

II. Water Quality

2. Nutrients

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1. Measurement methods

(1) Sampling and pretreatment

Lake water was collected in a column water sampler of 2 m length. The water sample was well mixed in a stainless steel bucket, and aliquots were placed in polypropylene bottles with ice. On the same day, the samples were filtered through Whatman GF/F glass filters (combusted under 400°C before use) promptly after they were carried to laboratory. Filtered water samples were kept in dark and cool conditions prior to the analysis. Analysis of dissolved nutrients was usually conducted on the next day of sampling. The water samples, subjected to digestion, were subsampled into digestion bottles on the same day of sampling. Oxidation reagent was added and the analysis was conducted within a few days.

(2) Analysis

We measured following 8 items: a) nitrate-nitrogen ($\text{NO}_3\text{-N}$) + nitrite-nitrogen ($\text{NO}_2\text{-N}$), b) nitrite-nitrogen ($\text{NO}_2\text{-N}$), c) ammonium nitrogen ($\text{NH}_4\text{-N}$), d) dissolved total nitrogen (DTN), e) total nitrogen (TN), f) phosphate-phosphorus ($\text{PO}_4\text{-P}$), g) dissolved total phosphorus (DTP), and h) total phosphorus (TP). Filtered water samples through Whatman GF/F were used for the measurement of DTN, while unfiltered water samples were treated in an autoclave under 120°C for 30 mins after adding potassium peroxodisulfate under alkaline pH for the measurement of TN. Filtered water samples through Whatman GF/F were used for the measurement of DTP, while unfiltered water samples were treated in an autoclave under 120°C for 30 min after adding potassium peroxodisulfate under acidic pH for the measurement of TP.

In this data book, analytical results are given for the following 7 items: $\text{NO}_3\text{-N} + \text{NO}_2\text{-N}$ (a), $\text{NO}_3\text{-N}$ (a-b), $\text{NO}_2\text{-N}$ (b), $\text{NH}_4\text{-N}$ (c), DON (d-a-c), DTN (d), TN (e), $\text{PO}_4\text{-P}$ (f), DTP (g), and TP (h). Either DTN or TN was analyzed until February 1992, while both items were analyzed after March 1992. The units used in this data book are $\mu\text{g l}^{-1}$ (ppb) for nitrogen and for phosphorus.

2. Measuring equipments

1977 to March 1997: AAI Auto-analyzer (Technicon Co.Ltd.)

See Nojiri (1987) and Otsuki et al. (1993) for selection of reagents

Since July 1995: AACSII Auto-analyzer (Bran+Luebbe Co. Ltd.)

Some of the reagents used for colorimetric analysis were changed.

Indophenol method for auto-analyzer was applied for ammonia analysis.

* Two different types of analyzers were used in parallel for comparison and there was no significant difference. Only AACSII type was used after April 1997.

References

Nojiri, Y. (1987): Progress in water-quality analysis, J. Japanese Society of Ground Water, 29: 107-111 (in Japanese).

Otsuki, A., H. Goma, M. Aizaki and Y. Nojiri (1993): Seasonal and spatial variations of dissolved nitrogenous nutrient concentrations in hypertrophic shallow lake, with special reference to dissolved organic nitrogen, Verh. Internat. Verein Limnol., 25: 187-192.