



Abstract View

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An Evaluation of the Quality of Sea Surface Temperatures and Salinities Measured at Station P and Line P in the Northeast Pacific Ocean

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ABSTRACT

A variety of oceanographic data comprising mainly temperatures collected by bucket, engine-intake, reversing thermometers and thermosalinograph, and salinities obtained with bucket, seawater loop, deep-sea sampling bottles and thermosalinograph has been gathered by various Canadian weatherships during the 20 years (1956–76) at Station P and along Line P.

The quality of sea surface temperatures and salinities observed by the oceanographic observers at Station P improved conspicuously in 1969, at which time observing techniques were altered. The accuracy of the data improved fourfold. For the period 1969–76, surface temperatures collected by the meteorological observers using specially designed bucket thermometers have been found to be correct to within $\pm 0.1^\circ\text{C}$.

The mean difference between the bucket and the engine-intake temperatures underwent appreciable change from one cruise to another and from one ship to the other, in much the same manner as noted by Saur (1963) for U.S. Navy ships. However, unlike Saur's mean cruise standard deviation, which varied considerably for each ship from one voyage to another, that associated with the present observations remained relatively unchanged, varying between ± 0.1 and $\pm 0.2^\circ\text{C}$ for all four ships. If appropriate field calibrations are made, the engine-intake method appears to provide data with the same accuracy as that obtainable by the bucket method. The mean temperature differences between the bucket and thermosalinograph temperatures also varied from one cruise to another and from one ship (instrument) to another, as did the corresponding differences between seawater-loop and thermosalinograph salinities. However, the mean cruise standard deviations of temperature and salinity were almost the same for all three ships (*Vancouver*, *Quadra* and *Parizeau*), that is, $\pm 0.13^\circ\text{C}$ for temperature and $\pm 0.25\%$ for salinity. Here again, if appropriate field calibrations are applied, the thermosalinographs appear to be capable of giving temperature to an accuracy of $\pm 0.1^\circ\text{C}$ and salinity to $\pm 0.03\%$. As is the case for the engine-intake temperature recorders, the need for frequent calibration is evident.

A complete explanation for the cause of cruise-to-cruise differences between the bucket and engine-intake temperatures is not yet available. For this reason it would be advisable that this problem be resolved before the

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engine-intake method for acquiring temperatures is widely adapted by merchant and naval ships for scientific applications.

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