

## Session 5D 'Viewpoints from International Programs'

The ICES perspective on the coming decade of ocean observations:

- 1) In the past ICES has undertaken several activities in the field of physical and biological oceanography with a view to supporting the development of operational capacities. The overall objective is to promote and further refine the science base for the ecosystem-based approach to management of human activities such as fisheries and other environment related impacts. The new ICES Science Plan 2009–2013 provides guidance on how ICES will accomplish this objective.
- 2) ICES has developed standardized, long-term observing systems that are operational now with well documented users. Ecosystems and fisheries surveys and assessments run by ICES use well established methods and tools which operate in near-real time mode. They are extensive and sustainably funded and are subject to continuous integration with a view towards developing integrated advice requested by our clients.
- 3) Changes in ocean climate affect whole ecosystems from the physical driving forces through the lower trophic levels to fish and higher predators. There are additional pressures, such as coastal development affecting the coastal zone as a result of discharges of substances of human origin and industry, developing interest in offshore renewable energy and the enhanced use of the sea for recreation. While many of these developments have been of benefit to society, they have come at a cost to the marine ecosystems. These challenges call for improved observation systems, including ecosystem parameters beyond ocean physics.
- 4) There is a need to expand and improve these systems by developing new and better observing technology, planning facilities and data management. Opportunities will be created for the integration of surveys and observational technologies into fully operational ecosystem surveys, based on existing time series, activities of ICES member countries, emerging survey methodologies, and enhanced coordination (plankton nets, acoustics, optics, trawling), with the aim of providing indicators in support of advisory needs of integrated management and ecosystem status reporting.
- 5) Elements will include remote observations (satellite and aircraft observations) and observations from buoys, gliders, moorings, and

tracking of biota. Coordination of deep-sea monitoring will be addressed, as well as optimizing the use of vessels involved in “ICES surveys”. A permanent network of ICES fixed stations using similar protocols will be developed. Protocols for diverse components of the programme will be developed and data sharing and availability enhanced. It will be of utmost importance to establish an early dialogue with the broad suite of stakeholders and managers.

- 6) Operational modelling combining oceanography, ecosystem functioning and population processes is needed to provide analysis, forecasts, and model-based products that give a reliable description of the physical, chemical and biotic components of the ecosystem. The accuracy of the predictions will be evaluated, as well as limits to forecasting. Operational models will be further developed to support the specific needs for advisory processes. Examples include forecasting of trends in recruitment as a function of oceanographic variables and prediction of spatial patterns in life history parameters and abundance of populations, and in community properties, due to changes in the environment.
- 7) Much of the marine scientific research also requires high quality hindcasts of oceanographic data. ICES will encourage the formation of easily accessible and high resolution data sets of oceanographic characteristics for at least the last 50–100 years of the ICES area. These datasets are core to improving our understanding of the marine system through a period for which ICES has already substantial time-series of fisheries, surveys and environmental data.