SCOR WORKING GROUP 34
INTERNAL DYNAMICS OF THE OCEAN

Report of Chairman: A.R. Robinson

The following information summarizes the activities of SCOR Working Group 34 (Internal Dynamics of the Ocean) for the period September 1976 to April 1977.

1. POLYMODE

A preliminary publication of the contributions in English to the Theoretical Institute held in Yalta in August, 1976 has been issued (March 1977) and is available from the US POLYMODE Executive Office, MIT. The final report, including contributions in Russian and English, will be issued in the near future in the USSR.

Scientific sessions during the US/USSR Joint POLYMODE Organizing Committee Meetings held in Cambridge, Massachusetts on 1-5 February 1977 were, in part, jointly sponsored by SCOR Working Group 34. Working Group members Gonella, Gould, Needler and Robinson attended. A Joint POLYMODE Programme and Plan was adapted and will be issued in final form in the near future.

2. NEADS (North East Atlantic Dynamics Studies subgroup)

The initial deployment of NEADS moorings (vid. *SCOR Proceedings 12,* p. 28) were deployed between November, 1976 and January, 1977).

3. Existing and Potential Data on Mesoscale Eddies in the World Ocean

A meeting sponsored by Working Group 34 was held in Cambridge, Massachusetts on 5 February 1977. It was attended by C. Collins, L. Dantzler, W.J. Gould, M. McCartney, G. Needler, A.R. Robinson and W. Simmons and assessed sources of mesoscale eddy information from the oceans of the world and discussed ways in which this data base might be improved and enlarged. It was recommended that (i) a list of existing or planned XBT ships-of-opportunity programmes be compiled; (ii) a bibliography of XBT reports be prepared; (iii) a catalogue of XBT data sets be compiled; (iv) a summary world map of mesoscale activity be produced; (v) the development of quantitative universal analysis techniques for mesoscale information on XBT sections be explored; and (vi) the possibility be examined of Working Group 34 helping to coordinate and organize XBT of opportunity programmes in order to obtain an efficient and expedient basis for world ocean mesoscale data. This could include FGGE ships en route from and to ports.

Dr Gould will prepare a report based on the more readily available information relating to (i-v) to guide Working Group 34 towards possible activities along these lines.

I anticipate that the Working Group 34 may wish to pursue aspects of the coordination, collection and classification of world ocean mesoscale data and may request funds to sponsor a meeting involving representatives of other interested groups as a next step.

4. SCOR/JOC Study Conference on the General Circulation Models of the Ocean and their Relation to Climate (Helsinki, May, 1977)

The Chairman of Working Group 34 has been active in planning this conference, and several Working Group members will participate.

JOC/SCOR STUDY CONFERENCE ON GENERAL CIRCULATION MODELS OF THE OCEAN AND THEIR RELATION TO CLIMATE

(Helsinki, 23-27 May 1977)

1. Introductory Lectures

(i) The general circulation of the ocean and its modelling
Speaker: W. Holland

(ii) The effect of the ocean on the atmospheric general circulation
Speaker: W.L. Gates

(iii) The physical problem of climate and the role of atmosphere-ocean interaction
Speaker: A.S. Monin

2. Review of Recent Research on the Modelling of Oceanic Processes

	Speaker	Discussant
(i) Mesoscale eddies	A. Robinson	P. Rhines
(ii) Boundary currents	P. Niiler	W. Düing
(iii) Surface boundary layer	S.A. Kitaigorodsky	P. Niiler
(iv) Mixing in the oceanic interior	C. Garrett	P. Müller
(v) Tropical and equatorial processes	G. Philander	K. Wyrtki
(vi) Coastal upwelling	J. O'Brien	J. Pedlosky
(vii) Sea-ice dynamics	J. Doronin	A. Semtner
(viii) Deep circulation processes	A. Sarkisyan	P. Welander
(ix) Intercomparison of Primitive Equation and Quasi-Geostrophic Ocean Models	A. Semtner	W. Holland
(x) High-latitude Processes – Modelling and Observations	D.J. Baker, Jr.	G. Needler

3. Process Parameterization in Ocean General Circulation Modelling

	Speaker	Discussant
(i) Global models of the oceanic general circulation (OGCM's)	K. Bryan	B.A. Kagan
(ii) Discussion of process parameterization and the structure of OGCM's	J.S.A. Green	R.L. Haney

4. Deterministic Analysis of Large-scale Ocean Atmosphere Interaction

(i) Observational evidence and empirical studies	R. Davis	J. Namias
(ii) Model simulation and sensitivity experiments with GCM's		

(a)	Oceanic responses (OGCM's)	G. Veronis	D. Anderson
(b)	Atmospheric responses (AGCM's)	P. Rowntree	S. Manabe
(c)	Responses in coupled GCM's	S. Manabe	M. Schlesinger

5. **Statistical Models of Climate Variability**

		Speaker	**Discussant**
	Introductory Lecture: Observed Spectrum of Climatic Variability	J. Kutzbach	
(i)	Low resolution of grid models	J. Adem	G. Paltridge
(ii)	Low resolution spectral models	M.C. Hendershott	D. Chalikov
(iii)	Time dependent SDM's	I. Held	M.I. Budyko
(iv)	Stochastic forcing models	C. Frankignoul	A.S. Monin
(v)	Entropy concepts	G. Paltridge	J. Charney
(vi)	Linear statistical predictors	L. Gandin	K. Hasselmann
(vii)	Predictability	J. Charney	Y. Mintz

6. **Resumé of Outstanding Scientific Problems and Outlook**

Panel:

K. Bryan, J. Charney, L. Gates, A. Gill, K. Hasselmann, A.S. Monin, A. Robinson, R.W. Stewart and K. Takano.

7. **Plan of Action**

A small ad-hoc working group will be convened 30-31 May 1977 in order to prepare specific action proposal to JOC and SCOR:

K. Bryan, B.R. Döös, L. Gates, K. Hasselmann, A.S. Monin, J. O'Brien, G. Paltridge, A. Robinson, and A. Wiin-Nielsen.