USE OF BIOLUMINESCENCE TO DEFINE GEOGRAPHICAL BOUNDARIES, ABUNDANCE AND VERTICAL DISTRIBUTIONS OF DINOFLAGELLATE BLOOMS IN COASTAL WATERS; AND A DESCRIPTION OF A NEW BIOLUMINESCENCE SENSOR.

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Abstract

Blooms of dinoflagellates have become more prevalent in recent years in the coastal zones of the northern European continent. In an attempt to monitor this phenomenon a programme of sampling was initiated in 1989 along the north east coast of UK using the Undulator/Aquashuttle towed from ships-of-opportunity. The towed vehicle was equipped with a sensor package measuring depth, fluorescence, temperature, turbidity, conductivity, upwelling and downwelling irradiance and nutrients (nitrate and nitrite). A new sensor was also constructed 'GlowTracka'(CI Ltd) to measure the bioluminescence in the water. This sensor was based on a photodiode which offers excellent sensitivity and long term calibration stability, necessary in the rugged use from ships-of-opportunity. The sensor can measure signals from low cell concentrations of 50 cells l\(^{-1}\) to full bloom conditions of \(10^3\) to \(10^5\) cells l\(^{-1}\). The data logged onto the solid state data logger, in the instrumnet package, are from high and low sensitivity channels, event counts of individual flashes over time, peak detector signal intensity every 5s and flow rate, to enable the data to be quantified. The proposed use of the sensor was to define the geographical boundaries of the bioluminescent dinoflagellates, especially Alexandrium tamarense responsible for paralytic shellfish poisoning (PSP) on the east coast of UK.
UNDULATING OCEANOGRAPHIC RECORDER/AQUASHUTTLE tow from M/V QUIBERON Plymouth (50° 15.4'N) to Roscoff (France) (48° 54.7'N) 3 October 1991, 00.07–06.00 hrs GMT.