

A New View of XBT Biases

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We present a new analysis of biases in historical eXpendable BathyThermograph (XBT) data, which comprises ~70% of pre-Argo ocean temperature profile data and thus are fundamental to our understanding of the planetary energy budget and thermosteric contributions to sea level rise over recent decades. A data-base of over 5000 side-by-side deployments of XBTs and Conductivity-Temperature-Depth (CTD) sensor data is used to separate out a pure temperature bias from a depth biases from the late-1960's to the present. The large number of assembled pairs allows small biases to be detected in the face of considerable drop-to-drop noise. A consistently warm pure temperature bias is found in all instruments and probe types examined. A time-variable depth bias is also found in the most commonly deployed XBT probes. We also explore the possible impacts of recorder type and environmental temperature on these biases.