

Marine Productivity

Marine Productivity (MarProd) was a 5-year Thematic Programme funded by the Natural Environment Research Council (NERC). Its main objective was to investigate the population dynamics of key zooplankton species in UK shelf seas and in the northern Atlantic with emphasis on how physical factors such as water temperature and oceanic currents influence their distribution, abundance and productivity.

Using modelling studies and observations, results from this multidisciplinary programme contribute to improving the understanding of the relationship between changes observed in the North Atlantic pelagic ecosystem and climatically-driven physical factors, and the ability to predict future ecosystem responses to ocean circulation and climatic conditions.

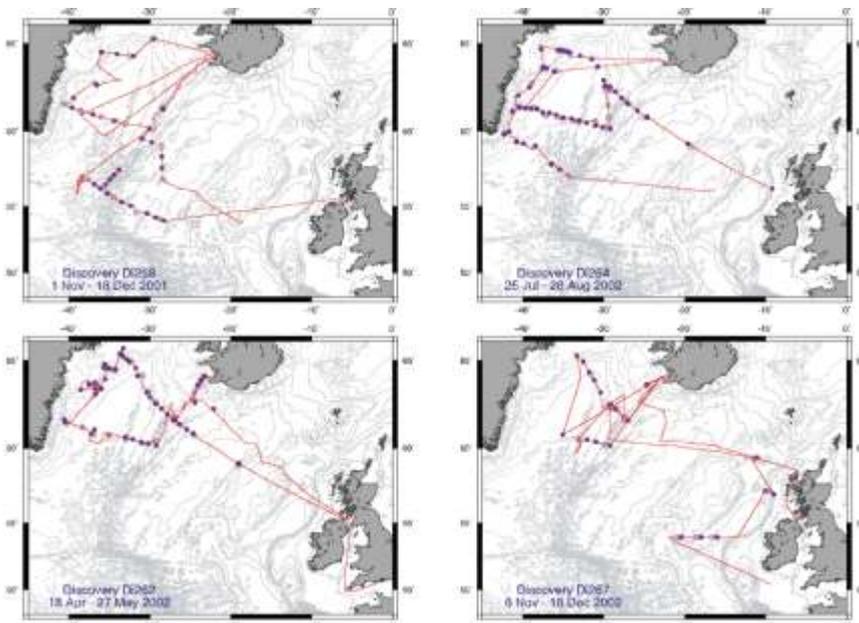
MarProd was the UK main contribution to the Global Ocean Ecosystem Dynamics project (GLOBEC), a core project from the International Geosphere-Biosphere Programme (IGBP) responsible for understanding how global change will affect the abundance, diversity and productivity of marine populations.

Research projects funded under a first phase (2000-2002) exploited historical datasets and existing biological models, complemented by laboratory experiments, remote sensing analyses and newly acquired field data to gain a better understanding of the dynamics of zooplankton populations in shelf seas. Under this phase, the following datasets are being archived at BODC:

- A long-term hydrographic and plankton time-series at the L4 sampling station (Plymouth Marine Laboratory)
- A year-long monthly survey of surface nutrient distribution in the Irish Sea (Department of Agriculture and Rural Development, Northern Ireland, DARDNI)
- A synthesis database of published data on growth and fecundity in marine planktonic copepods (Herriot Watt University)



Image credit : A. Mustard

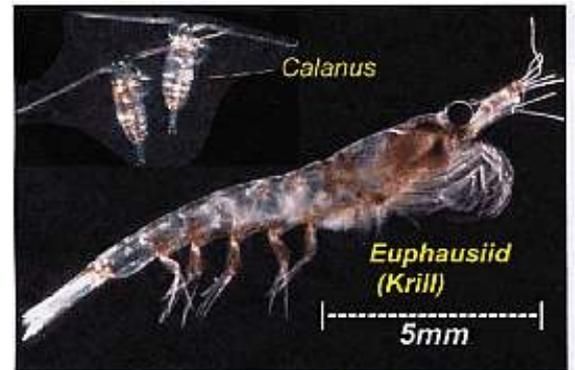
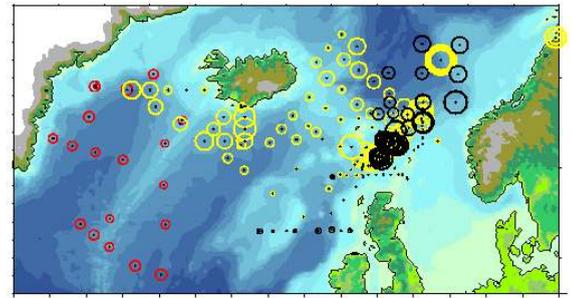


The second phase (2001-2005) focused on the open ocean and the North East Atlantic. A major fieldwork campaign of four research cruises on *RRS Discovery* was undertaken between November 2001 and December 2002.

A total of over 800 gear deployments was performed at 159 stations mainly distributed in the Irminger Sea and Iceland Basin.

The four cruises had a set of common specific objectives which were:

- To map the physical features of the survey region
- To collect water samples for plant pigment and microscopic analyses and to estimate the biomass of different taxonomic/functional groups of microplankton
- To measure high resolution profiles of inorganic nutrient concentrations
- To determine the 3D abundance of key zooplankton species (*Calanus finmarchicus*, *Oithona* spp. and euphausiids)



Instruments deployed included multisensor CTD profilers and rosette samplers, lowered and shipborne ADCPs, towed multi-instrument and multi-net plankton samplers, profiling and continuous underway Fast Repetition Rate Fluorometers, zooplankton nets, and towed and lowered scientific echosounders.



In addition, process studies were undertaken to obtain information about factors controlling the reproduction, growth, mortality and behaviour of individual species. These include physiological studies and analyses of biochemical composition.

Phytoplankton primary production was measured using carbon uptake on the last two cruises and additional data were collected using a Fast Repetition Rate Fluorometer (FRRF) through continuous surface underway sampling and vertical deployments.

All four cruises were supported by continuous underway measurements of bathymetry, surface hydrography (temperature, salinity, fluorescence and attenuation), meteorology (wind speed and direction, PAR and total incident irradiance, air temperature, humidity and atmospheric pressure) and by remote sensing of sea surface temperature and ocean colour.

BODC is the NERC Designated Data Centre for all digital information arising from MarProd. In particular, it has responsibility for the quality control, integration and long-term stewardship of data sets obtained from MarProd supported cruises under Phase 2 of the programme. Most of the data collected have now been assembled in BODC's Research Project Database under the Oracle Relational Database Management System. In accordance with the programme data management policy, access to the data was restricted to members of the MarProd scientific community until the end of the programme in 2005. Final assembly of the MarProd Data Set is currently taking place at BODC and will lead to its electronic publication on CD-ROM towards the end of 2006.

Visit <http://www.nerc.ac.uk/funding/thematics/marprod/> for more information about the programme or <http://www.bodc.ac.uk/projects/uk/marprod/> for information about the data collected.