

Comments on the oceanographic data from the Northwind cruise in 1963 to the Chukchi, east Siberian and Laptev Seas

Micromolar, micromoles/l and microgram atoms are equivalent when we say phosphate-phosphorus, nitrate-nitrogen, and reactive silicate-silicon.

Original data of Phosphate-phosphorus were given in microgram-atoms/l, also defined as "reactive phosphorus".

The method employed was based on an unpublished manuscript of Riley, but is similar to the molybdate methods used today. Ascorbic acid was used to produce the reduced molybdate complex, and I believe that the pH may have been a bit lower than in some of the methods used today (e.g. JGOFS and WOCE protocols).

There are two columns for PO₄-P because reactive phosphorus was determined on fresh samples soon after collection and on frozen samples (in the original data the second column was labeled PO₄-P^{**}(I)).

This is important, because nitrate and silicate were determined only on frozen samples and some of these samples were not collected and/or stored properly. All values are reported, but when the fresh and frozen phosphate values do not agree, you should assume that the nitrate and silicate data are bad. What "agreement" means is a judgement call, but in those days, the phosphate results were probably accurate to within about 5% of mid-range values assuming that they were collected, frozen and stored properly. As a rough rule of thumb, I would say that the fresh and frozen samples should agree within ~10% if there were no problems with the frozen samples. Only the PO₄-P data should be used without careful comparison of the fresh and frozen PO₄-P^{**}(I) results.

Original data of nitrate-nitrogen were given in microgram-atoms/l. The method employed was that described by Mullin and Riley (1955) in Anal. Chim. Acta. 12:464-480.

Original data of reactive silicate-silicon $\text{SiO}_4\text{-Si}$ is given as silicate in micromolar. The "silicate" that we determine is present as silicic acid. The method employed was that of Mullin and Riley (1955) in *Anal. Chim. Acta.* 12:162-176.

The pH data are probably useless.

Dissolved oxygen and nitrogen values were determined using a gas chromatograph according to the method of Swinnerton, Linnebom and Cheek (1962a&b), *Analytical Chemistry* 34:483-485 and 34:1509. Although the dissolved nitrogen values can deviate from the 100% saturation value for a variety of reason, I would view as suspicious any dissolved oxygen on nitrogen value for which the dissolved nitrogen value is more than 10% different from the equilibrium solubility (100% saturation at the sea surface) value.

Lou Codispoti, Dec. 2003