

USE OF HAND-HELD MULTISENSOR SYSTEMS IN PHYTOPLANKTON STUDIES OF A JAPANESE LAKE

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Over the last 15 years we have studied the physico-chemical conditions of lakes, ponds, lagoons and hot springs using relatively cheap hand-held instruments, however, recently two multisensor machines have been purchased; the U-22XD (Horiba, Ltd.) and the AAQ170-RINKO (JFE ALEC Co., Ltd). The U-22XD has a 30-m cable and provides simultaneous data on 10 parameters, with a built-in memory function for data logging. In contrast, the AAQ170-RINKO relays data on 8 parameters back to a computer in real time. With its titanium external body, a 100-m cable and weighing about 2 kg, this instrument will hopefully prove to be very versatile in phytoplankton studies in water bodies that are shallow or have restricted access (e.g. marine lakes in jungles), or in coral reef areas where the water depth at drop offs can suddenly plunge to 80 m.

Recently we have tested both instruments in Itabashi-numa, a freshwater lake in Kenminno-mori, a prefectural park near Yamagata. Many of the 17 lakes and ponds in this park are believed to have been formed more than 80,000 years ago by debris flows, following the catastrophic collapse of Mount Shirataka. Itabashi-numa covers an area about 0.7 x 0.15 km, and has a maximum water depth of <10 m. In winter the surface waters are completely frozen, with several large ice cracks forming across the entire lake. Water column profiles of various parameters at a number of stations in the lake are presented, and clearly show (as expected) that in the early summer the temperature, pH and dissolved oxygen decrease with depth, whilst the turbidity increases. The AAQ170-RINKO can also be used as a towed instrument and record changes in parameters in transects across the lake surface. Several examples of these transects are presented, one across the lake width and the other traversing the entire lake length. Thus, we believe that such instruments will be useful in documenting the lake or marine environment, and in providing support data for phytoplankton studies.

Surveys of the spring net phytoplankton have shown that Itabashi-numa is normally dominated by synurophytes, notably *Mallomonas* (6 spp.) and *Synura* (2 spp.), while the planktonic diatom genera *Aulacoseira* and *Cyclotella* are also common.