

back cover (this issue). The distribution of *Calanus* is fairly reflective of traditional results, but the molecular analysis has clearly indicated extended areas of distribution and co-occurrence when compared to results from traditional identification systems. Certainly in some of the Norwegian fjords many of the unexpected biological characteristics are now being attributed to misidentification of the species.

The ability to extend identification to all developmental stages facilitates new investigations into the life strategies and co-occurrence of four important *Calanus* species. The system was developed with funding from the NERC thematic programme "Plankton Reactivity in the Marine Envi-

ronment" and has attracted interest from researchers worldwide. In response, we have secured funding from the new NERC thematic programme "Marine Productivity" (see article by Phil Williamson, GLOBEC Newsletter April 2000, pp 17-18) to expand the species identification system to other copepods for which identification of either the adults or earlier developmental stages is problematic. Current targets include relevant species of *Acartia*, *Pseudocalanus*, *Clausocalanus* and *Paracalanus*, and we are collecting (and would welcome) ethanol-preserved examples of the above genera from regions across Europe. Additionally, we would welcome suggestions of other genera whereby an identification solution could be provided by this robust technique.

## The IMECOCAL Programme

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A program of ocean monitoring in the southern region of the California Current—off Baja California, MEXICO—has been underway since Autumn, 1997. This program supports major components of the GLOBEC research agenda and is maintained by a consortium of six Mexican institutions. It was initiated with a three-year grant from the Inter-American Institute of Global Change Research (IAI) and a five-year grant from the Consejo Nacional de Ciencia y Tecnología (CONACYT). This financial support has been used to set in place the critical elements of a program that incorporates the Mexican sector of the California Current pelagic ecosystem into an ongoing investigation of the environment and resources. It is modelled after the CalCOFI program (California Cooperative Oceanic Fisheries Investigation) covering the region off southern and central California to the north. Establishing a program of regular observations for the Mexican sector provides the extended coverage needed to match the scales of scientific sampling and analysis to the natural scales of variability in the California Current. It will also provide information relevant to understanding the behavior of transboundary pelagic resources inhabiting both the waters off Mexico and the United States. This program is known as Investigaciones Mexicanas de la Corriente de California (IMECOCAL).

The long-term goal of IMECOCAL is to improve our capabil-

ity to predict the response of the pelagic ecosystem to regional and global climate change, as well as to the combined effects of harvesting practices by Mexico and the United States. There are five Mexican academic institutions participating in IMECOCAL. These are CICESE (Centro de Investigación Científica y de Educación Superior de Ensenada), UABC (Universidad Autónoma de Baja California, in Ensenada), CICIMAR (Centro Interdisciplinario de Ciencias Marinas, in La Paz), UNAM (Universidad Nacional Autónoma de México, in México City), and CIBNOR (Centro de Investigaciones Biológicas del Noroeste, in La Paz). The government agency participating is INP/SEMERNAP (National Institute of Fisheries of the Ministry of the Environment, Natural Resources and Fisheries).

The IMECOCAL program has been conducting ocean monitoring cruises every three months with the CICESE research vessel *Francisco de Ulloa* over the sampling grid shown in Fig. 1 since October, 1997. One cruise was carried out on the UNAM research vessel *El Puma*. The IMECOCAL observations are scheduled in collaboration with the CalCOFI program. The IMECOCAL survey design is based on the original CalCOFI Basic Station Plan. The cruises cover a subset of the original CalCOFI grid, with stations spaced 20 nautical miles apart extending a maximum distance of 220 nautical miles offshore on the two long central lines and roughly 120 nautical miles on the other lines. The distance between lines is 40 nautical miles.

CalCOFI surveys consist of quarterly cruises (normally in January, April, July and October) covering the region from the U.S.-Mexican border north to just above Point Conception. This strategy maintains a sampling frequency able to capture the temporal variability critical to describing biophysical response down to interannual-scale climate forcing but compromises knowledge of spatial variability over the system by severely reducing the active area of the sampling grid. Awareness of the importance of multi-decadal variability has been steadily increasing since the 1980s, accompanied by the realization that not only temporal changes in abundance and productivity are important, but

that there are significant latitudinal shifts in the ranges of ecologically and commercially important species. Recognizing the complexity of space-time variability over decadal and longer time scales made it increasingly clear that the reduced CalCOFI sampling design does not adequately describe the fundamental changes in physical and biological structure in which significant spatial variability is embedded within the temporal variability (Hayward, 1996). The IMECOCAL program was initiated to improve our understanding of the overall response of the pelagic ecosystem of the California Current to regional and basin-scale climate change by extending the latitudinal scope of sampling. It also has the practical purpose of tracking ecosystem changes that impact the abundance and productivity of small pelagic fish species off Baja California that are important resources for México.

The IMECOCAL surveys are scheduled to coincide as closely as possible to CalCOFI cruise periods in order to provide an integrated description of the pelagic ecosystem of the California Current. Inclusion of the IMECOCAL results in the annual CalCOFI reports on the state of the California Current has already begun to produce a more complete picture of the ecosystem processes over a large region of the system (e.g., Lynn et al., 1998). The core sampling activities of IMECOCAL cruises include routine CTD casts to 1000 m depth (for detailed temperature and salinity profiles to describe hydrographic structure and circulation). There are also sensors to measure dissolved oxygen and

fluorescence profiles to complement the CTD data. Water samples are taken from the surface to 150 m at standard depths, using 5-liter Niskin bottles mounted on the CTD sampling rosette system. The water is used to analyze the concentrations of dissolved oxygen, inorganic nutrients and chlorophyll. At each station, standard oblique bongo tows are made to capture macrozooplankton, including the ichthyoplankton (fish eggs and larvae). Vertical Calvet tows are also made at each station for quantitative collection of fish eggs through a depth of 70m. Casts for *in situ* measurements of primary productivity as well as measurements profiling photosynthetic radiation is carried out daily at the mid-day stations. Continuous underway sampling of surface temperature and salinity, as well as continuous ADCP profiling for mapping the currents in the upper 200 meters is also done.

A CUFES system (Continuous Underway Fish Egg Sampling, Checkley et al., 1997) was installed on the R/V *Francisco de Ulloa* and has been operational since January, 2000. We look forward to contributing to the SPACC program of GLOBEC with improved knowledge of the characteristics of the spawning habitats of small pelagic species of fish populations and enhancing our understanding of space-time changes in distributions, abundances and production of the small pelagic fish populations in relation to environmental variability. Collaboration between IMECOCAL and CalCOFI in the employment of the CUFES system is particularly important to understand the response of the transboundary population of the Pacific sardine to climate change and to address the combined effects of harvesting by México and the U.S.

In addition to the monitoring cruises, IMECOCAL maintains sea level pressure gauges at Guadalupe Island (see Fig. 1), about 280 km offshore at 29°N, and at a coastal location at San Quintin (about 31°N). The location of Guadalupe Island provides a unique opportunity to continuously measure the mean flow of the California Current in a way not available at any other place along the west coast of North America. These paired instruments permit us to monitor the sea surface pressure gradient between the island and the coastal stations to provide a measure of the mean flow in the upper ocean (Christensen and Rodriguez, 1979) associated with the California Current. These instruments were purchased with the support of the National Science Foundation of the U.S. under a research grant in collaboration with Scripps Institution of Oceanography. They have been operating since January, 1999, and we would like to maintain them for at least ten years to provide continuous measurements from which to develop a long-term climatology of the flow across the main axis of the California Current in this region.

The IMECOCAL research program also includes the retrospective analyses of available paleoecological records from near coastal sites off southern Baja California to provide a regional historical context of interdecadal to centennial variability as seen of the past 500 to 1500 years to compare to the records off southern California described by Baumgartner et al. (1992).

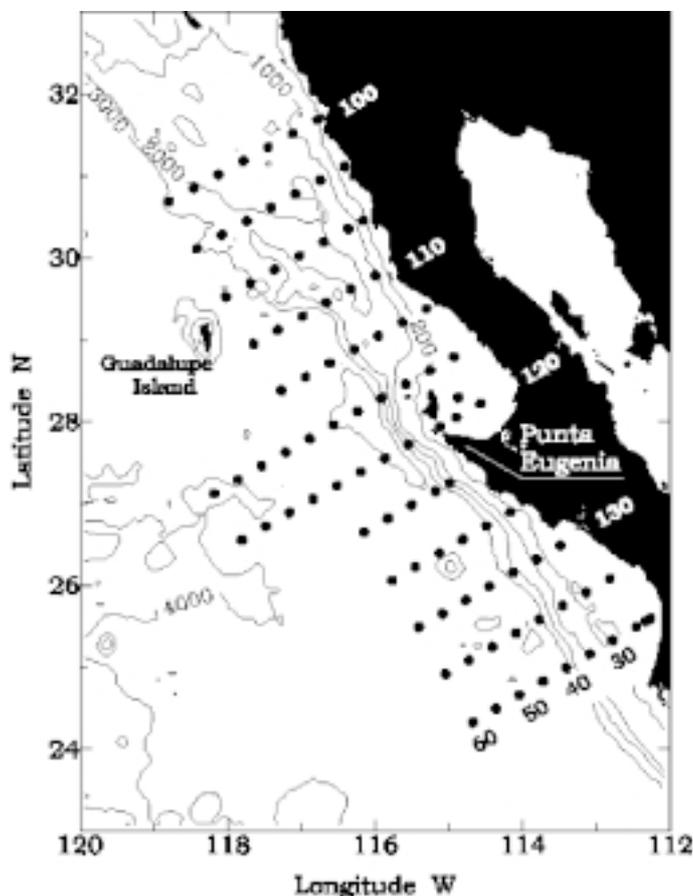


Fig. 1 Standard station grid of the IMECOCAL cruises

For more information see <http://ecologia.cicese.mx/~imecocal/>.

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## **New Continuous Plankton Recorder (CPR) Survey Data Policy Implemented**

### **14<sup>th</sup> September 2000**

The Sir Alister Hardy Foundation (SAHFOS) maintains and updates the unique Continuous Plankton Recorder database.

Data are held in a relational database containing the plankton abundance data together with time, date and position of sample recorded over 60 years on more than 174,000 samples from the North Atlantic and North Sea. Data are extracted by area co-ordinates and species or taxonomic entities, creating a matrix of plankton abundance values.

SAHFOS's data policy is compliant with the developing data policy for the Global Ocean Observation System (GOOS). The data are freely available, provided that the recipient has signed a 'Data Licence Agreement', available from the SAHFOS Data Manager.

Limited data are currently available on a number of samples in a given area via the SAHFOS web site. It is planned to allow more detailed data searches via the web in the future. Currently all data requests are dealt with by the Data Manager to ensure the integrity of the data. Contact him on e mail [sahfos@wpo.nerc.ac.uk](mailto:sahfos@wpo.nerc.ac.uk) WWW: <http://www.npm.ac.uk/sahfos>



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