**Salinity¶**

PIs

* Susan Becker (SIO)
* James Swift (SIO)

Technicians

* Laurette Roy (Tech Pool)
* Gabriel Matthias (Tech Pool)

**Equipment and Techniques¶**

Two Guildline Autosals were on board and operational, SIO-owned 8400A S/N 57-526, and S/N 55-564. S/N 57-526 was used for all salinity measurements during this cruise. The salinity analysis was run in the ship’s Climate Controlled Chamber, a refrigerator port and amidships between the Computer Lab and Analytical Lab. The chamber temperature varied between about 21 and 25 degrees Celsius around 3 times each hour, with an average (based on measuring temperatures of items in the chamber) of about 23C.

Both instruments were serviced prior to the cruise by their respective institutions. S/N57-526 was shipped to Guam and was the primary on the first leg of the PO2 occupation. S/N 55-654 was shipped to Hawaii with other equipment in March. IAPSO Standard Seawater Batch P-165 was used for all calibrations: K15 =0.99986, salinity 34.994, expiration 15 Apr 2024. A LabView program developed by Carl Mattson was used for monitoring temperatures, logging data and prompting the operator. Salinity analyses were performed after samples had equilibrated to laboratory temperature of 23°C, usually 8 hours or more after collection. The salinometer was standardized for each group of samples analyzed (normally 1 or 2 casts, up to 72 samples) using two bottles of standard seawater: one at the beginning and one at the end of each set of measurements.

Between runs, the water from the last standard was left in the cell. For each calibration standard and sample reading, the salinometer cell was initially flushed at least 2 times before a set of conductivity ratio readings was recorded.

**Sampling and Data Processing¶**

The salinity samples were collected in 200 ml Kimax high-alumina borosilicate bottles that had been rinsed at least three times with sample water prior to filling. The bottles were sealed with plastic insert thimbles and Nalgene screw caps. This assembly provides very low container dissolution and sample evaporation. Prior to sample collection, inserts were inspected for proper fit and loose inserts replaced to insure an airtight seal. Laboratory temperature was also monitored electronically throughout the cruise. PSS-78 salinity [UNESCO1981] was calculated for each sample from the measured conductivity ratios. The offset between the initial standard seawater value and its reference value was applied to each sample. Then the difference (if any) between the initial and final vials of standard seawater was applied to each sample as a function of elapsed run time. The corrected salinity data was then incorporated into the cruise database.

**Narrative¶**

No major problems were encountered during this cruise. Some red algae was seen growing in one case of sample bottles. Acid washing (10% HCl) solved the problem. Additional red algae was seen at the drain tube of the salinometer. Solved by leaving DI water in the machine for 8 hours.

Capillary tubes were carefully cleaned with MilliQ, followed by air, 3 times during the course of the cruise, to help with cell filling. The first cleaning included a run with diluted Triton-X.

3,265 total salinity samples were taken from 141 CTD casts. Four sample bottles were broken over the course of this cruise.

UNESCO1981

UNESCO 1981. Background papers and supporting data on the Practical Salinity Scale, 1978. UNESCO Technical Papers in Marine Science, No. 37 144.