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International Council for
the Exploration of the Sea

C.M. 1981 / C:42
Hydrography Committee

Report of the
Working Group on Oceanic Hydrography

1. The Working Group meeting was held on February 23 and 24, 1981, at the Institute of Oceanographic Sciences, Wormley, UK. Present were A. Clarke (Can), J. Crease (UK), R. Dickson (UK), H. Dooley (UK), D. Ellett (UK), J.-C. Gascard (France), J. Gould (UK), B. Hansen (Denmark), J. Harvey (UK), P. Killworth (UK), P. Koltermann (FRG), T. Kvinge (Norway), F. Madelain (France), Sv.-A. Malmberg (Iceland), J. Meincke (FRG), G. Prangmsma (Netherlands), R. Richardson (USA), A. Svansson (Sweden), J. Swift (USA).
2. Participants presented results of recent work or ideas for further studies in the North Atlantic. Among the presentations was a detailed analysis of historical data on the large scale coupling of water mass formation in the Greenland-Norwegian seas and the circulation of the northern North Atlantic (J. Swift). Furthermore a first summary of low frequency statistics obtained from long-term current records in the Northeastern Atlantic was presented showing unexpected seasonal variations at depths down to 4700 m (R. Dickson). Possible explanations were discussed.
3. The WG's "Inventory on Hydrographic Activities in the Oceanic ICES Area" was revised and updated. See Annex.
4. On the basis of preliminary shiptime commitments for the ICES "Deep Water Project" the WG coordinated the field work for the deep water formation season 81/82 in the Greenland/Norwegian Sea. See Annex.
5. The WG discussed the possible role of ICES to improve the North Atlantic oceanographic data base concerning the interaction between ocean and atmosphere on climatic time scales. The WG noted that
 - most of the oceanographic data relevant to climatic studies in the North Atlantic are available because of the long-term existence of the ICES Service Hydrographique. In a compilation by Ellett, Meincke and Smed this has been demonstrated during the CCCO-Meeting on long time series in the ocean (Tokyo, May 1981)
 - there is an increasing number of national and international long-term programmes under discussion for climatic studies in the North Atlantic (e.g. the CAGE-project, a North Atlantic ships of opportunity programme, a programme to obtain high quality CTD-transects of the North Atlantic Ocean)
 - the quality of present routine methods to obtain oceanographic parameters is not sufficient to warrant a long-term compatibility of data sets from different sources.

In view of this the WG stressed the need for a long-term existence of a center for North Atlantic oceanographic data relevant to climatic studies. The special task for such a center should cover

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- development and implementation of intercalibration procedures for instrumentation and data processing to ensure long-term quality of routine measurements
- implementation of objective methods for merging data sets of different origin
- publication of products.

The WG noted that the ICES Service Hydrographique would be the adequate instrument for a task like this. Before formulating, however, a detailed recommendation, the WG will discuss its findings in a wider community concerned about climatic studies of the ocean.

J. Meincke
Chairman

ICES Working Group on Oceanic Hydrography
Inventory on Hydrographic Activities in the Oceanic
ICES-Area

Compilation date: July 1981

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Area	Type of work*	Time	Status*	Major interest	Institute*	Scientist	Type of measurements or modelling
<u>Western North Atlantic</u>							
Western basins	4	-	5	Kinematics Antarct. bottom water	WHOI-USA	Worthington	T,S-sections, currents 1yr
Western basins	3	-	5	Oceanic tides	IOS-UK	Cartwright	Bottom pressure 5 months
Antilles current	1,3	81	1,5	Transport determinations	UOM-USA AOML-USA	Schott	T,S-sections, currents
22-32° N, 28-30° W	1,3	-	5	Absolute flow determinations	WHOI-USA SIO-USA	Stommel Armi	Stratification, tracers, currents
35° N, 50° W	1,3,4,5	-	5	Deep water mixing	SIO-USA	Armi	Stratification, currents 1yr
East of Grand Banks	3	-	5	Monitoring	NEFC-USA	Mountain	T,S-sections, currents 1yr
Gulf Stream Extension	3	79-81	1,5	Low frequency statistics	AOL-CAN. WHOI-USA SIO-USA	Hendry Fofonoff Armi	Stratification, currents long-term
New Foundland Basin	3	81	1,5	Source waters of NA current	AOL-CAN.	Clarke	Stratification, currents
Labrador shelf/slope	5	79-81	1	Transport of Labrador current	AOL-CAN.	Lazier	Currents 5 yrs
Nova Scotia shelf	1,2,6	-	5	Interaction shelf-slope waters	AOL-CAN.	Smith	Stratification, currents 1 yr, drifters
Nova Scotia rise	3	81	1	Vorticity under warm Gulf Stream rings	AOL-CAN. URI-USA	Smith Wimbush	Currents 1yr
Seamounts in western basins	3	81	4	Effects of isolated mesoscale topography	UEA-UK	Maskell	-
Flemish Cap	1	79-81	1	Environmental oceanography	AOL-CAN.	Ross	Stratification, currents, drifters, biology

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Area	Type of work*	Time	Status*	Major interest	Institute*	Scientist	Type of measurements or modelling
<u>Central North Atlantic</u>							
SW of Azores	1,2,3	81-82	1	Circulation and biology of oceanic fronts	IOS-UK	Gould, Fasham, Angel	Stratification, currents, drifters, floats, biological parameters
N of Azores	1,2,3,7	80-82	1,4	North Atlantic current	IFM-FRG	Krauß, Meincke, Woods	Stratification, currents 2 yrs, drifters, chemistry
N of Azores	1,2	81	1	Mixing along fronts	KNMI-NETH.	Prangmsma	Upper layer stratification, drifters
N of Azores	1,3	81-84	2,4	Circulation, water masses	COB-FR. LOP-FR.	Verdiere Gascard	Stratification, currents 1 yr, floats
SW of Azores	3	80-84	1,2	Gulf Stream recirculation	WHOI-USA URI-USA	Richardson Rossby	Long range floats
<u>Eastern North Atlantic</u>							
NE-Atlantic basins	3	80-82	1,2,5	Mean circulation, eddy climatology	LOW-UK IOS-UK LOP-FR. IFM-FRG	Dickson, Gurbutt Gould Maillard Müller	Stratification, XBT-sections currents long-term (NEADS)
European continental slope	3	-	5	Eddy dynamics	UEA-UK LOW-UK COB-FR. LOP-FR.	Harvey Gurbutt Durance Colin de Verdiere Gascard	Stratification, floats (Tourbillon-Exp.)

* See list of abbreviations and numbers

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Area	Type of work *	Time	Status *	Major interest	Institute*	Scientist	Type of measurements or modelling
Continental slope off Britain	3,7	81-83	1,2,5	Slope currents	IOS-UK SMBA-UK LOW-UK MLA-UK	Gould Ellett Dickson, Durance Dooley	Stratification, currents, drifters, radio-chem., nephelometry
Madeira Abyssal Plain	3,4	80-81	1,4	Benthic boundary layer	IOS-UK	Saunders, Thorpe, Webb, Richards	Stratification, currents 1 yr, floats
NW-European continental slope	3,6	81	4	Oceanic tides	IOS-UK	Davies	
Celtic Sea shelf edge	3,6	-	5	Oceanic tides	IOS-UK	Heaps	Bottom pressure 5 months
Eastern basins	1,2,4,5	81	1	Meridional spreading and mixing	COB-FR. CFR-FR.	Madelain Chesselet	Radioact.tracers,in relation to TTO-progr.
Eastern basins	1	81-82	1,2	Meridional spreading and mixing	IFU-FRG	Roether	Radioact.tracers,in relation to TTO-progr.
Eastern basins	1,3,7	81,82	2,4,5,6	Isopycnal distr. of natural tracers	LOW-UK	Shepherd, Gurbutt	2-D modelling in isopycnal coordinates, collection of silicate and radiocarbon samples
Eastern basins	1,3,4	82-85	2,4	Deep diffusion and dispersion	DHI-FRG	Kautsky	-
Eastern basins	2,3	81-82	4	Ocean circulation	IOM-FR.	Le Provost	-
Eastern basins	1,4	81-82	1	Variations of deep stratification	COB-FR.	Vaugnesheim	Stratification, currents 1 yr
Portugal shelf/slope	1,2,5,6,7	78-84	1,2,5	Dynamics of shelf and slope circ.	UOL-PORT	Fiuza Ambar	Stratification, currents, remote sensing

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Area	Type of work *	Time	Status *	Major interest	Institute*	Scientist	Type of measurements or modelling
Azores-Canary Islands	1,2,3,7	80-82	1,2,4	Eastern Atlantic circulation	IFM-FRG	Siedler	Stratification, currents 3yrs
W of Ireland	5	79-81	1	Surface drift pattern	UCG-IR.	Monahan	Surface drifters
Rockall Trough	3,5	80-82	1,5	Statistics of currents	IOS-UK	Gould	Currents long-term
Faroe-Shetland Channel	2,6	79-85	2,5	Circulation	MLA-UK	Dooley Martin	Stratification, currents 3 months
Iceland Basin	1,5	-	5	Water mass distribution	MRI-ICEL.	Malmberg	Stratification
English Channel- Azores-OWS 'C'	2	81-83	1,4	Convection parametrization	IFM-FRG	Woods	Batfish-tows
North Atlantic Ocean Stations	1,2	to 85	1,5	Monitoring	WMO-ICES		T,S
<u>Northern North Atlantic</u>							
Faroe waters	1,2,6	79-82	1,5	General hydrography and currents	AF-FAROE	Hansen	Stratification, currents, waves
Icelandic waters	1,2	79-82	1,5	Hydrobiology	MRI-ICEL.	Malmberg Olafsson	Stratification
Major fishing areas	1	80-82	1	Fisheries oceanography	ICES-coord	Smed	-
Norw.+Greenland Seas	1,2,3,5,7	79-85	1,2,4	Hydrographic climatology	AARI-USSR	Nagurni	-
Northern Norweg. Sea	1,3,5,6	79-82	1,5	Transport of water masses	BFA-FRG	Stein	Stratification
Jan Mayen waters	1,3,5	80-81	1	Water exchange between Greenl. and Norweg. Sea	GI-NORW.	Foldvik Saalen	Stratification, currents 1 yr
Greenland Sea	1,2,7	82	2	Spreading of deep waters	DHI-FRG	Koltermann	Stratification, currents 1 yr

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Greenland Sea	1,2,6,7	82	2	Water mass formation, circulation	AOL-CAN SIO-USA	Clarke Swift, Reid	Stratification, geo-chemistry, vertical currents, nutrients
Norw.+Greenland Seas	2,3,5,6,7	79-81	1,2,5	Transport of mass and heat	UOW-USA GI-NORW.	Aagaard Foldvik	Currents 3 yrs
Norw.+Greenland Seas	1,2,5,6,7	80-82	6	Water mass formation, circulation	SIO-USA	Swift	T,S,O ₂ , nutrients, geo-chemical parameters
<u>North Atlantic</u>							
20° S-66° N, 0-80° W	2,3,7	79-83	4,5	Mean flow, dispersal of pollutants	LOW-UK	Gurbutt	General circulation model
25-66° N, 0-80° W	2,3,7	80-82	4,6	Atlantic circulation	IFM-FRG	Krauß	Spectral model
0-66° N, 0-80° W	2,3,7	80-82	4,6	Atlantic circulation	IFM-FRG	Willebrand	Diagnostic model
North Atlantic	1,3,5,7	80-85	3,4	General circulation	MIT-USA	Wunsch	Satellite altimetry and chemical tracers
North Atlantic basins	3,5,7	81	1	Atlantic circulation	WHOI-USA LOW-UK	Brewer Shepherd	Transient tracers (TTO-progr.)
0-30° N, 0-80° W	1	81-82	6	Subsurface fronts and mixing	CSIRO-AUST	Tomczak	-
North of 50° N	1,5	81-82	6	Deep circulation	SIO-USA	Swift	T,S,O ₂ , silica, geo-chemical param.
North Atlantic	1,2	81-82	6	Near surface thermal and density structures	SAI-USA	Grabowski	MBT-XBT data
North Atlantic	1	83	2	General circulation, water masses	MIT-USA WHOI-USA AOL-CAN	Wunsch Stommel Hendry	High quality hydrographic sections, merid. and zonal

List of abbreviations and numbers

Type of work: 1: Hydrography of the North Atlantic waters
2: Upper ocean processes
3: Kinematics and dynamics of the oceans' interior
4: Deep ocean benthic processes
5: Exchanges between the North Atlantic Ocean and its adjacent seas
6: Interaction between ocean- and slope-waters
7: Vertical transport processes

Status: 1: Current field work
2: Plans for field work
3: Ideas for field work
4: Current theoretical work
5: Data analysis
6: Analysis of historical data

Institutions: WHOI-USA: Woods Hole Oceanographic Institution, Woods Hole, Mass., USA
MIT-USA: Massachusetts Institute of Technology, Cambridge, USA
USCG-USA: US Coast Guard Oceanography Unit, Wash., D.C., USA
UOW-USA: University of Washington, Seattle, USA
UOM-USA: University of Miami, Miami, Florida, USA
AOML-USA: NOAA-Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida, USA
NEFC-USA: Northeastern Fisheries Center, Woods Hole, Mass., USA
URI-USA: University of Rhode Island, Kingston, Rhode Isl., USA
SIO-USA: Scripps Institution of Oceanography, La Jolla, California, USA
SAI-USA: Science Applications Inc., McLean, Virginia, USA
AOL-CAN.: Atlantic Oceanographic Laboratory, Dartmouth, Nova Scotia, Canada
MRI-ICEL.: Marine Research Institute, Reykjavik, Iceland
LOW-UK: MAFF - Fisheries Laboratory, Lowestoft, UK
IOS-UK: Institute of Oceanographic Sciences, Wormley, UK
MLA-UK: Marine Laboratory, Aberdeen, UK
SMBA-UK: Scottish Marine Biological Assoc., Oban, Scotland
UEA-UK: University of East Anglia, Norwich, UK
UCG-IR.: University College, Dept. of Oceanography, Galway, Ireland
CFR-FR.: Centre des Faibles Radioactivites, Gif sur Yvette, France
COB-FR.: Centre Océanologique de Bretagne, Brest, France
LOP-FR.: Laboratoire d'Océanographie Physique, Paris, France
IOM-FR.: Institute of Mechanics, Grenoble, France
IEO-SP.: Institut Espanol d'Océanographie, Madrid, Spain
UOL-PORT.: University of Lisbon, Dept. of Physics, Lisbon, Portugal
KNMI-NETH.: Koninklijk Nederlands Meteorologisch Instituut, De Bilt, Netherlands
IFM-FRG: Institut für Meereskunde, Kiel, FRG
DHI-FRG: Deutsches Hydrographisches Institut, Hamburg, FRG
BFA-FRG: Bundesforschungsanstalt für Fisherei, Hamburg, FRG
IFU-FRG: Institut für Umweltp Physik, Heidelberg, FRG
IPO, DK: Institute for Physical Oceanography, Copenhagen, Denmark
GI-NORW.: Geophysical Institute, Bergen, Norway
IMR-NORW.: Institute for Marine Research, Bergen, Norway
AARI-USSR: Arctic and Antarctic Research Inst., Leningrad, USSR
AF-FAROE: Academia Faroensis, Thorshavn, Faroe Islands
CSIRO-AUST.: CSIRO Marine Laboratories, Div. of Oceanogr., Cronulla, Australia

ICES Working Group on Oceanic Hydrography

Preliminary Programme for the
Deep Water Project 81/82

November 9-19, 1981 Norwegian RV "Hakon Mosby"

Cruise into the Jan Mayen area to replace moorings and try to do deep CTD-stations with oxygen and nutrients for volumetric analysis.

(O.-H. Saelen, Geophysical Institute, University of Bergen, Norway)

February 24 - April 5, 1982 Canadian RV "Hudson"

Cruise into the Norwegian Sea concentrating on the area north of Jan Mayen. Deep CTD O₂ stations, nutrients, alkalinity and total carbon. 5-10 day deep convection experiment with vertical current meters and Batfish tows. Surface CO₂ underway.

(A. Clarke, Bedford Institute of Oceanography, Dartmouth, N.S., Canada,
J. Swift, Scripps Institution of Oceanography, La Jolla, Calif., USA)

May 19 - July 17, 1982 German RV "Meteor"

Cruise into Norwegian/Greenland Sea. Deep CTD, O₂ and nutrients, radio-chemistry. Current meter moorings and towed CTD-surveys. Station grid coordinated with Hudson-cruise. Intended participation of Laboratoire Oceanographie Physique with newly developed subsurface floats, surfacing regularly and being positioned with the Argos-System.

(P. Koltermann, Deutsches Hydrographisches Institut, Hamburg, FR Germany)

