



A Buoy System for Monitoring Hypoxia off Changjiang Estuary in China

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For studying the mechanism in formation of hypoxia off Changjiang estuary in China, we have found a buoy system sponsored by National Science and Technology Pillar Program which could acquire the whole seawater column data including many parameters relative to hypoxia closely in real-time.

The buoy system, which observes the profile in five layers from top to bottom, is composed of two parts: a buoy and a sub-mooring. The buoy part supports the monitoring instruments of four layers, the surface cell and the other three cells within thermocline. There are eight parameters (T/S/D/DO/Tu/Chla/pH/PAR) measured in surface cell with RBR-XRX420 equipped in the bottom of buoy. Five parameters (T/S/D/DO/Chla) are observed in each cell within thermocline with three SBE16plus-IM V2 inductive coupled instruments. The instruments are clipped on a plastic covered steel wire in the upper, middle and lower part of thermocline. The sub-mooring part use a TRBM (Trawl Resistant Bottom Mount) to equip the monitoring instruments in bottom cell which include RBR-XR420, Satlantic ISUS Nitrate and RDI-WHS300 for measuring T/S/D/DO/Tu/ORP, nitrate and current respectively.

The data integration and transmission of the buoy system are completed by collaborating among three data-loggers distributed in surface, thermocline and bottom layer. The surface data-logger integrates the data of surface RBR-XRX420, meteorological sensor and some sensors involved in safety of buoy (GPS/Water Leak/Pose/Battery). The thermocline data-logger integrates the data of three SBE16plus-IM V2 instruments got with inductive communication. The bottom data-logger integrates the data of RBR-XR420, Satlantic ISUS Nitrate and RDI-WHS300 located in the TRBM. In completion of data integration and backup, the surface data-logger acquires the data of thermocline and bottom data-logger one by one via acoustic modem, and then transmits all the data in sequence to lab in our institute via satellite or GPRS.

The buoy system had a successful test in Changjiang estuary in October 2009. We applied it to monitor hypoxia off Changjiang estuary for 42 days from 23rd July to 3rd September in 2010. The system transmitted all data every half an hour well and truly. We saw the value and variation of DO, and its response to the environmental factor in real-time. The system also got the information of environmental condition when the Dianmu and Kompas typhoon past. So far, it's the first buoy system in China can get the whole profile data of so many parameters in real-time.