

BODC is hosted by CCMS on behalf of the marine science programme of NERC. It is part of an international network of national oceanographic data centres and is NERC's Designated Data Centre for marine data

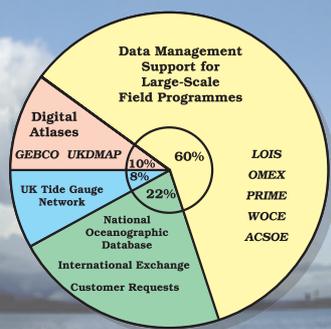


British Oceanographic Data Centre

Annual Report 1997-98

Highlights 1997-98

- **CD-ROM Publications:**
 - OMEX-I Project Data Set
 - OMEX-I Final Report
 - ARABESQUE Project Data Set
 - WOCE Global Sea Level Data Set
- 2700 customer requests serviced



Distribution of BODC staff effort during 1997-98

Introduction

Whereas the conventional view of a data centre is of a repository and distribution point for data, BODC's activities have always been far more wide ranging. The centre has an international reputation for managing data from large scale oceanographic field experiments and for developing innovative data products. Its activities are organised on a project basis with each project having well defined goals and a clearly identified customer. Projects typically last for durations of three to five years although some are of longer term strategic importance. They fall naturally into three categories:

- data management support to community-based research projects such as NERC's Land Ocean Interaction Study (LOIS), Atmospheric Chemistry Studies in the Ocean Environment (ACSOE) and Plankton Reactivity in the Marine Environment (PRIME) projects; the UK component of the World Ocean Circulation Experiment (WOCE) and the European Union (EU)'s Ocean Margin Exchange (OMEX) project;
- the development and production of digital atlases such as the UK Digital Marine Atlas (UKDMAP) and the General

Bathymetric Chart of the Oceans (GEBCO);

- well found data centre activities such as maintaining the national oceanographic database, servicing customer requests, participating in international data exchange and developing computer systems to facilitate the work of the Data Centre.

In addition, BODC has a special responsibility for capturing and managing the data from the UK National Tide Gauge Network. Furthermore, with recent NERC funding, it will soon begin to address the responsibilities assigned to it as NERC's Designated Data Centre for marine data.

Project Data Management

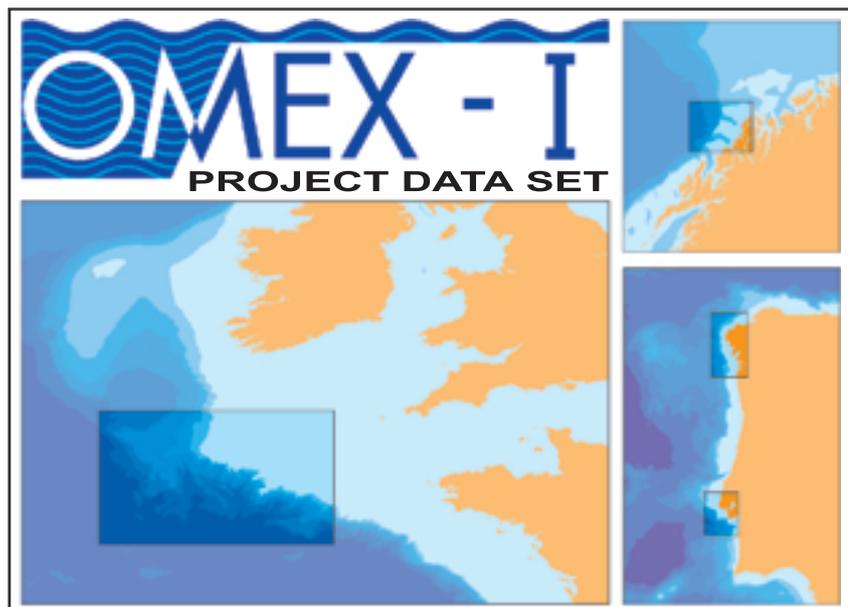
The OMEX Project

A double CD-ROM containing the final OMEX-I Project Data Set was published in November 1997. It represented the culmination of 10 staff years of effort since BODC was first contracted by the EU to act as the OMEX Project Data Centre in early 1994. The data management challenge presented by the project was beyond anything attempted in the marine field before and BODC's approach in meeting this challenge is viewed internationally as a model for other projects to follow.

The OMEX-I field programme (April 1993 to December 1995) was designed to study biogeochemical fluxes and processes across the European continental shelf break and comprised 47 cruise legs involving research vessels from 9 countries. It concentrated primarily in the area of the Goban Spur and generated an immense diversity of data encompassing physical oceanography, biology, biogeochemistry, benthic processes and air/sea fluxes. Some 200 scientists from 35 institutes and universities were involved in the collection and provision of the data to BODC. By the time the CD-ROM was published, over 95% of the 600 data sets collected during the project had been assembled onto the final project database.

Prior to publication, all data on the CD-ROM were subject to a detailed quality control audit and some 540 pages of supporting documentation were compiled by BODC so as to fully describe the methods and protocols used in the collection and processing of the data. Data were presented on the CD-ROM in a variety of forms including a relational database for the bulk of the data, a set of surface underway data files, a moored instrument data set, a specialist air-sea flux data set and a set of image data from satellites, Kasten core X-ray photographs, scanning electron micrographs and seabed photographs. Two major *Windows95* application programs, *Database Explorer* and *Underway Explorer*, were specially developed at BODC for use with the data on the CD-ROM.

An additional CD-ROM was published in November 1997 containing the OMEX-I Final Report. This was a compilation of the final scientific reports of the project's principal investigators and was delivered to BODC as a five volume, 2640 page document containing 108 reports. Most of the material, including figures and diagrams, was scanned at BODC and reformatted and compiled into *Adobe Acrobat* files, with the various papers catalogued and indexed to form a stand alone CD-ROM product. The resultant set of CD-ROMs provides a complete and



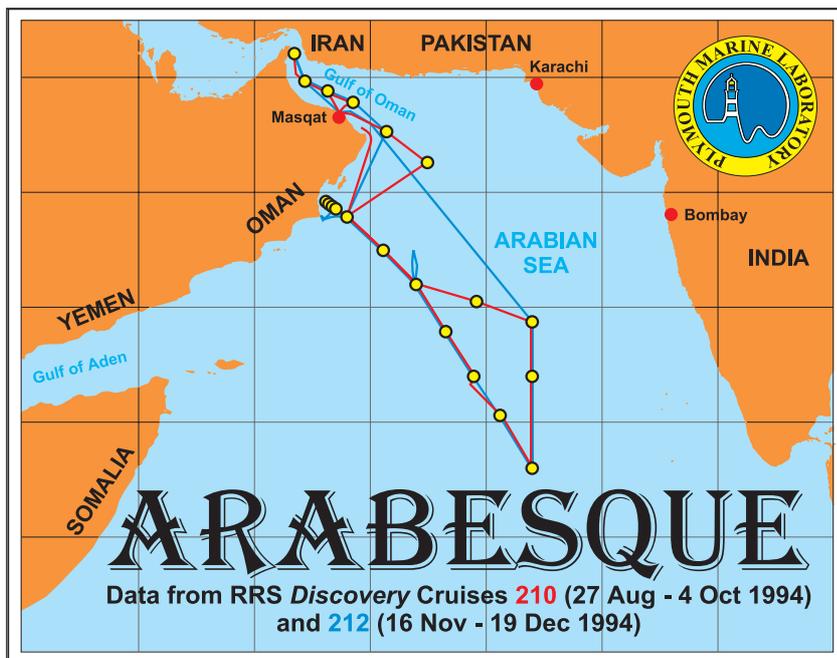
novel record of both the scientific output and the field data produced by the OMEX-I project. With a funding investment of the order of ten million pounds, OMEX-I was one of the flagship projects of the EU's Marine Science and Technology Programme.

In June 1997, BODC started a three year contract to act as the Project Data Centre for the second phase of OMEX, focused on the continental shelf edge off the NW Iberian Peninsula. BODC staff provided onboard data management support for four of the nine cruise legs undertaken up to April 1998. Of the 164 data sets collected to date, 64 have already been submitted to BODC. All of the CTD and underway surface data were worked up onto the project database and a multibeam survey of the OMEX-II area was worked up into a high quality bathymetric chart.

ARABESQUE & PRIME Projects

The final data set for the ARABESQUE project was published on CD-ROM in April 1998. The project was a study of upper ocean microbial biogeochemistry in the Arabian Sea and involved scientists from the UK, Canada, Germany and the Oman. It was organised by the CCMS Plymouth Marine Laboratory and was supported by a field programme based on two cruises of RRS *Discovery* in 1994. The first





The WOCE Project

BODC continued to operate the WOCE Data Assembly Centre for sea level data and maintained links with those responsible for submitting data from the 173 sites that comprise the WOCE worldwide tide gauge network. As of April 1998, BODC had quality controlled and banked about 2900 site years of data from the network. These data were made directly available to users over the World Wide Web.

In March 1998, BODC produced a CD-ROM of the WOCE Global Sea Level Data Set (Version 1.0). This will form part of a set of 13 CD-ROMs being published for the occasion of the WOCE Conference 'Ocean Circulation and Climate' in Halifax, Nova Scotia, in May 1998. Included on the CD-ROM were the WOCE Sea Level Data Set assembled at BODC; a complementary data set produced by the 'fast-delivery' data centre in Hawaii; and a tidal analysis of these data sets by the Laboratoire d'Etudes en Géophysique et Océanographie Spatiales in Toulouse.

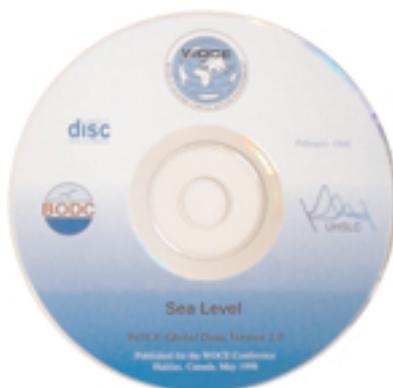
Good progress was made in assembling and screening UK data collected within the framework of WOCE. Of the 358 data sets collected on the 20 UK WOCE cruises up to November 1996, some 227 have already been submitted to BODC, including 59 delivered over the past year. Once submitted to BODC, the data are assembled into common formats and screened for quality. In due course, the full collection of data will be published on CD-ROM.

The ACSOE Project

BODC assisted the ACSOE project in the onboard collection and subsequent working up of the continuous underway surface measurements on RRS *Challenger* cruise 133. A limited edition CD-ROM was released on the occasion of the ACSOE Annual Meeting in January 1998 containing the hydrographic data collected on the three ACSOE cruises to date, viz RRS *Challenger* cruises 127, 129 and 133 west of Ireland.

cruise was timed to coincide with the South West Monsoon while the second took place during the inter-monsoon period through to the onset of the North East Monsoon. BODC provided data management support for the project, being responsible for assembling the project data set and also working up data as necessary. During the year, outstanding data were gathered in, comprehensive documentation was compiled to support the data and a quality audit was conducted on the complete data set. The data and documentation were then formatted for CD-ROM publication accompanied by BODC's *Database Explorer* and *Underway Explorer* software. The resultant data set contains a diversity of physical, chemical and biological data and comprises over 90% of the data collected during the field programme.

Work continued in assembling the PRIME project database, comprising data from RRS *Discovery* cruise 221 to the North East Atlantic in 1996, the Bergen Mesocosm Experiment of 1995 and the biological and hydrographic data collected in the early 1970s at Ocean Weather Ship India. Major accessions during the year included the phytoplankton and zooplankton data from OWS India and the organic chemistry, phytoplankton and nanoflagellate data from the RRS *Discovery* cruise.



The LOIS Project

Progress continued in assembling the data from the two marine components of the LOIS field programme, i.e. the Shelf Edge Study (SES) on the Hebridean Shelf Edge and the River-Atmosphere-Coast Study (RACS) focused around the Humber Estuary. Some 51 accessions of LOIS data were received during the year from 15 different laboratories and university departments. More than 60 data sets were loaded onto the SES and RACS databases, with data ranging from ADCP profiles to chemical determinations, marine snow profiles, chlorophyll measurements, drifting buoy data etc. A detailed bathymetric grid of the SES area was produced based on the multibeam survey on RRS *Charles Darwin* cruise 91. The LOIS Bed-Hop camera images were scanned and processed into digital files and banking was completed on the wave data from the first phase of the Holderness Experiment. Using BODC's new ADCP software, processing was carried out on the SES shipborne ADCP data from five cruises of RRS *Challenger*. This involved correcting the data for timing and misalignment errors and screening the data using BODC's visualisation software.

Other Activities

In addition to providing data management support to large scale field programmes, BODC staff were also involved in a wealth of other activities, a sample of which are summarised below.

Acting under the joint auspices of the IOC and the IHO, BODC continued to develop the GEBCO Digital Atlas as the authoritative bathymetric chart of the world's oceans. Worldwide distribution of the GEBCO-97 CD-ROM commenced in May 1997 and some 895 copies of the Digital Atlas have now been distributed to over 750 organisations in 78 countries worldwide. Updating of the GEBCO bathymetry continued with new material being digitised in the Indian Ocean, the Arctic Ocean and the North East Atlantic.

A beta-test CD-ROM of the *Windows* version of the UK Digital Marine Atlas (UKDMAP) was produced and circulated to selected customers for evaluation. The resultant feedback was used in the enhancement of the supporting software. The JNCC Seabirds and Coastal Directories data sets were merged into the UKDMAP system together with updated copies of the Admiralty Chart Indexes, the UK lifeboat stations list and the shellfish harvesting area classifications for England and Wales. Publication of Version 3.0 of UKDMAP is scheduled for Autumn 1998.

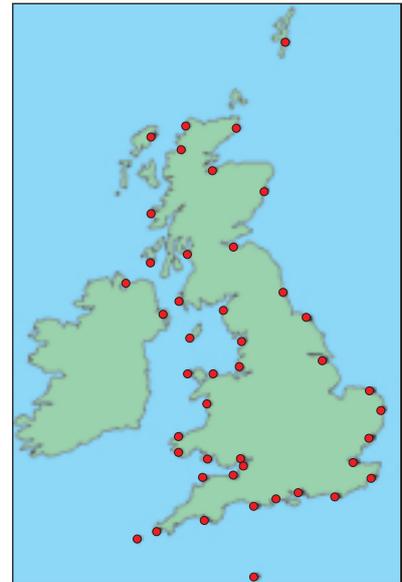
With funding from the MOD, work continued in rescuing and assembling all CTD data collected by UK laboratories since the mid 1970s and a further 1492 CTD profiles from 29 cruises were screened and reformatted for delivery to the Hydrographic Office.

BODC's ability to process and screen automatically logged data was greatly enhanced through the development of an extended system capable of supporting data series having a secondary dimension within their data cycles, e.g. spectral wave data, ADCP and OSCR data. The extended system required an object orientated approach and the production of a newly defined BODC subset of the NetCDF format used extensively by the atmospheric research community in the USA.

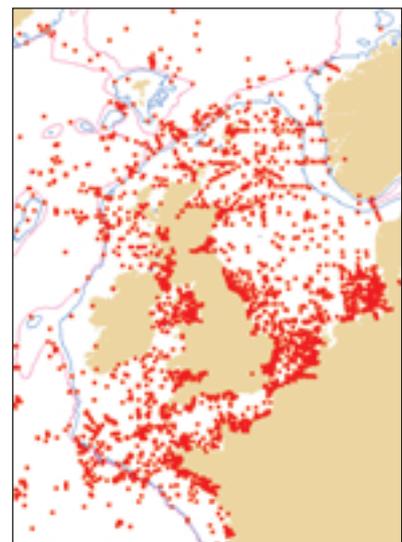
The UK Marine Environmental Data Coordinator is based at BODC working on behalf of the Inter-Agency Committee on Marine Science and Technology. Key activities during the year included working visits to key laboratories and agencies to further develop a UK network of data sources; updating the UK moored current meter inventory (it now covers 9700 current meter records collected by 75 organisations); publishing the UK GOOS Inventory of Monitoring Measurements on the Web, together with a further 133 UK Cruise Summary Reports (including track charts); and developing a plan for improving the submission of UK data to the World Data Centre system.



Interest in the GEBCO Digital Atlas remains high, with copies distributed to customers in 78 countries.



BODC manages the sea level data from the UK National Tide Gauge Network.



BODC's International Current Meter Inventory references data collected by laboratories within the UK and abroad.