

Theme Session M

Environmental and fisheries data management, access, and integration

ICES CM 2006/M:01 – Poster

Estimation of discard of Eastern Baltic Sea cod using FishFrame 4.1

Teunis Jansen and Henrik Degel

The discard of Eastern Baltic Cod (Cod-2224) has been estimated and used in the yearly stock assessment in ICES since 1995. This has been done partly by each country and partly by the stock coordinator (in SAS, MS Excel and other systems). In order to ease, streamline and quality assure this, software modules have been developed in the FishFrame system.

FishFrame is a free open source web-based datawarehouse application.

This paper describes the workflow and results, step by step for the case: Eastern Baltic Sea Cod from 2005. The modules functionality and performance are evaluated. Improvements and ideas for new features are suggested for future releases.

Keywords: FishFrame, cod, discard, assessment, data management.

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ICES CM 2006/M:02

FishFrame: Fisheries and stock assessment data framework

Henrik Degel and Teunis Jansen

Many research and advisory tasks need quality-assured data at a disaggregated level to make the re-stratification needed to answer a specific question. It is a slow process to gather international datasets for these analyses, because the raw data are spread between labs. Even when gathering data for fixed reoccurring tasks like assessment working groups, data are often late and the quality can be variable.

The current situation of this “semi-manual distributed datawarehouse” can be improved technically. Methods for quality control, raising and calculation can be discussed and unified. Development and test of software modules can be done once and reused by all. The biggest

challenge in this is not technical – it is in organisation, coordination, and trust.

This challenge has been addressed by FishFrame – a web-based datawarehouse application. The “bottom-up” approach with maximum involvement of end users from as many labs and user groups as possible has been rather slow but quite successful in building international trust and cooperation around the system. These are mandatory prerequisites when our primary goal is not the programming project itself, but the creation of a tool that adds real value to users and in the end improves the way we work with our data.

FishFrame version 4.1 is presented and the lessons learned from the process are discussed.

Keywords: FishFrame, fisheries, assessment, datawarehouse, data management.

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ICES CM 2006/M:03 – Poster

Preliminary results of an exploratory fishing targeting *Dissostichus eleginoides* in the southwest Atlantic by means of new design pots

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A Pilot Action of Exploratory Fishing was carried out from 18 June to 20 December 2005 by the bottom longliner “Arnela” within the international waters of the Southwest Atlantic. The exploratory survey was directed at *Dissostichus eleginoides* using newly designed pots in order to analyse their possible use by the commercial fleet in this study area.

Fishery and biological data were collected by one scientific observer that worked under the coordination of the Pesquerías Lejanas team of the Instituto Español de Oceanografía in Vigo (Spain).

Gathered data included date, time, position, depth, SST, weather condition, catches, discards, length distributions, sex, maturity, stomach fullness, etc. Length distributions, sex ratio, and maturity stage of the most abundant species in the catch were also taken. Catch, effort, and CPUE by area and depth strata were analysed using GIS techniques in order to have a better understanding of the species distribution and behaviour.

The survey lasted 186 days with a total of 326 hauls (49,329 pots). *Dissostichus eleginoides* was the most abundant species with 42,441 kg (75.3% of the total catches) followed by *Macrourus carinatus* with 5247 kg (9.3%). The highest yield for *Dissostichus eleginoides* was found around 47°S latitude and at depths of 1001 to 1200 meters. Some preliminary results of this exploratory survey are shown in this work.

Keywords: exploratory fishing survey, pots, *Dissostichus eleginoides*, Southwest Atlantic, GIS.

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ICES CM 2006/M:04 – Poster

Distribution and migration of cod in the northwestern Barents Sea depending on oceanographic conditions

Andrey Pedchenko, V. Guzenko, and A. Karsakov

The paper describes the effects of oceanographic conditions, seasonal temperature, and salinity variations on migration patterns, distribution, and fisheries of the Barents Sea cod in the Spitsbergen area in August–December.

Analysis of oceanographic, fisheries, and biological data permitted to identify the distribution of commercial aggregations and catch variations depending on the Barents Sea temperature.

Recently observed warming of sea waters contributed to the increased role of the Spitsbergen area in commercial fisheries. In some periods, waters of the archipelago were the only area suitable for commercial fisheries.

Fisheries and biological data, as well as observations on standard sections, indicated that heat content in the Northern branch of the North Cape current in the beginning of the year can define the northern limits of cod migrations during summer and autumn, while cooling of waters has an effect on the rates of fish migrations southwards. Studies revealed a dependence of cod distribution and fisheries on the heat content in the fishing areas in the northwestern Barents Sea.

Oceanographic conditions of cod distribution are investigated and the ranges of temperature and salinity optimal for the formation of commercial aggregations during feeding and return migrations are identified.

The revealed dependence between distribution patterns of cod and environmental conditions on the fishing grounds can be used to model different scenarios of fishing conditions, which could contribute to improving fisheries advice.

Keywords: cod migration patterns, cooling of waters, fisheries of cod, seasonal temperature and salinity variations, Spitsbergen area, standard oceanographic sections.

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ICES CM 2006/M:05

Confidentiality of fisheries data in the context of enforcement activities versus research

F. Nolan and A. Laurec

Scientists and fisheries enforcement authorities both collect fisheries data to fulfil their separate objectives. With increasing pressure on fisheries resources, they have increasing needs for better quality data. In recent years, significant advances have been made in the technologies used by fisheries enforcement authorities to collect, analyse, and disseminate fisheries data. Since the early 1990s, tracking of fishing vessels by satellite (VMS) has been providing valuable data for control purposes. Within the EU VMS now applies to all fishing vessels in excess of 15 metres overall length. The automatic transmission by VMS of data relating to speed and course of fishing vessels has been obligatory in the EU since 1 January 2006. Furthermore, there have been significant developments in the technologies used to electronically report and store data on catches and other fishing activities. While initial developments in this field were within the framework of scientific research projects the worldwide trend is now towards the development of the technology for control and enforcement purposes. There is no doubt that fisheries scientists could benefit hugely from access to data collected by enforcement authorities; however, such access must be subject to certain delays in timing of release of data. Levels of aggregation and confidentiality should ensure that the identities of individuals or vessels are not revealed. Here we highlight the main areas where progress can be made to ensure that scientists can have access to the best data available without compromising confidentiality.

Keywords: enforcement, satellite, aggregation, confidentiality.

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ICES CM 2006/M:06

NODC-i – The National Infrastructure for Accessing Marine and Oceanographic Data and Information in the Netherlands

Taco de Bruin

The National Oceanographic Data Committee of The Netherlands has embarked on an ambitious initiative to build a fully distributed system of marine databases, thus integrating the data contained in those partner databases and making the data available to the larger community. The Netherlands NODC is a Committee with representatives from 8 large marine and oceanographic institutes in The Netherlands. Together, these 8 partner institutes manage over 90% of all the marine and oceanographic data in The Netherlands.

However, these 8 institutes all have their own database management systems, data formats and structures. Some of the databases are online, whilst others are not (yet).

The Space for Geo-information programme, a funding programme from the Dutch government, offered the opportunity to vastly improve this situation by funding the NODC-i project. The objective of the NODC-i project is to build an online, national infrastructure for accessing marine and oceanographic data and information in The Netherlands. To attain this goal, new and recently developed Internet software techniques and tools will be used. This presentation will describe the NODC-i project and present some of the highlights and achievements.

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ICES CM 2006/M:07 – Withdrawn

ICES CM 2006/M:08 – Withdrawn

ICES CM 2006/M:09 – Withdrawn

ICES CM 2006/M:10

Measuring uncertainty in trawl surveys: implementation in DATRAS

Lena Inger Larsen and Henrik Sparholt

The basic data from several ICES coordinated trawl and beam trawl surveys in the Baltic Sea, the North Sea, the area west of Scotland and France are stored in the DATRAS database in the ICES Secretariat. Every year and for each survey member countries report data to the database and indices of fish stock abundance are calculated and fed into the routine fish stock assessment work. Estimates of uncertainties of these indices are not developed, although these probably would be very useful for

the population modelling used in the assessment work. Uncertainty estimates would also be very useful for evaluating individual surveys, e.g. whether they could be usefully intensified to improve the precision of the fish stock assessment models. The reason for the lack of estimates of uncertainty is mainly that this is a difficult task where standard statistical methods cannot be applied directly. Instead, it needs some modelling or some non-trivial assumptions about stratification and randomness to be made, before applying standard statistical methods. The present paper suggests simple ways to calculate estimates of variation of each stock/area index in a given year, based on variability between individual haul catches in that year and some basic assumptions. The goal is to be able to supplement the routine indices with uncertainty estimates in the future. Various validation analysis, like cross-comparisons between survey precisions, are included.

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ICES CM 2006/M:11 – Withdrawn

ICES CM 2006/M:12

ICES Data Strategy, systems and services

Julie Gillin

In October 2005, the ICES Council approved the first ever ICES Data Strategy. The Council also approved a new Data Policy to replace the policy of 1994. Ultimately, the Strategy and Policy will ensure value-adding systems and services for the ICES community. Concrete activities to implement the Data Strategy are enumerated in the Data Centre Business Plan. A User Survey conducted at the ASC 2005, is also helping to guide improvements in data systems and services.

Highlights of the Data Strategy 2006–2010 and the Data Centre Business Plan will be presented together with details on implementation of the Data Policy (including the move to open and free data), and results of the 2005 User Survey.

Keywords: ICES, data, strategy, Data Policy, systems, services, Data User Survey.

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ICES CM 2006/M:13

An object-based approach to integration of software to support management and reporting of marine ecosystem survey data

Marek Ostrowski

An object-based software to support distributed databases and data reporting from combined fisheries and environmental surveys is presented. It is designed with the conceptual framework of the object model and implemented using Microsoft's distributed object technology COM.

The key abstraction of this system is expressed as a collection of generic station (data) objects that is called the station set. Each station object consists in turn of a data structure, to store a master record and a matrix of data cycles, and a behavior to capture this data structure from a variety of input data formats and to store it in an on-board database. The station objects are not a part of the main system, but are implemented as separate runtime plug-ins. This makes this system easily adaptable to particular data collection needs of a given survey. All that is required is to devise a plug-in for a new data type, stemming from a code template provided with the base system.

Once the data are stored in the database, they are accessible through a set of generic data retrieval protocols, which generate tabular (spreadsheet-like) data subsets referenced by geographical position or returned as time-series. Through these protocols, implemented with the COM technology, the data are easily integrated with the user-end software on Windows, including GIS and numerical computing environments (Matlab, IDL, R/S-Plus, etc.), or made accessible to a web server for their distribution over the Internet.

The paper focuses on the technological aspects of the system and is thus addressed mainly to marine data system integrators and data managers. Nevertheless, complete end-user tools built with this system do exist for the CTD, along track weather data and acoustically measured fish abundance. These are described and can be freely downloaded from the Internet.

Keywords: marine data management, object-based technology.

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ICES CM 2006/M:14 – Poster

The effect of individual species variability on the use of the total catch as an indicator of trends in a multispecies fisheries in the Red Sea

Iyob Tsehaye and Leo A. J. Nagelkerke

In multispecies fisheries, adding the catches of individual species together results in the averaging-out of the temporal fluctuations and hence less variation in total catch. Under such circumstances the total catch cannot be appropriately used as an index of true trends. The reduction in variability depends on the relative abundance of individual species in the catch, as well as the degree of co-occurrence between the catches of individual species. Our analysis of the catches from the artisanal fisheries of Eritrea indicates that the use of total catch results in the coefficient of variation (CV) being reduced to 60% of what could be attained under perfectly positive correlation ($r=1$) between the catches of individual species. Analysis of co-occurrence, however, reveals that there is a higher degree of co-occurrence between some species than others. Accordingly, the total catch was divided into three categories, each consisting of species that exhibit a higher degree of co-occurrence, including (a) snappers, emperors, and groupers; (b) mackerels, tunas, barracudas, and cobias; and (c) jacks, sharks, sea catfishes, and grunts. We confirmed that these species can be added together without causing a significant reduction in variability (90%). The actual reduction in variability (CV) was also compared with the theoretical assuming independent occurrence ($r=0$) between the catches of individual species. We concluded that the total catches of the species within each of these categories can be added together without the risk of losing our perception of the actual patterns in the catches of individual species.

Keywords: multi-species fisheries, catch variability, species co-occurrence, reduction in variability, Eritrea.

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ICES CM 2006/M:15

Semantic interoperability: a goal for marine data management

Roy Lowry, Luis Bermudez, and John Graybeal

Whilst the problems of syntactic interoperability between data sources have reduced significantly through the acceptance of standard formats such as NetCDF and Microsoft package formats, the problem of semantic interoperability remains. Semantic interoperability is like language translation for science – making sure the terms we each use in our data can be understood by people and computers, allowing data to be exchanged reliably and

automatically. There are steps that those who are in the enviable position of building a marine data system from scratch can take to maximise the possibility that their system will achieve semantic interoperability. From defining terms, to using standards, to linking data and metadata, following simple guidelines will make a system's data available to many more researchers, much longer into the future. If users are to adopt vocabulary and content standards then those responsible for maintaining the standards need to deliver service that includes versioning, convenient access to current and past versions and timely response to requests from users for updated content. In most cases this has not been achieved to date. Those with either legacy data or strongly enforced local terminology will need vocabulary maps if they are to interoperate semantically. The Marine Metadata Interoperability Initiative (<http://marinemetadata.org>) has been developing high quality tooling to facilitate building this type of map. The time has now come for the marine science community to help evolve these tools and apply them to capture its domain expertise into semantic web resources that will form the basis for future semantic interoperability.

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ICES CM 2006/M:16

Overcoming obstacles to data integration: a case history

Hans Mose Jensen, Julie Gillin, Jacqueline Jones, and Patrick Roose

ICES Data Centre is currently developing the Database on Oceanography and Marine Ecosystems, DOME. This database integrates over a century of physical, chemical, and biological data which have previously been segregated into a variety of databases and file structures. DOME's development is supported by OSPAR, Cefas, and ICES.

Integration of oceanographic data has presented several challenges including *near*-duplicated data, incompatible coding, loss of links between data, normalization-breakers, etc. To provide guidance in dealing with these issues—and sometimes take hard decisions—OSPAR established an Intersessional Correspondence Group, ICG-DOME. ICG-DOME as well as Cefas are represented in DOME's steering group.

Typical problems of data integration and pragmatic solutions will be presented. DOME's structure will be outlined, and selected DOME features will be demonstrated.

Keywords: integrated oceanographic database system; integrated marine ecosystem database system; DOME.

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ICES CM 2006/M:17

The UK marine data and information partnership

P. D. Cotton

In the United Kingdom, marine data and information are collected by a variety of UK government, non-government, academic, private sector, and other research organisations for many different reasons. An almost inevitable consequence of these many separate marine data gathering and management activities is a legacy of differing ways of storing and sharing data and information. As new questions are asked of marine science and more holistic assessments required, it is essential that a coordinated approach to the management and stewardship of marine data and information is adopted.

The UK Marine Data and Information Partnership (MDIP) was launched in March 2005 to address these issues. MDIP's mission is to support the establishment of harmonised stewardship of and access to marine data and information, to facilitate improved management of the seas around the UK. MDIP has 21 initial partners from the private and public sectors, including UK Government holders of marine data at its core. The partnership is open to all marine data providers on an equal basis – with the view that its outcomes should be of benefit to the whole marine community.

This paper will present the aims and activities of MDIP, and discuss how MDIP is working to achieve these aims, aiming to draw on experience from across Europe and further afield.

Keywords: data Management, standards, interoperability.

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ICES CM 2006/M:18

Use of public domain tools for Internet access of oceanographic data at IEO

A. Nikouline, E. Tel, M. J. González, and M. J. García

An open source MySQL database with the interface written using PHP language were chosen in order to provide Internet access to oceanographic data at IEO. Before importing existing data into the database, these data in ASCII format coming from different data sources are prepared in Medatlas format and submitted to quality

control with QCDAMAR software. Then a special script performs data import into the web-based INDAMAR database. All currently available information at IEO about bottles, CTD and XBT profiles, as well as meta-data concerning cruises and fixed point observations was moved successfully to the database.

Complex queries make it possible to retrieve information using various criteria, such as space, time, depths, oceanographic parameters, etc. The extracted information is exported in different spreadsheet-like text format files, prepared for later use in many software applications, like ODV, Excel among others. These files can be downloaded by ftp access.

INDAMAR database has its "twin" called SelAVi, working in local mode. It has much more powerful interface, routines for calculating of climatic information and sophisticated graphic visualization modules. Calculations results together with the circulation information coming from a set of Matlab functions (MATCOR), such as current roses and tidal currents can be easily accessed via web by clicking in the corresponding quadrants or selected zone on the map.

Keywords: Internet access, environmental data, database.

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ICES CM 2006/M:19 – Withdrawn

ICES CM 2006/M:20

Fisheries data quality management : toward quality indicators

Christophe Tufféry and Stéphanie Mahévas

The quality of model outputs and advice is dependent on the data quality. Providing data quality requires first to analyze the methods of data collection, data storage, and data extraction, second to propose methods of data validation, and finally to develop metrics of data quality. Such an approach to data quality is based on the principles of a quality management system like those defined by the ISO9001:2000 international standard.

The MEQUAPRO project, developed within the framework of the SIDEPECHE programme at IFREMER, aims at reaching this requirement. Data qualification consists in assigning a quality value to data according to a range of preset quality values. Qualification is based on validation by one or more methods (primarily the respect of protocols), which enables to check if data reaches the preset quality value. The next stage consists in passing from qualification to quality indicators. These indicators make it possible to check and follow in time whether

data and products (estimates from data) achieve a precise qualitative aim, meeting either internal needs of IFREMER or those of "external customers" (French Ministry for Agriculture and Fishing, European Union, etc). The french process of data collection in board constrained by the European Data Collection Regulation illustrates this approach.

Keywords: data quality, indicators, quality management system, fisheries information system, qualification, validation.

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ICES CM 2006/M:21 – Poster

A multi-faceted approach to data integration in the Marine Institute

Martina Hennessy, Christopher Allsop, and Ciarán Kelly

The Marine Institute has evolved over the last 14 years from an initial staff of 2 to 180 today, with much of this growth due to the merger of previously separate organisations. As a result the organisation has extensive archives of oceanographic, environmental, and biological data, but in many different formats and to varying standards. Significant challenges are faced in collating, integrating, accessing, and disseminating this data, while also generating full scientific value from these assets. Consequently a phased programme of work is underway to address all aspects of data management, with a distributed approach being adopted. Enterprise-wide MS SQL Server databases have been established using common data models to manage distinct datatypes and provide centralised access, with further work planned to spatially enable them in the future. Specific examples include port sampling, fisheries surveys, and harmful algal bloom datasets. Restoration of data from archaic file formats is another aspect of this, involving fisheries sampling archives in a range of formats/media dating back to the 1980's, migrated to a common platform where they have been standardised. The ArcMarine spatial data model, developed by the marine community in the US, is being prototyped to manage a range of oceanographic datasets, with supporting GIS access tools developed. Linked web-GIS services have also been established to support general dissemination of metadata and data, including www.marinedataonline.ie and www.maps.marine.ie. The use of OGC standards in this area is considered vital to support interoperability, and collaborative work is underway with national and international organisations to further progress this distributed approach to integrated service delivery.

Keywords: data integration, data interoperability, GIS, data models, data archives.

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ICES CM 2006/M:22

Fisheries data management, access, integration and sharing – the Canadian approach

Gerry Sullivan and Denis Tremblay

Fisheries and Oceans Canada (DFO) is pursuing a variety of complementary technology innovations to address the challenge of optimizing access to and sharing of quality data in a distributed database environment supporting the movement of fisheries management and science components toward ecosystem-based management. In parallel to the development of multi-channel tools for the capture of fishing activity data at source, a key challenge has been to construct common repositories, data standards, common language tools and integrated access and reporting interfaces to a host of legacy systems, for use by internal DFO end users (resource management, compliance and science personnel) and external stakeholders and clients. Canada's size, with fishing activities on the Atlantic, Pacific and Arctic Oceans, increases these challenges considerably.

Key among the innovations already in place or in development are a common language system (CLaMS) and an Operational Data Store (ODS) that, combined, provide common language tables and a repository of consistent, quality, and timely operational data for access by fisheries and science personnel. DFO's National Vessel Monitoring System (VMS) provides enhanced GIS-based vessel location and activity information and is a prime example of a solution where data captured at source is matched and validated with a standardized common vessel table with resultant data accessible for integrated reporting, forensic analysis, or scientific research purposes. Specialized modular web-services tools, sharable from one data access application to another, have been developed to access the ODS and, where necessary multiple back-end legacy systems across DFO regions.

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ICES CM 2006/M:23

IDOD: an integrated marine environmental database

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In 1997, the Belgian Marine Data Centre started developing an integrated marine environmental database. The initial core model was designed taking into account the characteristics of concentration data in seawater. This model was soon expanded to cope with concentrations in air, sediment, and biota. Nowadays, also spectral data (optical properties, sediment granulometry), observations on living organisms and biodiversity information are stored in the database. Very recently, the structure was complemented with a taxonomic module that allows the storage of vernacular names, taxonomic changes, determinations to any level of detail as well as revised determinations of a given specimen. Next to the storage of measurement results, special attention is paid to the storage of a comprehensive set of meta-information like the corresponding research projects, the methodology, and the related quality control information. The main thought about storing and linking results of various disciplines together is to improve the knowledge of our marine ecosystem in its broadest point of view and to make the life of the users of the system easier. The online interface provides many search options and several export formats, in order to allow everyone to create a subset of the data suited to his/her very own needs. In this paper, we will present the structure of the IDOD database, the technical choices we made to reach our goals and our plans for the future.

Keywords: integrated database, database structure, marine environment, online user interface.

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ICES CM 2006/M:24 – Withdrawn

ICES CM 2006/M:25 – Poster

Flatfish fisheries in the Portuguese coast

Célia Teixeira and Henrique Cabral

Flatfish landings account for less than 1% of all the fish biomass landed on the Portuguese coast. However, the importance of flatfish fisheries is considerably higher due to the high commercial value of flatfish species, accounting for near 7% of the economical value of all landings. Flatfish are mainly caught by the artisanal multi-gear fleet, which consists of almost 5900 vessels. The main fishing gears used in flatfish fisheries are trammel and gill nets and bottom trawl. In the present study official

landings time-series data for the past 15 years are analyzed. Sampling surveys were conducted onboard fishing vessels and inquiries were made of fishermen communities throughout the Portuguese coast. Flatfish landings have been maintained in the past 15 years above 6000 tonnes year⁻¹. A marked seasonal pattern was noticed, with the highest values in autumn and winter periods. The main species caught were soles (*Solea solea*, *Solea senegalensis*, and *Solea lascaris*), with values considerably higher compared to the other groups of species, i.e. flounders, brill, turbot, megrims, bastard and wedge soles. The exploitation patterns of these species differ according to latitude, soles being heavily caught in the North and central Portuguese coast, megrims and spotted flounder in the North, and bastard sole in the South coast of Portugal. Although no evaluations of the exploitation status of flatfish stocks exist, there are strong concerns and probably overexploitation, based on information for the adjoining areas of the North coast of Spain and France.

Keywords: flatfish, landings, time-series, fisheries management, Portugal.

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ICES CM 2006/M:26

Revealing species communities in a spatial and temporal overlap

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Storing physical and chemical values, optical spectra and sediment granulometry is already a cumbersome task; dealing with biological data even falls into a different category. Biologists tend to focus their attention at species of their interest while other specimens in the same sample are often underestimated. Meanwhile taxonomists are continuously revising the taxonomy resulting in a complete new set of relations between these taxa. Keeping track with both and meanwhile having a dataset up to date seems endless. At the Belgian Marine Data Centre we tried to think outside the box and came up with a solution to content both biologists and data managers. The last thing we aimed at is to create another web index to refer species, therefore we hooked up with the existing web-based referencing systems. The need to get data about different food webs in a spatial and temporal overlap is answered by our hierarchical storage of taxa which allows selecting a predator at species level and at the same time selecting different prey species at lower taxonomic levels. As these species, and also the scientists, usually are not confined within 'latitude longitude squares' we elaborated the spatial selection tool which defines user-specific polygons on which to base the se-

lection of data. We will briefly present the structure of our relational database but specific attention will be given to the taxonomic and spatial parts. Incentives and discomforts in organizing the data in this way, and our current web interface, will be demonstrated.

Keywords: taxonomic database, spatial querying, hierarchical data storage.

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ICES CM 2006/M:27

GeoModeler – Integration of a nutrient-phytoplankton-zooplankton (NPZ) model and an individual-based model (IBM) with a geographic information system (GIS)

Tiffany C. Vance, Bernard A. Megrey, and Christopher W. Moore

Ideally, spatial ecological models should be easily linked to a geographic information system (GIS). In the past, these two have not been well integrated for scientific uses. This lack of true integration hinders the ability of managers and scientists to create interactive, GIS-based models for management and research.

However, GIS packages are starting to provide programming constructs, i.e. by exposing code and objects, to allow closer coupling of core GIS functionality and analytical/modeling tools.

In creating GeoModeler, we have provided a prototype of how one might integrate a GIS with a number of oceanographic and fisheries models. With this tool, scientists and managers are able to use a graphical interface to display datasets, select the data to be used in a scenario, set the weights for factors in the model and execute the model. The results are returned to the GIS for display and spatial analysis. The project creates a framework for linking to other types of back-end fisheries, oceanographic, and ecosystem models written in a variety of programming languages.

Shown is an application to visualize and analyze the results of two models; a model for mammal-prey interactions and a model to look at the effects of climate change on the recruitment of an economically important fish species. The first model is an individual-based model (IBM) that models the fate of individuals using characteristics such as age, size, and prey consumption. The second model is a nutrient-phytoplankton-zooplankton (NPZ) model looking at the effects of climate change on the early life history of fish.

Keywords: visualization, fisheries, models, GIS.

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ICES CM 2006/M:28

A web-based fisheries oceanographic information system for the Gulf of Alaska

Vardis M. Tsontos, D. A. Kiefer, and P. A. Livingston

A prerequisite for better understanding the factors influencing the dynamics of marine populations in space and time is the integration, within a unified spatial modeling framework, of series of quantitative survey data on species distributions, environmental information, and model results. The Gulf of Alaska electronic fisheries atlas combines these features with standardized protocols for data access within an oceanographic Web-GIS to support the information needs of scientists and decision makers. Building upon informatics tools and approaches developed during GMBIS (Gulf of Maine Biogeographic Information System project), the Alaskan fisheries atlas combines historical fisheries catch survey and gut contents databases from NMFS-AFSC with coincident physical data and an extensive series of satellite imagery of diverse types. The resulting system allows users to interactively explore across the Internet via an intuitive, browser-based GIS interface the temporal evolution of species distribution patterns and trophic interactions in relation to diverse environmental datasets. This paper summarizes technical aspects of the system, and outlines its possible future usage as a tool supporting marine ecosystem studies.

Keywords: fish distributions, trophic relationships, Gulf of Alaska, web-based, GIS, EASy, Biogeography, OBIS.

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ICES CM 2006/M:29

InterCatch – a tool for fish stock assessment, status and methods

Henrik Kjems-Nielsen, Lena Larsen, Maria Zarecki, Teunis Jansen, Brian Cowan, Peter Sandbeck, Mads Dueholm, and Ole Skov

InterCatch is a web-based system for handling fish stock assessment data. National fish stock catches are uploaded to InterCatch by national data submitters. After all catch data are uploaded the stock coordinators then allocate sampled catches to unsampled catches, aggregate to international catch and download the output. The output is used as input to the assessment models.

InterCatch has been developed by ICES and DIFRES in 2005–2006. This year, InterCatch is being tested by stock coordinators including tests comparing results from legacy systems. Full production is planned for the 2007 assessment season.

InterCatch functionality will be demonstrated, and results of current testing will be presented. The methods and algorithm upon which InterCatch is based will be examined.

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ICES CM 2006/M:30

Integrating environmental data from heterogeneous sources: dangers and pitfalls

K. Deneudt and E. Vanden Berghe

Scientific data are often collected in the framework of relatively small projects; the resulting datasets are usually relatively small-scale, and fail to inform on the scale of global environmental problems with which humankind is confronted. This has prompted a multitude of data integration activities, to try and assemble several of these smaller datasets in larger, interpretable databases. Older datasets are transcribed from paper to electronic forms in data archaeology and rescue projects. While these integrating and rescue activities are extremely useful, they are often labour-intensive, they often cause a certain degree of loss of detail in the information, and they introduce an inherent danger of data duplication. To facilitate integration, reference should be made as much as possible to standard vocabularies of terminology: standard taxonomic names, standard biogeographical names, parameter names. Where standard protocols were used in generating the observations or where there is an opportunity to make *a priori* agreements with the scientists about minimal required metadata, the integration process can be simplified and the loss of detail can be minimized. To avoid accidental introduction of the same data more than once, tools have to be used to check for exact or near duplicates. In all cases, extensive documentation is essential. Issues are illustrated using integration activities at VLIZ, including data management for the North Sea Benthos Project of ICES.

Keywords: environmental data, data management, integration.

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ICES CM 2006/M:31

WATeRS: A Web Map Service with near-real time MODIS standard chlorophyll products of the North Sea

Marieke Eleveld, Alfred Wagtenonk, and Nils de Reus

Phytoplankton concentrations can be derived from measurements with remote sensing (or earth observation) techniques because of the spectral characteristics of the chlorophyll pigment. The MODerate Resolution Imaging Spectroradiometer (MODIS) is a 36-band spectrometer observing the land, atmosphere, and oceans within a wavelength range of 412 to 14 385 nm. An open web map server system has been set up for using the chlorophyll (CHL) data from the standard MODIS Level-2 Local Area Coverage (LAC) data products, which are brokered in compressed scientific data format from NASA's Ocean Biology Processing Group. We import, convert, project, and subsequently serve these data in open GIS compliant format in a near-real time web mapping application, which enables users to interactively explore the remote sensing products, and to seamlessly combine the data with other geographic data. The WATeRS system <http://ivm10.ivm.vu.nl/mapserver/waters>:

- 1) is a near-real time interactive, easily online accessible map service of water quality information from operational remote sensing, based on off the shelf technology that complies with open standards;
- 2) serves verifiable results via a GIS-based map service with a metadata catalogue that provides, amongst others, full lineage of the CHL maps;
- 3) was customised to create a simple, clear and intuitive user interface, grid-cell query functionality, and automated archiving of produced map results.

The robust service has been used for automated data collection since January 2005, has a growing user group, and should be embedded into a larger framework to ensure continuity of the service.

Keywords: ocean colour, remote sensing, water quality products, phytoplankton, patterns, web map server, metadata, <http://ivm10.ivm.vu.nl/mapserver/waters>.

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ICES CM 2006/M:32 – Withdrawn

ICES CM 2006/M:33

NORSEPP quarterly update reports on North Sea conditions – operational oceanography and fish stocks

Hein Rune Skjoldal and Martin Holt

The ICES/EuroGOOS Planning Group for the North Sea Pilot Project (NORSEPP) started in 2005 to produce quarterly update reports on North Sea conditions, with emphasis on the physical conditions as drivers for biological variability. The reports include modelled mean monthly fluxes of water across boundaries and sections in the North Sea compared to long-term averages, SST, hydrographic parameters, and some information related to the seasonal development of phytoplankton. The aim of NORSEPP is to demonstrate the timely availability of products based on modelling and observations. The hope is that such information on physical drivers and variability of the North Sea may help in assessments of biological conditions, including commercial fish stocks.

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ICES CM 2006/M:34

Sea-Search – SeaDataNet: development of a common data index based upon ISO19115

Dick M. A. Schaap (MARIS), Catherine Maillard (IFREMER), and Sea-Search and SeaDataNet partners

Sea-Search (2002–2006) and its successor SeaDataNet (2006–2010) are major Pan-European projects, undertaken by National Oceanographic Data Centres (NODCs), marine information services, and divisions of major national institutes, from nearly all coastal states bordering all European seas. Sea-Search focused on metadata and has established and populated an array of directories and overviews of ocean and marine data and information resources; these are available from the Sea-Search portal website <http://www.seasearch.net>. SeaDataNet continues and expands the operation and maintenance of the Sea-Search directory services and moreover focuses on providing transparent online access to available oceanographic and marine data sets and data products. *Inter alia* it will interconnect the existing ocean and marine data management centres and enhance and harmonize their current data management facilities and procedures. The **Common Data Index** (CDI) gives users a highly detailed insight in the availability and geographical spread of marine data across the different data centres and institutes across Europe. The CDI format is defined as a dedicated subset of the ISO19115 metadata standard. A CDI XML format supports the exchange between CDI-partners and the central CDI manager, and ensures interoperability with other systems and networks.

CDI XML entries are generated by participating data centres (i.e. CDI-partners), directly from their databases. A pilot CDI user interface system has been developed which contains more than 100,000 entries from 10 CDI data centres. SeaDataNet will work on further finetuning and populating the CDI with entries of all data centre partners and possible other institutes in their countries. The **European Directory of Marine Organisations – EDMO** was launched to manage and to present addresses and profiles of organisations that are active in Europe in the field of marine and oceanographic data acquisition, data management, and research. The maintenance is executed by means of an online Content Management System (CMS). The EDMO directory can be queried and browsed by users via the Sea-Search web portal via a combined alphanumeric-geographical User Interface.

Keywords: data management, ISO19115, ocean and marine data.

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ICES CM 2006/M:35 – Poster

Satellite monitoring of cyanobacterial blooms in the Baltic Sea – The Baltic Algal Watch System (BAWS)

Martin Hansson, Bertil Håkansson, and Bengt Karlson

The Baltic Algal Watch System (BAWS) is satellite monitoring of cyanobacterial blooms in the Baltic Sea. The summer blooms of nitrogen-fixing cyanobacteria are regular and natural phenomena in the Baltic Sea, but the strong and widespread blooms in the past years have caused major environmental concern both to the public and authorities due to the toxicity and the increased nitrogen input. The most abundant toxic species *Nodularia Spumigena*, can pose a threat to small animals and children.

The Baltic Algae Watch System (BAWS) at SMHI has been operational since 2002 and provides information both to the public and to the Information Offices for Skagerrak/Kattegat, The Baltic Proper, and the Bothnian Bay. The main source of information is the satellite sensor AVHRR (Advanced Very High Resolution Radiometer), which measures radiation in five broadbands ranging from visual to thermal infrared. The highly reflective surface accumulation of algae can be clearly visible in the visual channel 1.

The poster will include an explanation of the method used to monitor algae bloom from satellite, results, other operational oceanographic products in the system, the correlation between satellite and *in situ* data, methods to compensate for the cloud cover, statistics, and image examples of blooming areas both in the Baltic Sea and in Skagerrak.

Keywords: NRT-monitoring, cyanobacterial blooms, toxic, weather forecast, dispersion, models, solar radiation, dispersion of oil spill, SST, environmental indicator, HELCOM.

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ICES CM 2006/M:36 – Poster

SeaDataNet Pan-European infrastructure for ocean and marine data management

Catherine Maillard and Dick Schaap

SeaDataNet will succeed Sea-Search for the years 2006–2010 as an “Integrated Infrastructure Initiative of the EU Specific Programme “Research Infrastructures”. It will maintain the Sea-Search directories and expand their coverage from 30 to 35 countries bordering the North-East Atlantic and its adjacent seas. Moreover, it will focus on interconnecting the existing oceanographic data centres to provide integrated on-line access to the most comprehensive multidisciplinary available sets of *in situ* and remote sensing marine data, meta-data, and products. This initiative is undertaken by a consortium of 49 partners of major oceanographic institute of the 35 participating countries, acting as National Oceanographic Data Centres (NODC), Satellite Data Centres (SDC), two expert modelling centres, and three international bodies. By involving the Intergovernmental Oceanographic Commission of UNESCO (IOC), the International Council for the Exploration of the Sea (ICES), and the EC Joint Research Laboratory (JRC), SeaDataNet will ensure that the standards developed are consistent with ongoing works at the international level. Training and products preparation activities will provide an important support for these standardizations and technical issues.

Keywords: SeaDataNet, marine data management, National Oceanographic Data Centres, Satellite Data Centres, IOC, ICES, on-line data access, sets of *in situ* and remote sensing marine data, international standards.

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ICES CM 2006/M:37 – Poster

ICES-FishMap, an electronic atlas of North Sea fish

Henk J. L. Heessen, Niels Daan, Paul Eastwood, Jim R. Ellis, Neil Fletcher, Remment ter Hofstede, Colin Kirk, Lena Larsen, and Henrik Sparholt

ICES has recently opened up access to the fish data collected by research vessels around the North Sea, in the form of an online mapping system (<http://www.ices.dk/marineworld/ices-fishmap.asp>).

ICES FishMap allows users to make maps showing the distribution of fish in the North Sea over the period 1983–2004. The surveys used are the International Bottom Trawl Survey (IBTS) and the Beam Trawl Survey (BTS).

FishMap has two parts: a basic section with general info about each species with a pdf for more detailed information, and then an advanced section where the user can make the maps.

ICES-FishMap is the result of a project co-funded by the European Commission and currently holds data for 15 species. In a second phase the authors intend to provide similar information on all other fish species caught in the North Sea.

Keywords: North Sea, fish, distribution, research vessel surveys.

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ICES CM 2006/M:38 – Poster

Quality check surveys: DATRAS – North Sea IBTS

Remment ter Hofstede and Niels Daan

The North Sea International Bottom Trawl Survey (NS-IBTS) provides appropriate data for the examination of large-scale spatial and temporal analyses of fish assemblages in the North Sea, Skagerrak, and Kattegat, and therefore for the derivation of metrics with which to assess changes in the structure, function, and diversity of fish assemblages. The survey data are becoming increasingly important for assessing the status of commercial and non-target fish species and fish communities as a whole. Hence, sampling protocols of the North Sea IBTS survey should ensure that data collection is appropriate for studies of the wider fish community. It has been highlighted before that the IBTS has potential problems associated with (a) input errors and (b) the misidentification of selected taxa, especially with several taxa of non-target fish species. Additionally, there are several taxa that member states report at a range of taxonomic levels

(species, genus, or family), which may affect the utility of survey data for fish assemblage studies (e.g. biodiversity studies and metrics for fish communities). All information collected during the NS-IBTS from 1965 onwards is stored in the DATRAS database at ICES headquarters. A quality check on this database lists the problematic taxa, identifies possible misreporting, and provides recommendations for change.

Keywords: data quality, misreporting, Datras, IBTS, North Sea.

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ICES CM 2006/M:39 – Poster

Data Centre for Coastal Operational Oceanography

M. Fichaut, A. M. Jégou, T. Carval, L. Delauney, J. F. Le Roux, E. Moussat, and J. F. Piollé

In the frame of a Regional programme a data centre for Coastal Operational Oceanography has been built in the French Research Institute for Exploitation of the Sea (IFREMER).

The objectives of this data centre is to provide operational services to the users of coastal areas in France who need information on currents, sea level anomaly forecasts, monitoring of sea water quality and urban contaminants discharge, or on phytoplankton blooms.

The data centre collects different data types coming from various sources:

- Reference data such as bathymetry
- Forcing data: model output, meteorological data, river output
- *In situ* data collected during cruises (CTD, water samples, Acoustic Doppler Current Profiler) or by autonomous sensors (profilers, tide gauge, wave buoys, etc.)
- Remote sensing data such as SST and sea colour

The data are received as much as possible in real time or near real time and the data centre delivers it to the modelling centre for several daily runs.

The data centre provides also an archive system for the data and the model results which allow hindcast runs.

Both observed data and model results are available through the PREVIMER Web site (<http://www.previmer.org>).

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ICES CM 2006/M:40 – Poster

Adding interoperability features to the U.S. JGOFS/U.S. GLOBEC Data Management System

Robert C. Groman, P. H. Wiebe, M.D. Allison, and G. Heimerdinger

The JGOFS/GLOBEC Data Management System is a flexible, extensible, data driven, and network accessible software system used to serve oceanographic data over the Internet by several projects, including the U.S. Joint Global Ocean Flux Study (JGOFS), U.S. Global Ocean Ecosystem Dynamics (GLOBEC), Northeast Consortium, and FleetLink. The system uses the hypertext transmission protocol (http) to exchange information over the web, which enables it to readily deal with numbers, text strings, and images, although the fundamental data type is ASCII strings. An object-oriented paradigm isolates the underlying data organization and retrieval mechanisms from the higher level functionality familiar to typical database systems, including data selection and projection operations. Data sources are fundamentally “flat file” structures, which work well for many data sets including underway observations, meteorological measurements, conductivity/temperature/depth (CTD), and biological sampling tows. Acoustic data can pose some problems, but we are working on this issue. Lacking from the original implementations of the JGOFS/GLOBEC system are mechanisms to interoperate with other data systems. This is understandable given that the software was first developed in the late 1980’s and used its own web communications protocol initially before changing to the http in the early 1990’s. We describe here our recent efforts to address this limitation by implementing two new capabilities to the system: Access via the Open Geospatial Consortium’s Web Mapping Service and Web Feature Service and access via the Ocean Biogeographical Information System’s (OBIS) Darwin Core Version 2 extension (DiGIR) interface.

Keywords: data management system, interoperability, oceanographic data, JGOFS, GLOBEC, OBIS, OGC.

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ICES CM 2006/M:41 – Poster

Differences in CTD operations: significant differences in the resulting data?

Taco de Bruin

The ICES Working Group on Marine Data Management (WGMDM) has conducted an international survey on

CTD operation practices. The poster will present the results of this survey.

The way a CTD is operated is rarely, if at all, recorded in the metadata, which accompany all CTD data. However, differences in operating a CTD result in differences in data and in the accuracy of the data. These differences are unknown to a scientist, compiling a dataset from various sources. Yet, depending on the discipline and on the objectives of the research, the differences may seriously affect the comparison and interpretation of the data.

The possible consequences of the differences in operating a CTD will be discussed.

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ICES CM 2006/M:42 – Poster

SONATE – SONAr effectTs on marinE life – Aiding naval officers in planning safe operation of active sonar

Jonas F. Henriksen and Nina Nordlund

The Royal Norwegian Navy is purchasing new frigates with advanced and powerful active sonars (1–8 kHz) to be used for detection of submarines.

These sonars have been claimed to have negative impacts on marine mammals and fish. A decision aid tool and a marine resource database has been developed to aid Norwegian naval officers in planning and executing exercises where sonar is to be used. The project is a collaboration between FFI and IMR.

The database contains distribution maps of marine mammals and fish assumed to be sensitive to sonar signals, as well as ecologically and commercially important species. Distribution in time, space, and stage of the species (larval, spawning, feeding, cubs, adults, etc.) is provided in the best possible resolution, given our current knowledge of the species.

The database has two main objectives:

- To provide data to the Navy’s decision aid tool
- To make the data available in GIS-systems to researchers through a WMS interface

The decision aid tool collects data from the distribution database, as well as fisheries activity data. The user selects an exercise area and time, and is presented a map with species found in the selected area at the selected time. Sonar-sensitive species are linked to a set of simple regulations with limitations regarding the use of active sonar in the vicinity of the species. Thus, naval officers

can avoid planning and execution of sonar trials in areas and at times where it might have adverse effect on the local fauna.

Keywords: Marine mammals, GIS, WMS, sonar.

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ICES CM 2006/M:43 – Poster

Coastal monitoring on the Internet

Jan R. Andersen, Karen Gjertsen, Helge Sagen, and Øivind Østensen

The Institute of Marine Research measures temperature and salinity at fixed stations, fixed transects, and regular ship routes. The data provide scientists with long-term time series. When published on the Internet they also provide the public with an opportunity to study the current trends in temperature and salinity along the Norwegian coast. Calibration and quality control routines for the different data sets are outlined in this poster along with the online data access tools and public interface. Three datasets are presented on the web.

Fixed coastal stations along the Norwegian coast measure temperature and salinity every second week. These measurements date back to 1935 and are valuable in climate studies. The data gathering is done by local fishermen, and data are transferred electronically to the institute, along with water samples for quality control.

A thermograph recorder is mounted on the coastal steamer that travels along the entire western and northern coastline from Bergen to Kirkenes. This instrument records temperature in the surface-layer every 5 minutes. The thermograph will be upgraded to a thermosalinograph within the year.

Publishing of fixed transects are under development. Mean values of temperature and salinity distributions along the transects are calculated. A web-application will show 2-D contour plots of mean values, measured values, and anomalies.

Keywords: Thermograph, fixed stations, transects, CTD, on-line data access, Internet, coastal monitoring.

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ICES CM 2006/M:44 – Poster

Mareano WEB – GIS Internet Portal for Marine Data in Norwegian Waters

Kareen Bröker and Jonas F. Henriksen

The Mareano project is a collaboration between the Norwegian Institute of Marine Research (IMR), the Geological Survey of Norway (NGU), and the Hydrographic Survey of Norway (SKSK). The purpose of the project is to contribute to a more complete, knowledge-based management of Norwegian waters. An important part of this project is the Mareano WEB Internet portal, a virtual marine GIS database that accesses data from distributed databases. The data portal contains the project members' existing and new data. This includes geological, bathymetric, and ecological data in addition to data describing human activities in Norwegian waters such as fisheries and petroleum operations. The data are administered by the respective project member, which means that the responsibility to update, format, and quality check the data lies with the data owner. The distributed databases are connected by standardized interfaces for exchanging map data such as XML (eXtended Markup Language), and WMS (Web Map Server). Various data themes are presented as separated map layers, which can be shown separately or in combination with other map layers. At the Mareano WEB portal a user selects an area and data themes. Data that correspond to that selection are collected from the distributed databases, and the system presents a map with the selected information. The user will perceive the system as one map server, but the data will be collected from several distributed map services and databases.

Keywords: marine data, distributed databases, GIS, WMS, ArcIMS.

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ICES CM 2006/M:45 – Poster

Can otolith shape analysis and age estimation be helpful for fisheries management of black scabbardfish, *Aphanopus carbo*, in Portuguese waters?

Ana Rita Vieira, I. Farias, L. Serrano Gordo, I. Figueiredo, P. Bordalo-Machado, T. Moura, A. Neves, and B. Serra-Pereira

The black scabbardfish, *Aphanopus carbo*, is the most important exploited species in Portuguese deep-water fisheries, having shown an increase in landings to nearly 3,000 tonnes in the last decade. Despite the increasing economic importance of this species, little is known about its stock(s) structure(s); this information is fundamental for future proposals of management measures. It

is supposed that this species presents a migratory pattern related to either reproduction or feeding strategy, although its movements are poorly known. As a result, the hypothesis of the existence of more than one stock cannot be excluded. The main objectives of the present study were to compare the shape of otoliths from specimens caught in Madeira Island and Sesimbra (mainland Portugal) and to investigate if these structures are adequate to discriminate the two hypothetical stocks. Otolith shapes were determined using Fourier analysis. Stock discrimination through shape analysis of otoliths has been shown to be an essential tool to understanding the dynamics of fish species. Differences in the shape of otoliths are probably related to the deposition rate of its compounding materials which, in turn, depend on geographically variable environmental factors. Furthermore, the age of black scabbardfish specimens was determined based on the analysis of whole and sectioned *sagitta* otoliths. The occurrence and individualization of growth increments was compared between the whole and sectioned otoliths in order to identify the most appropriate area to estimate the age of this species. It was observed that the most suitable area was the dorsal face of sectioned otoliths.

Keywords: black scabbardfish, otolith, stock discrimination, Fourier analysis, age determination, incremental growth.

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ICES CM 2006/M:46 – Poster

Resource exploitation patterns of the flatfish fishery in the west coast of Portugal

Marisa Batista and Henrique Cabral

Official data on flatfish landings were analysed, from 2002 and 2004, for two harbours of the west coast of Portugal, together with vessels characteristics, in order to detect patterns in the flatfish fishery. The multi-gear fleet was responsible for 96% of total flatfish landings, although trawl presented a high importance for lefteye flounder. Soles (*Solea solea*, *Solea senegalensis*, and *Solea lascaris*) were the most important. Flatfish landings presented a marked seasonal pattern (higher values recorded from November to March), the selling price being higher when landings were lower. The flatfish fishery fleet characteristics were slightly heterogeneous. The 360 vessels that operate in this area were classified in groups based on their catches, using cluster analysis. Three groups were distinguished, accounting for 58%, 39%, and 3% of the catches. Vessels of the group responsible for the highest landings have a lower gross tonnage, length, and engine power compared to vessels belonging to the other important group. The compliance

of legislation and adequacy of management guidelines were analysed.

Keywords: flatfish, soles, landings, fishery statistics, vessel characteristics, Portugal.

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ICES CM 2006/M:47 – Poster

The European Register of Marine Species: tool for data integration

Edward Vanden Berghe

Taxonomic information systems are an essential tool in integration of data from several sources; without intelligent taxonomic databases, all spelling variations and synonyms would be treated as separate taxa, thus (sometimes vastly) increasing apparent biodiversity. Within Europe, The European Register of Marine Species (ERMS) is the most complete register of marine taxonomic names, and is used by several initiatives as the standard vocabulary for taxonomy. ERMS contains not only valid names, but also invalid synonyms and documented misspellings; this way, ERMS forms a guide to the correct application of taxonomic names. ERMS provides an online tool for data integration. Scientists and data managers can preserve their own nomenclature, but link it to the standard taxonomic vocabulary. The contents of ERMS is maintained by the taxonomic community, through a web application that allows them to edit data residing in the central database. The system of passwords is classification-aware, and allows fine control over who has edit rights for which taxa. The intellectual property rights of the taxonomic editors are managed by a society founded to this purpose, the Society for the Management of European Biodiversity Data (SMEBD). One of the objectives of ERMS is to make a contribution to broader initiatives such as ITIS, Species 2000, and Catalogue of Life. Currently the list contains 52,105 taxonomic names, of which 36,957 are of species or infraspecific rank; of these 31,973 are valid.

Keywords: biogeography, taxonomy, nomenclature, standardisation.

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ICES CM 2006/M:48 – Poster

The VLIZ Maritime Boundaries Geodatabase as a biogeographical tool

P. Deckers and E. Vanden Berghe

Maritime boundaries and Exclusive Economic Zones in particular are important concepts for a lot of biogeographical applications. As no global public-domain cover of such information was available, the Flanders Marine Institute (VLIZ) decided to develop it, and make it available to the scientific community. Treaties between countries were gathered and the coordinates that were published herein were imported in a GIS. Where no treaties were available, maritime boundaries were calculated in ArcGis as 200 nautical mile buffer lines or as median lines, according to the regulations of the United Nations Convention on the Law of the Sea. Two global GIS-covers in ESRI shape format were produced: one contains polylines representing the maritime boundaries, the second holds polygons representing the EEZs. The geodatabase is consultable online through a dedicated website (<http://www.vliz.be/vmdcdata/marbound>) where one can search and download extra information about the maritime boundaries, and consult the data through a map-interface where one can zoom, pan or query the GIS-layers. The database can be used to standardise EEZ name and extent, and thus facilitate integration. Furthermore, there are numerous possible applications in various areas. With the layer of EEZ-polygons, catches or samples can be geo-referenced so national marine species lists can be created. Linking species to countries can also be used to improve and expand quality checks of records in biogeographical databases.

Keywords: Biogeography, Exclusive Economic Zone, GIS.

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ICES Data User Survey

Julie Gillin and Mike Drew

In 2005, the Bureau Working Group Data Development Project (BWGDDP) developed ICES first ever Data Strategy and updated the previous Data Policy from 1994. The *Data Strategy* sets out three main goals:

- 1) ICES will remain a focal point for marine data in the North Atlantic.
- 2) ICES will create a portal serving as a hub for distributed data.
- 3) ICES web portal will become more attractive to the science community.

Simply stated, the ultimate goal is to provide data in timely, useful ways to facilitate analysis, assessments, etc. To do this, several questions such as “which data do we need?” and “how should it be presented?” must be answered. A number of initiatives were implemented to answer such questions. One initiative, a Data User Survey, was conducted at the ASC 2005. The Data Centre compiled the responses. The Study Group on Management of Integrated Data (SGMID) then evaluated the responses at their meeting in May 2006. The results of the survey and the evaluation are presented on this poster.

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ICES CM 2006/M:50 – Poster

Development of a genetic catalogue, biological reference collections and online database of European marine fishes (FishTrace)

Hilde van Pelt

Within the European project FishTrace (2003–2006) a genetic catalogue of more than 200 marine fish species has been drawn up. It includes nucleotide sequences of the mitochondrial cytochrome b and nuclear rhodopsin gene as molecular markers related to morphological data. The collected data has generated tools for species differential diagnosis, validation strategies, and study of genetic variability and genetic distances of widespread species inhabiting different ecogeographical areas.

Creation and long-term preservation of biological reference collections (fish specimens, otoliths, muscle tissue, and DNA samples) has been established to promote their use for standardisation and cross-referencing.

Implementation and coordination of a Web-based database compiling the standardized data generated in the project (taxonomy, genetics, and biological collections) has been established.

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4-D environmental data visualization and analysis. What we have learned from the unique challenges in working with complex temporal and spatial (4-dimensional) data derived from modern fisheries sonar systems

Tim Pauly and Matthew Wilson

Data from modern fisheries sonar systems present unique challenges in complexity and quantity. To be efficient and effective, visualisation is essential to all stages of working with fisheries sonar data: quality assurance; filtering; analysis and hypothesis forming; and presentation of results. SonarData's software products meet these challenges through a commitment to ongoing development in supporting the requirements of leading researchers around the world.

The extension of SonarData's Echoview software to provide a unique 4-dimensional visualization and analysis environment, to meet the demands of new generation

fisheries multibeam and scanning sonars systems, has guided both developers and users in further understanding the requirements for both visualization and analysis of fisheries acoustics data and their fusion with other environmental data. Mindful of the advancing capability of computing technology, we present some of these requirements of data access, analysis, and visualization with a view to achieving outcomes for better understanding dynamics, change detection, and data fusion.

The ability to fuse and transform data from multiple sources into a versatile 4-dimensional visualization environment provides scientists with opportunities, through observation and interaction, for new insights into marine ecosystems and will ultimately yield the analysis methodologies of the future.

Keywords: fusion, visualization, fisheries, acoustic, software, scanning sonar, multibeam sonar.

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