NEW MARINE ENVIRONMENTAL MONITORING STRATEGIES AND TECHNOLOGY

Introduction

Detecting change and identifying its causes (natural, climatic or anthropogenic) forms the basis from which effective management strategies for sustainable use and protection of marine environment can be developed. Measurement and monitoring of the marine environment by survey vessel alone is costly, time-consuming and provides a relatively infrequent dataset against which to assess environmental change. To meet the need for improved detection and measurement of ecosystem change over appropriate temporal and spatial scales a new approach is required.

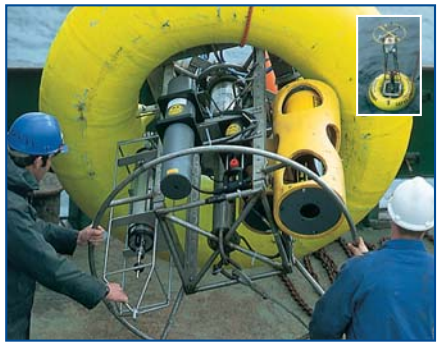
The RV Corystes

Novel instrumentation

In response to this need, a new generation of self-contained and automated systems that offer cost-effective solutions to high frequency, multi-parameter data collection in the marine environment is being developed.

These offer:

- High frequency sampling in time and space
- Physical, chemical and biological measurements
- Smart technology enables conditional water sampling
- Smart Buoys and Minipods for total marine observations
- Real-time global monitoring via telemetry
- Custom configured systems



***Smart Buoy** being deployed*

Applications

- Enhanced assessment of environmental health
- New insights into ecosystem function
- Improved understanding of environmental variability
- Monitoring change in marine biodiversity
- Early warning and forecasting
- Improved model validation and testing
- Sea-Truth measurements for validation of remote sensing

***U-Tow** with collected seawater samples*

Smart Moorings

- Moored observational platforms to measure temporal variability in physical, chemical and biological parameters
- *In-situ* automated sensors and plankton sampler
- Featuring **Smart Buoy** technology, an integrated sensor and 'intelligent' sampler system
- Independent *in-situ* automated calibration of sensors
- *In-situ* nutrient analyser
- Real-time global 2-way telemetry
- Sensor configuration to meet user needs

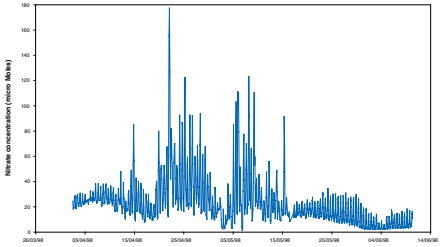
***Minipod** lander being prepared for deployment*

Intelligent towed bodies

- **U-Tow** is a ship-towed integrated system to measure spatial variability in physical, chemical and biological parameters
- Complete plankton sampling (micro - to zooplankton)
- Shared technology with **Smart Buoy**
- Jointly developed by CEFAS, DANI, SAFHOS and WS Ocean Systems Ltd in a program funded by DETR and MAFF

Bottom Landers

- **Minipods** and **Microlanders** are examples of a range of flexible seabed landers for measuring near seabed processes
- Highly flexible application-specific build and deployment options
- Automated *in-situ* measurements of sediment processes
- Simultaneous measurement of physical, chemical and biological parameters
- In-situ calibration of optical and acoustic sensors



*Data from **Smart Buoy** with nitrate analyser (Thames estuary 1998)*

Sensors for the Future

Using the technology described above, future applications of these marine monitoring strategies will be determined by the suite of sensors available. The development of bio- or chemosensors with appropriate long-term stability and robustness to measure a wider variety of parameters is highly desirable. Construction of new sensor-systems that are specifically adapted for use at sea, and can be integrated into different sampling platforms, is challenging but crucial for improved monitoring of the oceans.

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