

New approach to correct systematic errors in bottle data of ocean temperature

September 14 2022, by Li Yuan



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In the 20th century, oceanographers mainly used two ocean-water samplers to determine the essential physical properties of seawater: Nansen bottles, made of metal with thermometers attached to record the

temperature and pressure of the sample site, and electronic temperature profilers, or CTDs—an acronym for conductivity, temperature and depth.

Though a high degree of consistency between the Nansen cast and CTD data was confirmed on general, a systematic sample depth overestimation was detected for Nansen cast temperature profiles.

Recently, Cheng Lijing and Viktor Gouretski from the Institute of Atmospheric Physics (IAP) of the Chinese Academy of Sciences (CAS) and Tim Boyer from the National Centers for Environmental Information, for the first time, described the results of the global inter-comparison between the collocated Nansen cast and CTD temperature profiles.

The study was published in the *Journal of Atmospheric and Oceanic Technology*.

The origin of this depth bias is related to the method of sample depth estimation. For CTD profiles, sample depth is estimated from the high precision pressure sensor, whereas the sample depth for a considerable part of Nansen cast profiles is given by the length of the wire put out.

"The shape of the wire in the water is not known and the wire usually deviates from the [vertical position](#), so that [temperature](#) is actually measured at a shallower level compared to the target sample depth," said Viktor Gouretski.

"Correcting Nansen cast sample depth has a significant impact on the estimates of the warming rate of the World Ocean," said Cheng Lijing. "We hope this correction method can help achieve better understanding of ocean warming."

More information: Viktor Gouretski et al, On the Consistency of the Bottle and CTD Profile Data, *Journal of Atmospheric and Oceanic Technology* (2022). [DOI: 10.1175/JTECH-D-22-0004.1](https://doi.org/10.1175/JTECH-D-22-0004.1)

Provided by Chinese Academy of Sciences

Citation: New approach to correct systematic errors in bottle data of ocean temperature (2022, September 14) retrieved 27 April 2024 from <https://phys.org/news/2022-09-approach-systematic-errors-bottle-ocean.html>

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