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REPORT OF THE
WORKING GROUP ON MARINE DATA MANAGEMENT

Dublin, Ireland
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International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

Palægade 2–4 DK-1261 Copenhagen K Denmark

Table of Contents

1. Opening of the meeting

The meeting was opened at 0940am on 1 May 1995, hosted by the Irish Marine Data Centre and held at Dublin Castle. Participants were welcomed by the WG Chairman. In her opening remarks, she mentioned that she was keen to involve as many countries as possible in the Working Group. This year we have a new member from Estonia, and the Chairman is trying to find a representative from Spain. She felt that the Internet mailbox set up by H. Dooley had been an excellent idea to promote intersessional contact between group members and also a means of involving those members who could not attend the meetings. Other members of the WG agreed that it had been most useful. J. Wallace also welcomed participants and explained the local arrangements which included a tour of the Irish Marine Data Centre.

Members of the Working Group present were: S. Almeida, Portugal, J. Atkinson, UK, M. Fichaut, France, R. Gelfeld, USA, N. Kaaijk, the Netherlands, H. Loeng, Norway, K. Medler, UK, P.B. Nielson, Denmark, R. Olsonen, Finland, L. Rickards, UK (Chairman), J. Szaron, Sweden, H. Valdimarsson, Iceland and J. Wallace, Ireland. The ICES Oceanography Secretary, H. Dooley, was also present for part of the meeting. Apologies for absence were received from S. Feistel, Germany, N. Håkansson, Sweden, K. Jancke, Germany, S. Narayanan, Canada, M. Ostrowski, Poland, G. Slesser, UK, and L. Smit, the Netherlands. Some members of the Irish Marine Data Centre also attended parts of the meeting.

2. Adoption of the Agenda

The agenda for the WG meeting was adopted as a resolution of the Statutory Meeting in St. John's (C.Res. 1994/2:10, Annex 1).

3. Reports of activities of Data Centres in the ICES area

WG participants reviewed activities at their own data centre/laboratory over the past year and looked to developments in the future. A summary of these activities can be found in Annex 2 and the reports were distributed to WG members, together with the report of the ICES Oceanography Secretary. The WG noted with pleasure that many institutes were setting up Home Pages on the World Wide Web. This is discussed further under item 10.

The WG were pleased to see the progress made by the Irish Marine Data Centre, since it was set up in 1993. A wide range of projects are being undertaken and some sophisticated software has been developed in support of these.

Some discussion took place with regard to bathymetric data sets, including the need for a consistent data set for modellers. It was agreed that next year this topic should be considered with particular reference to the North West European Shelf Seas.

4. Assess the post-1990 oceanographic data sent to ICES by each member state, identify problems and suggest solutions

In his report to the WG, H. Dooley noted that new submissions of data were continuing at a satisfactory rate. This was due mainly to substantial historical data set deliveries, which account for 90% of the data submitted. Between May 1994 and March 1995, over 16000 profiles were received. All have been checked but not all outstanding queries have been resolved. However submission of new data continues at a very unsatisfactory rate. This is disappointing after the invigorating activity in response to the needs of the North Sea Task Force/Quality Status Report.

Over the year H. Dooley had supplied information via the MDM mailbox about the status of both ROSCOP delivery and data submission. This was very useful and not only provided helpful information, but also acted as a prompt to WG members to submit data.

Members of the WG reviewed the situation in their own countries and laboratories. This is summarised below:

Denmark: P.B. Nielsen reported that his institute should soon be up to date with their west Greenland sections. Three to four years of data were almost ready to be sent. J. Szaron noted that data from other institutions in Denmark were very much up to date.

Finland: R. Olsonen reported that all data up to and including 1993 had been sent to ICES. 1994 data will be sent soon, together with ROSCOPs.

France: M. Fichaut noted that all ROSCOPs up to 1993 had been sent, and 1994 ROSCOPs would be sent before the summer. A full copy of the SISMER CTD database was supplied to ICES in November 1994. Since then many more CTDs had been received; these should be sent soon.

Iceland: H. Valdimarsson reported that the water bottle data was on track and loaded to the Marine Research Institute data base. CTD data was loaded to the data base up to 1992, but had not yet been sent to ICES. These data and ROSCOPs should be sent to ICES soon.

Ireland: J. Wallace reported that ROSCOPs had been completed and those for 1993 had been submitted to ICES. The Irish Marine Data Centre has only been in operation since 1993 and time has been spent in setting up procedures. So far, they hold 350 CTD profiles, which should be passed to ICES by the end of the year. They were currently using the Polish data set as an example to test their quality control procedures.

Netherlands: N. Kaaijk reported that data collected as part of the Joint Monitoring Programme were forwarded to ICES every year. His institute have no scientific research cruises. As far as he was aware NIOZ forwarded their information to ICES.

Norway: H. Loeng reported that ROSCOP submission was up to date, and included some forms from 1995. With regard to the data, he reported that CTD data were being loaded to the IMR database. 1994 data would be sent to ICES first, then other years would be added, working backwards.

Portugal: S. Almeida reported that no data from 1990 onwards had been sent to ICES. Between 1991 and 1993, there had been a project with the University of the Azores, the data collected being used for a Ph.D.; this is due to be completed this year and the data will then be sent to ICES. ROSCOPs from 1994 and 1995 have been supplied to ICES.

Sweden: The major part of data from 1991 have been sent to ICES. Data from the Coast Guard, Universities and Icebreakers remain to be sent. ICES and Sweden use different ship codes for identifying Coast Guard vessels and Icebreakers, a problem that needs to be addressed. Data from projects such as JMG and IBTS are sent in on time. A major load of ROSCOPs have recently been submitted to ICES. Starting this year ROSCOPs from the largest Swedish research vessel Argos will be submitted in near real time to ICES over e-mail (including trackcharts).

U.K. (BODC): L.Rickards reported that ROSCOP submission to ICES was quite good, but progress in supplying data was slow. Over the year more data had been quality controlled, but these had not yet been fully documented or loaded to the BODC database. When this had been done the data would be supplied to ICES.

U.K. (HO): J. Atkinson reported that 1994 and 1995 data should be sent soon, together with the ROSCOPs. Data had not been collected very carefully of late. Recently the winch on the ship had broken, and no data were being collected at present. It was hoped that data collection would be resumed before too long.

U.K. (MAFF): Six cruises from 1993 have been forwarded to ICES, sending of these had been delayed waiting for the nutrient data, so that this could be merged prior to delivering the data. Remaining 1993 and 1994 data should be sent by the end of the year. K. Medler commented that it was very useful to have a second opinion about the data, and he had found the feedback on the data from H. Dooley most helpful.

U.S.A.: ROSCOPs up to 1993 had been supplied to ICES, but 300-400 from 1994 and 1995 were still outstanding. Data were being sent up to 1993. At present there was no standard method of data supply from the U.S.A. to ICES, although communication was very good between the two centres. In the next year or so the U.S.A. archives may be matched up with ICES again.

It was agreed to include this item on the agenda for next year as there was obviously still much work to be done. WG members were encouraged to forward their data to ICES as a matter of routine and to make vigorous efforts to catch up with the backlogs which have developed, often due to a lack of resources or changes/updates to computer facilities.

5. Review progress in the implementation of IOC's Global Oceanographic Data Archaeology and Rescue (GODAR) Project in each ICES member state

R. Gelfeld provided a review of the status of the GODAR project. Since it began, four regional workshops had been held, the most recent in Malta (April 1995). A further regional workshop was planned for South America, with perhaps an international workshop sometime in 1996.

Since the inception of the GODAR project, WDC(A) had received 1.2 million profiles. These have been received from a variety of countries including Canada, Denmark, France, Germany, Iceland, UK, Poland and Russia. Much of this data set had now been published on CD-ROM as part of the World Ocean Atlas, which also includes climatologies. These developments were welcomed as a good way of getting the data sets too the scientific community. However it was noted that there was a slight problem with the CD-ROMs, in that the data files as supplied are for UNIX machines and need to go through a conversion program (to insert CR/LF) before they can be used with DOS on PCs. Many utilities are available to do this; OCEAN-PC, for example includes routines for this.

WDC(A) has been working closely with ICES on the GODAR project. ICES has some restrictions on some more recent data, these are respected. The data can be as input to the climatologies, but the data themselves are not included on the CD-ROMs. Part of the mandate of WDC(A) is that data submitted are not subject to any restrictions and are freely available to the

community. In addition to temperature and salinity data, biological parameters and chlorophyll are also being sought.

Historical data have been identified at the Institute for Marine Research in Norway, and WDC(A) are collaborating with H. Loeng in the digitisation of these MBT data. Additionally, the UK Hydrographic Office have historical Nansen Bottle data, as yet undigitised. L.Rickards noted that IOS, Wormley were due to move to Southampton during the coming summer, and every effort would be made to check that no data will be lost during this relocation.

K. Medler asked if there were any problems in compiling so much data into a database which had been collected by many different methods over time. R. Gelfeld replied that with high volumes being used to generate the climatologies, small differences would be averaged out. He further noted that data are copied as they arrive. Then incoming data are run through the quality control procedures and are tagged with quality flags of 1 to 7. Duplicate checks are carried out, based on date/time and position, when duplicate profiles are identified, these are not deleted, but flagged and stored in a duplicates database.

In the future data may be scanned and stored as images to ensure that the data are not lost. These can then be read using OCR, if this can be achieved without too many problems, or digitised manually. The US NODC and WDC(A) had funded some of the work being done by G. Reverdin collating surface salinity data for the North East Atlantic. Members of the WG were urged to support this valuable effort.

So far there has been little contact with Spain, but they are believed to be collating historical data to be included as part of the MEDATLAS project.

The WG were pleased to hear of the continuing progress of the Data Archaeology Project and wished to be kept informed of future developments.

6. Report on procedures for processing and storage of shipborne ADCP data

L. Rickards introduced this item by remarking that over the last few years the WG has developed proposed guidelines for the management of shipborne ADCP data. These had been adopted by WOCE and appeared in their WWW pages and also in various handbooks. When these were first developed few laboratories had much experience with ADCPs, but gradually more and more laboratories were acquiring them. Hence it was relevant that the WG kept up to date with developments, and revised the guidelines as necessary.

All those members of the group who had experience of shipborne ADCPs were using those manufactured by RDI. Several members of the WG (K. Medler, R. Olsonen, S. Narayanan) had produced brief notes of their processing procedures; summaries of these may be found in Annex 3. Others, including M. Fichaut, J. Wallace and S. Almeida, were expecting to receive ADCP data before too long. R. Gelfeld noted that the University of Hawaii have developed software for processing and archiving shipborne ADCP data. These are freely available over Internet. The University of Hawaii currently have 83 cruises, mainly from the Pacific, stored in their database: the data are also available over Internet. Brief instructions and other details of the ADCP data and software can be found in Annex 3.

L. Rickards noted that the Institute of Oceanographic Sciences, Wormley has a manual for two of the UK NERC ships describing their procedures for collecting and processing ADCP data. In addition, BODC have developed some software for checking and loading ADCP data to their project databases. Most of these data have been collected as part of WOCE. As yet, no WOCE ADCP Data Assembly Centre has been established, although it is likely that one will be set up before too long.

7. Critically analyse data processing procedures for moored current meter data in ICES member countries

During the intersessional period, H. Loeng had carried out a survey of moored current meter data collection, processing and archival procedures used by members of the WG. He had distributed a questionnaire to members of the group and received 17 replies. An overview of these is given in Annex 4. The WG thanked H. Loeng for the work that he had done on compiling and summarising the questionnaire replies.

He commented that as the replies were diverse, it was difficult to summarise the results. Each laboratory has its own processing system, but most are working along the same lines although in slightly different ways. Quite a lot of work has already been done with regard to moored current meter data, and the ICES Cooperative Research Report No. 165, on Current Meter Quality Control, includes some useful papers. These range from describing the processing and archiving systems in use to intercomparisons between different instruments.

H. Loeng noted that a lot of the information needed was available in the Guidelines for Exchange of Moored Current Meter Data produced by the WG over 10 years ago. However, these were not well known or well used. It was felt useful to go through these Guidelines and update them, perhaps changing the

emphasis. The original Guidelines were aimed at the exchange of data, and it was felt that they could be improved by some additions. H. Loeng felt that what was needed was a set of minimum requirements for moored current meter data, as has also been suggested for CTD data.

The discussion widened to consider different data types. H. Loeng thought that it would be useful if there were a set of notes (maximum length four A4 pages) describing the minimum amount of information that was needed for different data types. For moored current meter data, for example, this should include information about moorings, instruments, quality control procedures and exchange formats. He suggested that it would be useful to form a study group made up of members from the Working Groups within the Hydrography Committee to consider this in more detail over the year, including perhaps holding an intersessional workshop to finalise the different sets of minimum requirements. The WG supported this suggestion.

Various questions were raised as too whether more guidelines were required and how they fitted in with work done by other groups, in particular the IODE/ GETADE, who have produced various guidelines. It was felt to be essential that the different groups cooperated to reduce duplication of effort.

L. Rickards suggested that if these new minimum requirements were produced, it was essential that they were distributed widely, and that people knew where to find them. She wondered if it would be possible to include them on the ICES pages on the World Wide Web. Already there is information on formatting guidelines for oceanographic data exchange, as ICES acts as the RNODC (Formats).

It was felt that further discussions on the quality assurance of data were needed; these should focus on the proposed minimum requirements to be developed. This should be considered on next year's agenda, possibly in collaboration with the Oceanic Hydrography WG.

8. Quantitatively analyse SCOR WG 51 recommendations for processing CTD data

During the intersessional period, M. Fichaut had produced a brief summary of the SCOR WG 51 recommendations and distributed this together with a questionnaire about the collecting, processing and archiving of CTD data to 40 laboratories (20 in French institutes/laboratories and 20 to MDM Members). The purpose of this was to check if the various laboratories and institutes used the SCOR WG 51 recommendations, or other guidelines, and to assess opinion as to whether these could be improved.

Twenty-one replies were received, 8 of which were from French institutes. Of the 21, 18 were involved with data collection, 20 with data processing and 18 with archiving or exchanging data. A copy of the questionnaire can be found in Annex 5(a) and a synthesis of the replies is in Annex 5(b).

The general conclusions were that the SCOR WG 51 guidelines were often used, but not extensively; several other guidelines were also in use, the most popular being those supplied by the CTD manufacturer and the WOCE manuals.

Suggestions for improving the guidelines included:

* guidelines reflect the state of the art in 1988 and as technology advances, they should be updated to reflect this.

* guidelines are needed for measurements in coastal waters

* special guidelines for the Baltic Sea

* more accurate description of how the calibration of sensors is to be carried out

* GF3 format is not suitable any more

* algorithms for the compaction of the data set would be useful

* recommendations for other parameters such as O_2, fluorescence would be useful

Most centres use autodescriptive ASCII for storing and exchanging their data. There was agreement on the units used for temperature (degrees C) and pressure (decibars), but for oxygen several units are found (for example, ml/l, micromole/kg and micromole/l).

The main conclusion of the exercise was that the SCOR WG 51 guidelines are not used in their entirety, but they are abided by, with the exception of using GF3 as the exchange format. An improvement seems necessary, especially because the technology of the sensors has evolved over the last few years. There is a great variation in the data collected, especially in the accuracy. M. Fichaut noted that a response of over 50% to the questionnaire is a good response, and shows that there is great interest in this topic.

The WG thanked M. Fichaut for the work that she had done in producing the questionnaire and in compiling such a comprehensive and excellent summary.

The discussion which followed explored the next step that the WG should take with this topic. H. Dooley suggested that it would be useful to go through the

various manuals and take the best features of each. Everywhere possible there should be standardisation and consistency. There was a general feeling that most of the guidelines available were long and complex, and that what was needed was something shorter.

H. Loeng suggested that there should be cooperation with the Oceanic Hydrography WG, who were also considering data quality assurance. He described some of the work to be done over the year by that group.

H. Dooley noted some of the problems encountered at ICES with incoming data, these included: anarchy with pressure intervals - no standardisation exists; some data are received as depth (metres) instead of pressure (decibars); units for oxygen, and to some extent nutrients, were also a problem. He also recommended use of the JPOTS manual (Processing of oceanographic station data. JPOTS Editorial Panel. 1991. UNESCO). A quick survey of the WG revealed that not all members had come across this. It was recommended. K. Medler asked where one could find out about guidelines, manuals etc., and the WG thought that it would be useful if relevant details of manuals and where to obtain them were available on one of the ICES pages on the WWW.

There was some discussion on the accuracy of measurements made. The view of the WG was that it is essential that the accuracy of a profile or set of profiles is stated, this is even more important than collecting data of very high quality. This is especially true for historical data when it was not possible to be so accurate as it is now. The JPOTS manual recommends that the accuracy of the data is reflected in the number of decimal places quoted (for example, if the data are accurate to 2 decimal places then 3 should be quoted).

N. Kaaijk noted that his institute has carried out a comparison of sensors on various instruments. A report was available to those who were interested.

Further discussion followed about handling of up and down casts when these were received. If ICES only receive an upcast then it is retained, and reversed to turn it into a down cast. A note of this is stored in the documentation. BODC keep both down and upcasts when these are supplied by the data collector, but usually would only supply the downcast to those requesting data. Upcasts can be reversed if required.

9. Assess the results of the intercomparison of quality assurance methods for station data

At last year's meeting, several members of the WG had agreed to take part in an intercomparison of quality control methods for station data. The data set chosen for this was one supplied by Poland to ICES which contained a range of data (four cruises from the Norwegian Sea and four from the Baltic) and a tremendous number of errors! The data set has since been resubmitted to ICES.

The intercomparison has so far been completed by H. Dooley and R. Gelfeld. This in itself produced a problem due to the differing ways that ICES and the US NODC identified the stations. This has made comparisons difficult. Those others taking part in the exercise reviewed the progress so far in general terms.

H. Loeng reported that he had reformatted the data to his own format and produced plots of the locations of the profiles and some temperature-salinity plots. This had shown up some problems. J. Wallace had also converted the data to his in-house format and checked some of them. He had available a report generated by his quality control software and some plots. L. Rickards had also converted the data to her in-house format, looked at some profile and temperature-salinity plots and profile location plots. Quite a number of problems had been encountered, but there was still some work to be done. M. Fichaut reported that she had only just received the software that she had intended to use for this exercise, and so had not been able to make any progress so far. J. Atkinson reported that there had been some reorganisation within her department, which had meant that it had not yet been possible to quality control the data. All of those taking part in the exercise wished to continue with it, perhaps on a reduced scale if there was too great a volume of work involved in reformatting and quality controlling the entire data set. L. Rickards urged those participating to try and complete the work over the next six months and also encouraged other members of the WG to take part on the exercise.

H. Dooley mentioned that other groups were also interested in joining in with this exercise, in particular the IOC/IODE GETADE group and EU/MAST. H. Dooley was encouraged to follow up the GETADE involvement. The WG felt that this exercise might usefully lead to a workshop.

L. Rickards informed the WG of a related exercise being undertaken by participants in the EU/AIR SEFOS project. She had been discussing this with Bill Turrell from the Marine Laboratory, Aberdeen who is coordinating the work.

He and his colleagues have prepared a set of 35 data files (header, then p,t S) derived from the data collected from all of the SEFOS participants who completed whole or part SEFOS standard sections. They are individually looking at these combined data and already some large discrepancies are appearing.

A second exercise within SEFOS is also underway. Three participants are exchanging 36 CTD profiles (6 from each participating institute). These files are as raw as possible (i.e. converted to physical units from machine units, p,t,C) but uncalibrated and unprocessed (no averaging, despiking, etc, applied). Each of the participants will process the data as if it were their own, apply the calibrations as supplied and then re-issue the final versions, averaged into 1 decibar bins. The resulting profiles will then be compared.

The WG was interested to hear of this work and wished to be kept informed of its progress.

10. Report on the development of an umbrella for Gopher (internet)

Since last year's meeting, the World Wide Web (WWW) has developed rapidly and has overtaken Gopher as the preferred way to disseminate information over the Internet. A demonstration of several WWW pages of interest to the WG was provided. This began with the ICES Home Page. ICES has set up pages relating to a wide range of ICES activities ranging from a tourist brochure of Aalborg (the location of the 1995 ICES Annual Science Meeting) to the retrieving of oceanographic data collected during ICES projects. To date about 1500 separate domains have connected to the ICES pages. The system is in a continual state of development, with a primary aim of to provide links with institutes associated with ICES. This aspect of the system was illustrated, with the links to Iceland, France, BODC and the US NODC being demonstrated.

Discussions within the WG showed that there was quite a lot of interest in the WWW, and it was felt a useful way to advertise and raise the profile of the various centres, including ICES, and their data and products. So far the following Home Pages have been set up:

ICES:	http://www.ices.inst.dk
SISMER	http://www.ifremer.fr/sismer/sommaire.htm
US NODC	http://www.nodc.noaa.gov/index.html
BODC:	http://www.nbi.ac.uk./bodc/bodcmain.html
Iceland:	http://www.hafro.is

It was also noted that the Icelandic and French pages were available in English as well as the original language.

Others in the WG, including J. Szaron, J. Wallace, R. Olsonen and N. Kaaijk were either working on Home Pages or knew of plans within their organisations to develop a Home Page. These developments were welcomed by the WG. Others in the WG, including H. Loeng, K. Medler and P.B. Nielsen, had a connection to Internet, but as yet no plans to develop an interface to WWW. As yet J. Atkinson and S. Almeida have no access to Internet, although S. Almeida was hopeful that she would have access later this year. When members of the group set up Home Pages, the information should be passed on to ICES and other WG members, so that links can be put in place.

J. Szaron remarked that he could see the potential for using the WWW for disseminating plots of data for near-real-time data collected in the Baltic, and asked if there were any products like this already available. H. Valdimarsson replied that there were some pages which were frequently updated, which included real-time data. L.Rickards noted that the Oceanic Hydrography WG were considering as one possibility the publishing of plots of standard sections on the Web.

The WG felt that good progress had been made over the year and looked forward to reports of further developments in the future.

11. Report on the work of the IOC/IODE Group of Experts on the Technical Aspects of Data Exchange (GETADE)

The IOC/IODE Group of Experts on the Technical Aspects of Data Exchange (GETADE) had met since last year's MDM meeting and had discussed various items of interest to the MDM. These areas of common interest included the development of World Wide Web (WWW) pages, the intercomparison of quality control methods and the Guidelines for Submission of Profile Data.

J. Wallace presented a brief review of the meeting and its conclusions. There had been some discussion of formats, including the use of BUFR (used by the IGOSS programme) and net-CDF. The GETADE group has also created a format, formulated originally in 1993 at a meeting on modern formats. This format was designed to provide an interface to spreadsheets and relational databases, and is compatible with various protocols for structuring information. The GETADE format has built on the strong points of GF3, but removed its media dependence. Some data have been exchanged in this new format.

The Guidelines for the Submission of Profile Data are the first of many describing the requirements for data exchange of most oceanographic data types. They have been prepared mainly as a result of the rapidly developing diversity of data exchange components which have arisen in recent years. The WG examined the Guidelines and felt that they were very useful. They compliment the lists of minimum requirements that the MDM and Oceanic Hydrography WGs wished to develop.

The GETADE were intending to hold an Ocean Climate Data Workshop in June 1996, hosted by the Irish Marine Data Centre and held at Dublin Castle. J. Wallace had agreed to organise this and currently funding sources were being sought. The Workshop was due to last for 3-4 days and input from scientists was required.

J. Wallace was also responsible for the distribution of a questionnaire, the responses from which would be used to draw up a software inventory. This would include information relating to relational database management systems, technology, in-house software development, use of geographic information systems (GIS), visualisation techniques and exchange formats.

GETADE is also looking to preparing a WWW interface for use within IODE; this topic was also discussed at the IODE Think Tank meeting in March. Progress made by MDM in its use of WWW is being monitored by GETADE, and feedback will be provided to the GETADE members.

Members of the GETADE group were also keen to enter the quality control intercomparison exercise. MDM members were again encouraged to complete this work as soon as possible, and the addition of GETADE members also taking part was welcomed as a most useful development.

The discussion widened to a more general discussion of those groups which consider data management (i.e MDM, GETADE and EU MAST Data Committee) and appear to overlap considerably in their interests. It was stressed that contact should be maintained between the groups to avoid duplication of effort and to increase cooperation and collaboration.

Other conclusions of the discussion included the requirement for guidelines for formatting data rather than developing new formats, the standardisation of information supplied with data, the use of common algorithms for conversion between oceanographic parameters (e.g. conductivity to salinity, etc.), and storage of information about the data, including data collection, calibration and processing procedures.

It is also essential that scientists and data managers know from where the relevant information can be obtained. N. Kaaijk mentioned the initiative by the Centre for Earth Observation (CEO) to develop a general structure for both remote sensing and in situ data. This would also include the exchange of tools and processes. CEO have given a presentation to the EU/MAST Data Committee.

12. Review existing and planned national and international oceanographic data distribution policies in order to advise ICES on future data policy

L. Rickards introduced this item by saying that the Hydrography Committee had requested that the WG consider this topic. WG members were invited to describe their own laboratory's or country's policy for data distribution. Overall there were many similarities between the different countries. There were two main considerations: whether there was any restriction on the supply of data to third parties and whether there was a charging policy in force.

The general consensus was that data are available to the scientific community on request, although there may be a 2 to 3 year restriction imposed on recently collected data to allow a scientist to write up the results for publication. Contact with the scientist on a case by case basis usually results in the data being released. For project data sets, these are usually available to project scientists during the project and to others once the project had been completed.

Charging policies varied slightly, with some laboratories providing data free of charge to the scientific community, and others recovering marginal costs. For dealings with the commercial sector, charges were imposed, but these were again usually cost recovery charges. For access to on-line data, some have a yearly subscription or payment must be made to use dial up lines. One or two laboratories have developed licences and conditions of supply for use with the commercial sector.

Exceptions to the above included the UK Hydrographic Office, who exchange data freely with other Hydrographic Offices, but a lot of their data holdings are classified and thus not available to the scientific community. However, where data have been declassified, they are generally available to the scientific community free of charge or at marginal cost.

The WDC(A) makes data available free of charge (or on a cost recovery basis for CD-ROMs) without restriction; this is part of its charter from the International Council of Scientific Unions (ICSU), its parent body. This can cause difficulties when data are provided by organisations wishing to keep the data restricted for a number of years.

The Irish Marine Data Centre has taken a different approach. All data are declared confidential to protect the data suppliers, but in practice this means that data suppliers are contacted to check that there are no problems in releasing data to a data requester. Regarding charging policy, J. Wallace noted that as yet no charges had been applied, but customers had been

advised that they would be charged for data and value added products in the future.

The ICES policy for the Oceanographic Data Bank was that there is no restriction on supply of data as such, but as a matter of courtesy, for any data requested which are less than 10 years old, the data supplier is contacted to check that this is acceptable. This is a benefit to the data suppliers and should encourage the early submission of data and can also be useful to data requesters, as they may be put in touch with the suppliers where it would be useful. Many of the requests received by ICES are for products rather than data; these are answered without reference to data suppliers.

The general feeling of the WG was that scientific data should be made freely available in a timely manner. Scientists should be encouraged to submit their data to data centres and to ICES, and their wishes on restrictions on the data should be respected. In most cases, the period of restriction should be fairly short (e.g. 2 to 3 years). The policy in place for the ICES Oceanographic Data Bank seemed to work well, and in almost all cases data were released to those requesting them with little delay. There was a range of opinion in the WG as to whether 10 year period was rather long; views ranged from those who thought that this provided useful feedback to the data originator to those who felt that there should be no restriction on access to the data. The only real problem was in the supply of data to WDC(A) from ICES, data from the last 10 years held at ICES will not normally be passed on unless requested by the data supplier.

13. Election of chairman

L. Rickards reported that she had been chairman of the WG for 3 years and that the WG now needed to elect a new chairman. R. Gelfeld proposed that L. Rickards should continue for a further 3 years and the WG agreed that this should be recommended to the Hydrography Committee. L. Rickards thanked the Group for their support and work over the last three years and said that she would be willing to continue.

14. Any other business

J. Atkinson asked the WG if they were using the new drop rate equations for XBT data and whether they had corrected historical data. R. Gelfeld replied that the data held by the US NODC/ WDC(A) have all been through the correction procedures, and that this had been documented.

J. Atkinson then posed a question about storage of water samples. On some Royal Navy cruise where CTD casts are taken, samples are taken for the determination of salinity for calibration of the CTD. These cannot always be analysed onboard, and may be stored for 6 to 7 months before analysis. She wished to know whether this would cause many problems. K. Medler thought that the samples would not keep well and noted that D. Kirkwood, from the MAFF Fisheries Laboratory, some years ago had carried out a comparison of salinities determined from samples kept for up to 16 weeks (There is an ICES paper describing the results - ICES CM1987/C:21). R. Olsonen agreed to check with her laboratory for their views.

In a final question, J. Atkinson asked if other members of the WG had any experience of the use of XCTDs, as the UK Navy were starting to use them. J. Szaron replied that IOC/IODE had produced reports on XCTDs and suggested that she check through these.

J. Wallace then raised a question about the new ROSCOP forms (Cruise Summary Reports). Specifically he asked about the use of Marsden Squares in the form, but he felt that there were areas of the form which could be improved. L. Rickards reminded the Group that in his report to the WG, H. Dooley had noted that there were shortcomings in the CSR forms which he had reported back to IOC. J. Wallace then suggested that the WG should critically review the form, and suggest improvements to IOC. The WG agreed that this would be a useful topic to consider and J. Wallace agreed to coordinate this during the intersessional period and report back at next year's meeting.

Finally, J. Wallace mentioned a project with which he was involved to publish papers electronically. This is part of an EU/MAST project. This has involved compiling a publication list and referencing these geographically. He had discovered that permission was required from publishers before information could be included in the database, and royalties had to be paid. He hoped that in the future scientists would be able to persuade publishers to agree to the information being held electronically as long as the original publication was cited.

15. Date and location of next meeting; topics for discussion

i) Topics for the next meeting

The following items were suggested for inclusion in next year's agenda

a) Assess the post-1990 oceanographic data sent to ICES by each member state, identify problems and suggest solutions;

The oceanographic data received by ICES post-1990 is disappointingly low, this item should act as encouragement to Member States to supply the ICES Oceanographic Data Centre with data in a timely manner;

b) Review progress in the implementation of IOC's Global Oceanographic Data Archaeology and Rescue (GODAR) Project in each ICES member state;

Much data has been recovered by GODAR already, but many valuable data sets still remain outside of established data banks and archives. WG members need to continue searching out old data sets and forwarding them to ICES and WDC(A). ICES has taken a lead role in this project for the ICES region, which provides a focus for member states activities.

c) Assess the results of the intercomparison of quality assurance methods for station data;

Members of the WG will take part in an intercomparison, using a data set of 810 stations, to check that certain minimum standards are being met by the quality assessment procedures currently in place in ICES member countries.

d) Report on the development of World Wide Web pages and links between them within ICES Member Countries;

This is an opportunity to exploit new developments within the Internet and raise the profile of the data centres within in the ICES community;

e) Quantitatively analyse the minimum requirements for quality assurance of oceanographic data;

There is a need for simple guidelines for those collecting, processing and quality assuring data. Having reviewed those guidelines and manuals presently available, a set of minimum requirements will be produced for assessment by both the MDM WG and Oceanic Hydrography WG. Advertising the existence of such requirements and their distribution will also be considered.

f) Critically review the available bathymetric data sets for the North West European Shelf;

There is a need for a consistent bathymetric data set for the North West European Shelf Seas for many users, including modellers. This item will address the requirements and review the data sets available and identify any gaps.

g) Critically assess the IOC Cruise Summary Report, identify weaknesses and suggest improvements;

The Cruise Summary Report has been in use since 1990. Various shortcomings have been discovered in the form. This item will allow the WG to suggest improvements based on the experience of using the form in their own countries.

ii) Time and place of next meeting

The WG expressed its wish that the next meeting should be held at the Royal Danish Administration of Navigation and Hydrography, Copenhagen, between 22 - 24 April 1996. This will overlap with the Oceanic Hydrography WG, to be held at the same institute, allowing continued cooperation and interchange of ideas between the two working groups.

The Chairman closed the meeting by thanking the participants for their hard work, enthusiasm and valuable contributions. On behalf of the WG, she also thanked J. Wallace for an well arranged and enjoyable meeting. She closed the meeting by wishing participants a safe journey home.

Annex 1

Agenda

C.Res. 1994/2:10

The Working Group on Marine Data Management (Chairman: Dr. L.J. Rickards, UK) will meet in Dublin, Ireland, from 1-3 May 1995 to:

a) Assess the post-1990 oceanographic data sent to ICES by each member state, identify problems and suggest solutions;

b) Review progress in the implementation of IOC's Global Oceanographic Data Archaeology and Rescue (GODAR) Project in each ICES member state;

c) Report on procedures for processing and storage of shipborne ADCP data;

d) Critically analyse data processing procedures for moored current meter data in ICES member countries;

e) Quantitatively analyse SCOR WG 51 recommendations for processing CTD data;

f) Assess the results of the intercomparison of quality assurance methods for station data;

g) Report on the development of an umbrella for gopher (on Internet);

h) Report on the work of the IOC/IODE Group of Experts on the Technical Aspects of Data Exchange (GE/TADE).

i) review existing and planned national and international oceanographic data distribution policies in order to advise ICES on future data policy.

Annex 2

Highlights from the reports of the Data Centres

ICES: New submissions of data are continuing at a satisfactory rate. Work continues on data archaeology, evaluating and quality controlling the ICES historical data holdings. Recently attention has been turned to re-assessing the old route and lightvessel surface salinity data. These comprise some 1.5 million observations from 1900 to mainly the early 1980s when supply of these data largely dried up. ROSCOP submissions continue at a healthy rate. The software used for managing these is now over 10 years old, and consideration is being given to its updating. The USA is planning to link to the system via a new WWW SQL interface.

Interactions continue between the EU/MAST and ICES, with a meeting last year to discuss areas of cooperation and collaboration. During 1994 ICES contributed to the EU/MAST commissioned study on the 'European Infrastructure on Ocean Data Management'. Also ICES has received requests to partner a number of MAST III projects; this would be a substantial commitment by the Secretariat if all of the proposals are successful.

In December 1994 ICES established a home page on the World Wide Web (WWW). The system is in a continual state of development, with a primary aim to provide links with all ICES member institutes.

Collaboration has continued with IOC, in the form of meetings of the IOC Group of Experts on the Technical Aspects of Data Exchange (GETADE). This Group has produced some Guidelines for Submission of Profile Data and a new Data Exchange Format. They are also looking toward providing a WWW interface for use within IOC/IODE.

Denmark: During 1994, RDANH Oceanography Department has continued operation of sea level stations in Denmark and Greenland. A station was established on Rønne on Bornholm; the number of stations is now 13. RDANH has also established an oceanographic station in the southern part of the Kattegat. This comprises an ADCP measuring currents at 6 depths and a thermistor chain. A further 4 stations will be set up during the year. the data from these will be available in near real time. RDANH is participating actively in Nordic WOCE, operating 13 current meter stations on the Greenland-Scotland ridge. Profile data from west Greenland (1989-1994) are almost ready for supply to ICES.

Finland: The main effort in 1994 has been in creating a quality system for hydrographical and chemical parameters, which is due for accreditation within one month. For data management this means a better quality of the data from the beginning. Operational procedures have been improved and data checking is comprehensive. Where chemical parameters are measured an authorised chemist is responsible for the data quality. A tool for examining new data during cruises has been implemented. It consists of graphical checking and mutual comparison of newly analysed and hydrographical and chemical results with earlier data from the station and its surroundings.

Other activities have included replenishing and improving the main FIMR database. Routines for biological data transfer to HELCOM have been developed and a summary table for benthos has been created. Hydrographical and chemical data have been sent to ICES and a mutual checking is going on.

France: A client-server interface, SAFRAN, was delivered last year. This has been tested and is now available to the scientific community. Migration from Oracle V6 to V7 and from Sunos4 to SOLARIS has taken place. Specification and development of quality control software (SCOOP) was carried out. This has now been delivered. The software design is focused on user-friendly interfaces and detailed visualisation of the sets of profiles. The quality control takes into account pre-existing knowledge; maximum and minimum values are adjusted regionally. Flagging is carried out as automatically as possible. However visual checking is always necessary to resolve inconsistencies and uncertainties.

A new format for CTD and water bottle data has been defined, for the MEDATLAS project, and all relevant data has been transcribed to this format. An inventory of missing data has been drawn up; these data are now being sought. Already some 1700 new CTD stations 750 bottle stations and 100 current meter records have been received.

Iceland: Over 500 CTD stations including water bottle data were taken in 1994 and deep current meter moorings were continued. ROSCOPs up to 1995 were compiled and sent to ICES. Station and water bottle data from 1991 and 1992 were sent to ICES. Before this could be done, vertical sample depths were changed from depth to pressure. Water bottle depth registration is now in decibars. Improved and detailed cruise registration should make the compilation of ROSCOP files easier and faster. Loading of CTD data into an Oracle database has started, which should lead to the data being sent to ICES.

Work is in progress to coordinate and set up a database for fish and environmental data. Information from the database is then put into graphical form on the Institute's WWW page (for local use) Increasing activity in satellite tracked drifters is foreseen as a project in cooperation with NOAA.

Ireland: J. Wallace reported that as yet no data had been sent to ICES. However ROSCOPs were being completed and some of these had been forwarded to ICES. Data will follow in due course. Work had concentrated on setting up a system for the research vessel, Lough Beltra. Underway data collected by the ship could now be quality controlled at the Data Centre. Shipborne ADCP data has also been collected, but there were major problems with the data when the ship speed exceeded 6 knots.

Work has also continued on a extended version of EDMED, and a further project to compile a list of Irish marine publications was underway. During the year the Data Centre had implemented a quality control system, which has now been ISO 9000 accredited.

One other project that the centre was working on was the digitisation of UK Admiralty Charts from the Irish Sea and to the west of Ireland. Everything on the charts had been digitised, including bathymetry.

Netherlands (MARIS): Work is proceeding on the development of a CD-ROM containing North Sea Tidal Data, and information on collecting organisations and measuring instruments. Overviews are produced of sea going research (commissioned by the Netherlands Geosciences Foundation) and current marine and coastal research (commissioned by BEON).

A database containing information about measurements taken during the Netherlands Indian Ocean Programme (NIOP) has been compiled. This can be used to locate data on a CD-ROM containing the data sets gathered during the expedition.

A workshop was organised to consider the possibility of establishing a national oceanographic data centre in the Netherlands, hosted by the Netherlands Geosciences Foundation. Following on from this a task group was formed from those organisations taking part, to develop the concept of an infrastructure, taking into account the possibilities already available.

Netherlands (RIKZ): Data from the Joint Monitoring Program have been forwarded to ICES. Historical waterbound data from several databases have been loaded to the DONAR database, which is now operational. A special program for integral use of remote sensing data, in situ measurements and model results was begun. In addition, support was given to many national and international research projects, particularly in the field of coastal zone management.

Norway: The IMR integrated database is completed and the first data input has also taken place. CTD data from 1995 will go directly into the database after calibration and quality control. Historical data will go through a careful quality check before being input to the database. Work has begun with 1994 data, once this is completed, work will progress backwards through earlier years with quality control and input of data. A lot of work has been done during the last year developing quality control software. The first version of all of the programs is available, but improvements are continuously sought.

No data for the period 1991-1994 has been sent to ICES. However, an agreement has been made with the ICES Oceanography Secretary, that historical data will be sent as soon as they have been through the quality procedures at IMR. Some data from 1995 have been transferred. As before, submission of ROSCOPs is working well.

During the last year, about half of the IMR's MBT data has been copied and sent to World Data Center (A) to be digitised. The rest of the data will be sent before the end of 1995. This is a contribution to the Global Oceanographic Data Archaeology and Rescue (GODAR) Project.

Portugal: Some ROSCOPs have been sent to ICES together with data from the EU/AIR SEFOS project. This comprises data from standard sections along the shelf edge. Both CTD profiles and current meter data are being collected.

A catalogue of data held by the Hydrographic Institute has been produced. 25000 XBTs from 1957 onwards are included in the Institute database. Meteorological data from 11 stations along the coast have been quality controlled.

The main data collectors in Portugal include the Hydrographic Institute, the University of Lisbon and the Fisheries Institute.

Sweden: The main activities included sending water bottle, compressed CTD and biological data from Swedish research vessels, coast guard vessels and ice breakers to HELCOM and ICES, and also submitting a large number of ROSCOP files to ICES. The number of cruises has increased and the laboratory now visits the main stations in the Skagerrak, Kattegat, the Sound and Baltic proper at least once a month. SMHI has also been contracted to perform monthly investigations and data sampling in the near coastal zone in the west, south and south east of Sweden.

The SMHI Oceanographic Laboratory has been accredited by the Swedish Board for Accreditation and has also been appointed as a reference laboratory by QUASIMEME. In addition, the laboratory has been appointed 'data host' for physical and chemical oceanographic data by the Swedish Environmental Protection Agency. This means that institutes who run projects funded by the Agency are required to submit

their data to SMHI's Oceanographic Laboratory.

U.K. (BODC): BODC has continued it's work compiling project data sets from NERC Community Research Projects (UK WOCE and Land Ocean Interaction Study (LOIS)) and is also compiling the data from the EU/MAST Ocean Margin Exchange (OMEX) project. Work is also continuing on operating the WOCE Sea Level Data Assembly Centre. Over 1000 site years of data are currently held; three quarters of which have been quality controlled.

Considerable progress has been made in sorting out the backlog of CTD data held by BODC. This has involved extracting the data from a variety of complex formats, reformatting to the BODC in-house format, quality control of the data and collating the qualifying documentation. Approximately 4000 CTDs have been checked during the year. A lot of work has been put in to trying to rescue the CTD data collected by the Proudman Oceanographic Laboratory at Bidston. All of their data collected during the 1970s and early 1980s were stored in (obsolete) machine dependent binary, with very little documentation.

Work has been completed on the Directory of Marine Environmental Data held by UK Laboratories. This is to be published by the UK Inter-Agency Committee on Marine Science and Technology. It is intended that the entries will be loaded into the EDMED database, together with entries from other EU countries. Some effort has been put into allocating keywords for these, and about half of the total (of 1700) have been processed.

A home page has been set up on the World Wide Web. Other additional pages are also under development, and should be on-line very soon. Since the GEBCO Digital Atlas was released last March, over 350 copies of the CD-ROM, software and manual have been distributed.

U.K. (HO): The Hydrographic Office (HO), Taunton, is a Defence Agency within the Ministry of Defence (MOD). It provides navigational services to the MOD and to the international maritime community, and additionally, a range of specific products and services to the MOD. In the area of oceanographic services, the HO has compiled the largest collection of physical oceanographic data (temperature, salinity, sound velocity) in a single operational database. CTD and XBT data are added to this continuously. Most of these recently collected data are classified and not yet available to the scientific community. However, during the year a CD-ROM was released to the scientific community containing 185000 XBTs. As yet there is no similar move to release CTD data.

CTD data collection by Cumulus continued until recently when the winch broke. It is hoped that this will be repaired in the future and that data collection will continue. A new vessel, HMS Scott, is due for delivery in 1997 which will be equipped for using CTDs.

U.K. (MAFF): The main areas of work at the Laboratory are concerned with fisheries stock management, fisheries biology, marine pollution and the monitoring of radioactive substances in the marine environment.

Data collected by the physical oceanographers during 1993 from 10 cruises to the North Sea, concerned primarily with nutrient fluxes in three prominent UK estuaries, have been processed. This represents approximately 430 CTD profiles and about 1700 discrete samples. The data from the first five cruises have been sent to ICES and BODC. It is hoped that data from the other five will be submitted over the summer. Oceanographic cruises during 1994 have taken place in the Irish Sea and the data collected are being worked up. It is hoped that some salinity data from the fisheries cruises (Irish Sea and North Sea) will be sent to both ICES and BODC shortly. ROSCOP forms from 1994 have been completed and sent to ICES and BODC.

Development of a database to accommodate 97000 samples collected since 1957 by the laboratory as part of its light vessel and merchant vessel program has recently been completed. ICES have recently received approximately 19000 temperature and salinity samples from this database.

U.S.A.: During the year a set of CD-ROMs was produced by World Data Center-A (WDC(A)). This set of 9 CD-ROMs, known as the World Ocean Atlas, contains original data, data at standard depths and climatologies. These have been distributed to most MDM members. Much of the data included has been acquired by the WDC(A) as a direct result of the GODAR project. It is intended to release more data on CD-ROM next year. Collaboration has continued with ICES, checking out who has what data. The US NODC was not very good at sending data to ICES, although relations with ICES are good.

A set of pages has been developed for the World Wide Web, these have seen frequent accesses and already 1000 data requests had been serviced via the Web. This is a great change in the method of distributing data, until recently most requests were serviced by distributing data on magnetic tape; now most are serviced via ftp or CD-ROM. Work is continuing with the WWW to develop links via SQL to allow interrogation and data extraction.

Annex 3

ADCP Processing procedures

MAFF Fisheries Laboratory

An RDI Broad band ADCP has been acquired by the Laboratory and is used by both physical oceanographers and biologists. Standard software provided by the manufacturer is used to log and process the data.

The system has been used by oceanographers to good effect in two 1994 cruises to the Irish Sea. Different de-tiding techniques have been developed in conjunction with modelling work being done at the Laboratory and a comparison with current measurements using other sensors has been encouraging. In particular, observations near a gyre in the western Irish Sea using current meter moorings, drifting buoys with drogues and geostrophic currents from scanfish sections have been in good agreement with the ADCP data.

Bin size used: 2m for water depths less than 140m and 4m bins in water depths up to 310m. Bottom tracking is effective in all of the depths encountered. Navigation comes in through the DGPS link and heading information from the ship's gyro.

Finnish Institute of Marine Research

The ADCP is fitted to the research ship Aranda, and is an RDI 153kHz instrument. The RDI Transect program is used for data collection and all parameters are recorded, also the GPS (or DGPS) position. Bottom tracking is available in the Baltic Sea where Aranda usually operates. Furthermore the GPS position, heading and ship speed and direction are collected separately and used for checking. Problems have sometimes been encountered with the heading values recorded by the ADCP.

Percentage good and error velocity are used to discard bad/suspect data. Sometimes the recorded currents are unreasonably high. The reason for this is probably ringing, together with shallowness of the Baltic Sea and the low frequency of the ADCP. But it is unclear why the recorded currents are sometimes reasonable and sometimes not, even though the circumstances (ship speed, sea state, bottom depth) seem quite similar.

Because the quality of the data has been so variable, ADCP data are collected only on some cruises and there is no special database for the data. The data recorded at the station and between stations are usually saved to separate files. Data processing routines are still being developed. Programs to show currents at various depths or along the ship track are in use.

North West Atlantic Fisheries Centre, St. John's

Vessel mounted ADCPs have been used to collect velocity profiles along transects off Newfoundland and southern Labrador since 1991, as part of the physical oceanographic components of cod ecosystem research under the Northern Cod Science Program (NCSP). Concurrent with the ADCP surveys several cross shelf CTD transects were also occupied.

The ADCPs installed on the vessels are the ones manufactured by RDI. Prior to 1994, the ADCPs were set up to record only the ensemble averages (over 60 pings in each ensemble) and the associated quality control parameters. In 1994, the AGC signal was examined to estimate plankton density in the water column, and the conclusion was that this may be a valuable tool. However the horizontal resolution required for this is higher than that necessary for velocity estimates. Therefore the raw data are now stored at sea, along with navigation from a GPS; ensemble averaged velocities are computed during the post-processing.

Instead of developing the post-processing and archiving software from scratch, the Common Oceanographic Data Access System (CODAS) developed by the University of Hawaii was implemented. This is available for PCs and UNIX workstations and the source code is also available. Evaluation of these indicated that it should be fairly straightforward to add new modules if required.

So far a total of 17 cruises have been processed and archived. The editing and quality control are carried out using the PC version of CODAS, on a cruise by cruise basis. After a data set is loaded to CODAS, a plot of the mean temperatures, acquired by the ADCP transducer head is generated for comparison with the CTD casts, for ADCP performance evaluation. The location information is also extracted from the ensemble headers to generate a cruise track plot. The next step is to quality control the velocities. The data for each cruise can be viewed profile by profile in various forms. The different types of plots include U, V and W velocity, amplitude signal return strength, and error velocity along with latitude, longitude and time. Suspicious profiles and bins are given different types of flags depending on which criteria it has failed.

The navigation data are extracted in two different files and formats. One file lists the decimal time of day, latitude and longitude. The other includes the time and heading. These are used to create a reference file from which a smoothed navigation file can be generated. After this has been loaded to the database, final products, such as contour plots of transect lines and vector plots of various levels in the ocean, can be generated.

Shipboard ADCP global database management by NODC - Status: 15 February, 1995

The National Oceanographic Data Center (NODC) has established a Shipboard ADCP Center (SAC) at the University of Hawaii (UH). The location was chosen to take advantage of scientific collaboration with UH ADCP experts, Dr. Eric Firing and associates. The SAC actively acquires data sets from data collectors, standardizes the data format, completes the documentation, and allows easy access for the scientific community. Guidelines for submission of data sets are available and an archive system for managing and distributing the data sets has been developed.

For each data set, i.e. cruise, the NODC archives the data in two forms: 1) a high-density set in Common Oceanographic Data Analysis System (CODAS) binary format consisting of currents and ancillary parameters at the sampling interval with which the data were recorded and processed and 2) an ASCII standard subset of absolute currents at hourly and 10 m intervals. If absolute currents are not available due to lack of navigation, then relative currents are provided. The high-resolution set is also available as an ASCII dump. The standard subset includes mean ship velocity and transducer temperature.

Data contributors are requested to provide the complete data set at the sampling interval as recorded and processed. The data set should be in a quality controlled, calibrated, and documented form. It is not be the responsibility of NODC to process the raw data sets. Upon receipt of the data at the SAC, the data are loaded into the CODAS system and reviewed. If the data set appears questionable, the originators will be informed. Data sets that do not meet basic quality specifications, as determined by SAC personnel in collaboration with UH scientists, will not be added to the global database.

For data sets accepted into the global database, a standard subset at hourly and 10 m depth intervals is prepared and a cruise summary form is completed. The archive is maintained on a UNIX-based workstation in a directory tree system and backups are made on a DAT tape subsystem. The standard subsets and cruise summary forms are kept online.

Access to the global data base is possible through the Browse, Inventory, and Retrieval System (BIRS), which is a C-language program developed by the SAC. The BIRS is driven by a control file containing various query and output options that the user sets with a text editor prior to execution. The BIRS can query and provide inventories with up to 16 attributes, i.e. time range, region, PI, project, ship, etc.

The BIRS software is available via anonymous ftp. The user downloads the appropriate version, presently either "sun", "sgi", or "pc". The software includes an executable file (birs), an ASCII control file (birs.cnt), and a binary metadata summary file (ftr.sum). The user may then modify the control file to set options and run the software locally to see what data sets are available through a variety of query attributes.

The distributed version of BIRS only allows access to an inventory. Each cruise in the inventory is identified by an SAC ID. The customer can send the desired SAC IDs to the SAC for access to the data.

During the first years of operation, the NODC in Washington, DC will serve as a permanent archive for the global database and as an advocate for its availability, while the SAC will handle the acquisition, quality assessments, documentation, and the majority of the data/metadata distribution. The NODC will prepare and distribute CD ROMs for handling large requests, e.g. all CODAS binary data for the Pacific.

Questions and comments can be directed to:

Mr. Patrick Caldwell
NODC Hawaii Liaison Officer
Shipboard ADCP Center
Dept. of Oceanography
University of Hawaii, MSB 317
Honolulu, Hawaii 96822
USA

Internet: caldwell@soest.hawaii.edu
Fax: 808-956-4104
Office phone: 808-956-4105

General READ.ME file for University of Hawaii Shipborne ADCP Center ftp directory

Hello Data Recipient,

The National Oceanographic Data Center (NODC) is pleased to assist you with your request through the efforts of the Shipboard ADCP Center (SAC) established at the University of Hawaii. Acknowledgement of NODC's services in publications using this data is appreciated.

The data have been placed in an anonymous ftp account. For access, type

```
ftp kapau.soest.hawaii.edu

user: anonymous
pswd: your email

cd pub/adcp/xfer_dat      (or other path if so instructed)

mget *.*
```

The filenames are the following:

read_1st.doc	"This file - explains file names"
std_sub.doc	"standard subset format description"
cru_trk.doc	"cruise track format description"
dist_pol.doc	"NODC shipboard ADCP distribution policy"
*.inv	"inventory file"

The following exist for each cruise given by SAC_ID, such as 00001:

*.bft	"cruise summary and metadata file"
*.cru	"ASCII cruise tracks"
*.sub	"standard subset"

If high-resolution data have been requested, a subdirectory is created for each cruise using the SAC_ID as the directory name. Within this directory, you will find another read_me.doc file to explain contents.

Other information available within the NODC/SAC anonymous ftp area :

directory	comment
INVNTORY	Inventory lists, cruise track plots
DATABASE	standard subsets, cruise tracks, and cruise summary files for each cruise (*if you obtain files, please email me and let me know what you grabbed, thanks. caldwell@soest.hawaii.edu)
BIRS	Browse, Inventory, and Retrieval Software. Available for public queries of global database.
GEN_DOC	general documentation and overview
ASC_DUMP	software for ascii dump of codas data set
CODAS_MN	1) a compressed post-script "rough draft" of processing manual and 2) "second draft" of NODC's Access to High-Resolution CODAS Shipboard ADCP Data
SUBMIT	ATTENTION DATA CONTRIBUTORS: metadata is invaluable, to assist in preparation for your submission, see this subdirectory for a blank form and an example
SAMP_SUB	sample files for NODC subset
ESM	article for NOAA's Earth System Monitor
xfer_dat	working area for data transfer

Annex 4

Summary of replies to moored current meter data questionnaire

1. *Are you involved in moored current meter data collection, processing or archival?*

   11 collection, processing and archival
   3 archival only (BODC, IFREMER, WDC(A))
   2 collection and processing
   1 collection, processing and some archival

2. *What type of instruments do you use?*

   9 different types of current meters
   14 use Aanderaa
   5 use InterOcean
   5 use ADCP

3. *What type of moorings do you use?*

   Subsurface buoyancy
   Mainly I-mooring, but also U-shaped and L-shaped

4. *Where do you carry out measurements?*

   Estuaries, coastal areas, shelf seas, deep ocean

5. *Which parameters do you usually measure?*

a)	*current speed and direction*	15
b)	*temperature*	15
c)	*salinity (conductivity)*	5 + 5 partly
d)	*pressure*	6 + 5 partly
e)	*other*	turbidity (1)
		fluorescence (1)

6. *Do you have any information on*
   a) typical length of the time series

   Estuaries, coastal waters: 2 weeks - 2 months
   Deep ocean: 2 months - 1 year

   b) how much data do you receive yearly

   Typical: 10-50 current meter records
   BODC: 150-200 current meter records
   All together: 400-500 individual series

7. *Provide a brief description of*
   a) calibration methods

   Highly variable, but usually one or several of the following controls are carried out:

   * flow tank for speed
   * temperature check
   * meters balanced in tank
   * compass control
   * pressure sensor calibration

   * Instruments calibrated by manufacturer

   b) data collection methods

   tape, DSU
   different sampling intervals

   c) data processing

   own programs

   d) data banking/archival

   BODC: transfer, data assembly, data screening

   raw files in ASCII
   different local databases

   e) data quality control

   header check
   computer control (i.e. maximum/minimum values)
   manual check (i.e. plotting routines)

8. *What information/metadata is stored with the data?*

   * Position * Bottom depth
   * Measuring depth * Start/stop date/time
   * Sampling interval * Magnetic variability
   * Who was responsible for the measurements

   * Calibration data * Meter information
   * Special events

9. *Do you include comments on data quality with the final data set?*

   No: 4
   Yes: 7 In data reports: 2

10. *What are the main problems encountered in dealing with moored current meter data?*

    * Calibration
    * Varying quality from one sensor to another
    * Instrument performance
    * Biological fouling
    * Jellyfish
    * Corrosion
    * Data reduction techniques
    * Quality control
    * Correction of erroneous data

11. *Are the data available on request?*

    All, except 2
    Some have restrictions until 5 years after collection

12. *Other comments*

    None

Annex 5

CTD questionnaire and summary of responses

1. Are you involved in CTD data:
   - ☐ collecting
   - ☐ processing
   - ☐ archiving

2. Do you use the SCOR WG 51 guidelines for:
   - ☐ collecting data
   - ☐ processing data
   - ☐ archiving data

3. Do you use other guidelines? If so, what are they?

4. Do other laboratories/institutes in your country use the SCOR WG 51 guidelines?

5. Do you think the SCOR WG guidelines could be improved?

Can you describe more precisely your methods?

CTD manufacturer: (Neil Brown, SeaBird..)

Data Calibration

	In situ	Between cruises	
Pressure	☐ Yes ☐ No	☐ Yes ☐ No	frequency.....
Temperature	☐ Yes ☐ No	☐ Yes ☐ No	frequency.....
Salinity	☐ Yes ☐ No	☐ Yes ☐ No	frequency.....
Oxygen	☐ Yes ☐ No	☐ Yes ☐ No	frequency.....

CTD Operations

- ☐ Protection against strong heating (sun or other causes)?
- ☐ Leave the CTD in the sea a couple of minutes prior to starting the measurements
- ☐ Check of the sensors drift during the cruise
- ☐ Recording atmospheric pressure and air temperature just before the cast

Recording rate:.....per second
Lowering speed:.....m/s
Frequency of sensors cleaning.....

Data Processing

- ☐ Which conductivity do you use?
  - ☐ 42.914
  - ☐ Other value?
- ☐ Salinity computation
  - ☐ 1978 definition (Unesco 1981)
  - ☐ Other?
- ☐ Time lag corrections
- ☐ Hysteresis
- ☐ Compaction of data set?
  - ☐ Averaging within pressure intervals
  - ☐ Representation by flexure values
- ☐ Removal of individual data thought to be erroneous
- ☐ Filtering and smoothing data

Data exchange

- ☐ Quality control checks on the data
- ☐ Format
  - ☐ GF3
  - ☐ Autodescriptive ASCII
  - ☐ Other

Units

Temperature.....	Precision.....
Pressure.....	Precision.....
Salinity.....	Precision.....
Oxygen.....	Precision.....

Header Information

- ☐ source of data
- ☐ project
- ☐ platform
- ☐ cruise identifier
- ☐ start date
- ☐ end date
- ☐ start position
- ☐ end position
- ☐ sea floor depth
- ☐ originator's identifier

Pressure interval
.....dbars?

COLLECTING, PROCESSING and ARCHIVING of CTD DATA

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IFREMER

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Object

- ★ *Summarize the SCOR WG 51 recommendations*
- ★ *Check if the differents laboratories/institutes use these recommandations or other guidelines*
- ★ *Do the SCOR WG 51 recommendations need improving ?*

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Questionnaire

- ★ *40 laboratories/institutes contacted*
  - *– 20 in France*
  - *– 20 MDM members*
- ★ *22 answers (9 from french institutes)*
  - *– collecting : 19*
  - *– processing : 21*
  - *– archiving / exchanging : 19*
  - –

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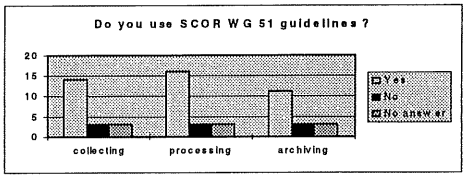
About guidelines (1)



- ★ *SCOR WG 51 guidelines are often used not extensively and several guidelines are consulted and applied.*

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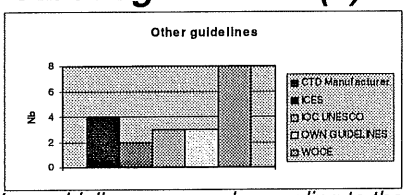
About guidelines (2)



- ★ *Other guidelines are used according to the activity. And some centers have their own guidelines issued from compilation of official ones.*

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Improvment of guidelines

- ★ *Guidelines reflects the state of the art in 1988, and as technology advances...*
- ★ *Guidelines for measurements in coastal waters*
- ★ *Special guidelines for the baltic sea (small depths and large salinity variations)*
- ★ *More accurate description of how calibration of sensors has to be carried out*
- ★ *GF3 format not suitable any more*
- ★ *Algorithms of compaction of the dataset*
- ★ *Recommendations for parameters such as O_2, fluorescence*

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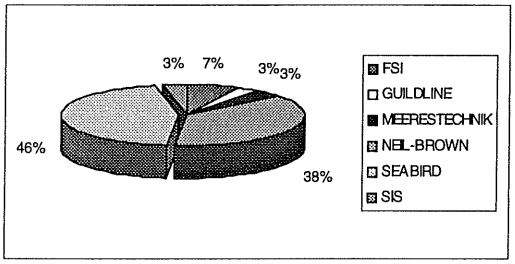
CTD Manufacturers



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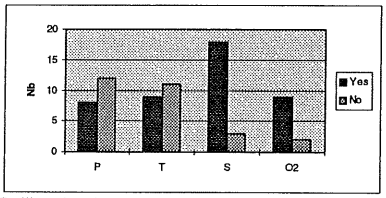
DATA CALIBRATION

★ *Calibration in situ*



★ *Calibration between cruises is very variable : before and after every cruise, every 1, 2 or 3 monthes, once a year ...*

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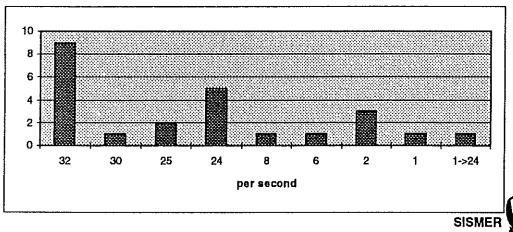
CTD OPERATIONS (1)

★ *Recording Rate : variable*

NEIL-BROWN : 32/seconds

SEABIRD : 24/seconds



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CTD OPERATIONS (2)

★ *LOWERING SPEED depends on the sea state and of the sea floor depth but is kept constant between 0.1 and 1.5 m/s.*

★ *FREQUENCE OF SENSOR CLEANING is variable :*

beginning and end of a cruise

each cast

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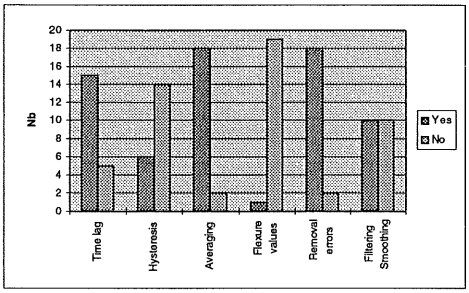
DATA PROCESSING



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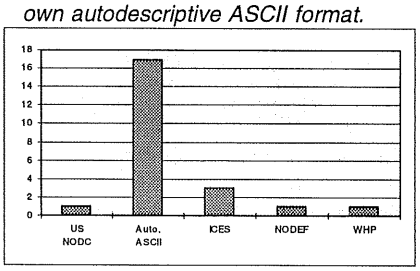
EXCHANGE FORMAT

★ *GF3 is not used, almost each center has its own autodescriptive ASCII format.*



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UNITS

- ★ *Agreement on the units of T (°C) and P (dbars)*
- ★ *for O_2, several units are found : ml/l, µmole/kg, µmole/l :*
  - *what about the data centers, do they have to convert into only one unit, and which one has to be choosen ?*

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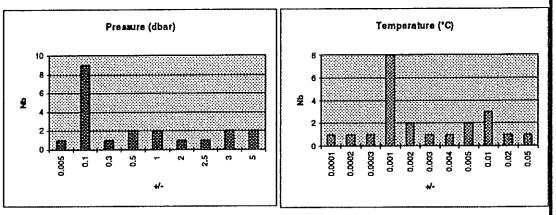
ACCURACY (1)



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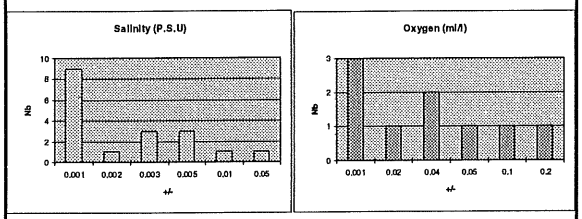
ACCURACY (2)



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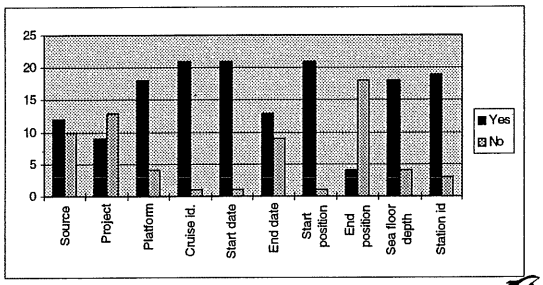
HEADER INFORMATIONS



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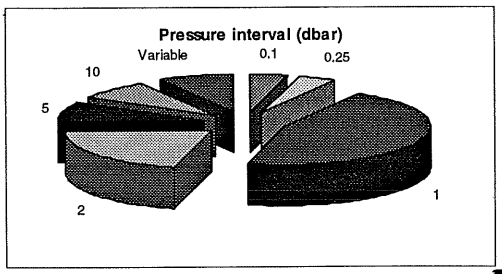
PRESSURE INTERVAL



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CONCLUSIONS

- ★ *Even if the SCOR WG 51 guidelines are not explicitly cited, they are rather abided except for the GF3 exchange format*
- ★ *An improvment seems to be necessary, specially because the technology of the sensors has evolved in the last few years*
- ★ *There is still a great variation between the data, specially about accuracy*
- ★ *More than 50% of answers to the questionnaire is a good performance*

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Annex 6

Recommendations

Proposed Agenda for next year's meeting

The Working Group on Marine Data Management (Chairman: Dr. L.J. Rickards, UK) will meet in Copenhagen, Denmark, from 22-24 April 1996 to:

a) Assess the post-1990 oceanographic data sent to ICES by each member state, identify problems and suggest solutions;

b) Review progress in the implementation of IOC's Global Oceanographic Data Archaeology and Rescue (GODAR) Project in each ICES member state;

c) Assess the results of the intercomparison of quality assurance methods for station data;

d) Report on the development of World Wide Web pages and links between them within ICES Member Countries;

e) Quantitatively analyse the minimum requirements for quality assurance of oceanographic data;

f) Critically review the available bathymetric data sets for the North West European Shelf;

g) Critically assess the IOC Cruise Summary Report, identify weaknesses and suggest improvements;