degrees Celsius (1 degree Fahrenheit) from 1900 to 2000.

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