Notes and Updates

11 Jan 2013 SZ: Received file from Michiyo. N:\SHARE\DATA\2008\2008-LSSL\2008-29-C3O\data\Chemistry\Alkalinity\LS2008-29C3OTA.xlsx

Data were analyzed on board by Marty Davelaar (July 2008). Last two casts were analyzed by Michiyo Kawai while she was on the following JOIS leg (Aug 2008).

Made edits to stations FS1 and vs1 where sample column was swapped with depth column (Sample3 143 to 163)

Created a sheet "Leg1 Transfer to Chem" and checked to see if any replicates (none and also none specified in electronic log)

No replicates collected so no SP.

Likely CTD salt was used for all calculations. It was for last two casts. CTD and WS agree w/in 0.2 PSU

Methods, but without standard information (from 2008-30 data report draft):

2.4.8 Alkalinity (Fresh Water)

Seawater samples were collected from Niskin bottles into 500 mL glass bottles for alkalinity measurements. XXX water samples from XX stations were collected and stored in the fridge until ~1 hour before analysis. Samples were analyzed on board the vessel within 48 hours after sampling by [ANALYST]. One third of samples were analyzed in replicate. Samples from the last several stations were stored in the cooler, with HgCl2 added to prevent biological activity, to be analyzed back on shore. The total alkalinity was determined by potentiometric titration using 0.1 N HCl with a Brinkman Dosimat 665, a Ross combination pH electrode, and an Orion pH meter model 725A. The Dosimat was controlled using a program written by the University of Hawaii.

The sample was weighed (~75 g) prior to analysis for onshore analysis. For on board analysis, a constant volume of sample or standard water was collected using a pipette and put into an open beaker. Pipette and sample bottles were kept at 4 °C in a water bath prior to analysis. Room temperature, used as acid temperature, was read by a digital thermometer mounted next to the alkalinity system. An initial amount of 0.1N HCl was added to the seawater to take its pH to approximately 3.5. Then, 0.025 mL aliquots of acid were added to the seawater until a final pH of approximately 3.0 was obtained. The University of Hawaii program was used to calculate the total alkalinity of the seawater by use of a Gran plot. A nominal weight of 100.55 g was used as an input value into the PC program for alkalinity calculation, which was determined by a “practical method” to obtain the assigned value of 2280.33 µmol/kg of IOS standard water (IOS-STD). The IOS-STD alkalinity was determined against the certified reference material supplied by A. Dickson, Scripps Institute of Oceanography. Obtained “raw” values of the samples were then corrected for density differences by using:

T\_Alk [µmol/kg] = T\_Alk [raw] \* density [STD] / density [sample]

where density of the IOS-STD at 4 °C is XXXX kg kg/m3. IOS standard water was measured daily before the sample measurements.

Standards and precision

The average concentration of IOS-STD was XXXX.XX ± X.XX µmol/kg; n = XX for the on board analysis and was XXXX.XX ± X.XX µmol/kg; n = XX for on shore analysis.

A plot of total alkalinity measurements vs. CTD-salinity was made simultaneously during analysis, and samples that seemed unusual in the plot were re-analyzed. In addition, a couple of samples were randomly chosen for each station and analyzed in duplicate. Pooled standard deviation for replicate analysis was sp = X.X (n = XXX).