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REPORT ON SCOR WORKING GROUP 38 (WITH SCAR) -
SPECIAL STUDIES IN CIRCUMPOLAR WATERS SOUTH OF 40°S

by

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Since the formation of the group the Chairman has corresponded with interested scientists of a number of countries and various ad hoc discussions have been held. However, the full membership of the group has not been established and no formal meetings have been held. This is partly because it has not been possible to identify scientists ready to work on new data and reluctance to organize Antarctic supply vessels into undertaking new programmes of measurements without a clear objective in view and immediate prospects of producing results that would demonstrate the value of the work.

This present report was prepared at a small meeting at the National Institute of Oceanography in the United Kingdom on 19 April 1973.

The views expressed and the ad hoc discussions support the earlier emphasis on the need for information on meridional and zonal transport at all depths. SCAR has gathered information on the capabilities of all supply vessels operating regularly in the Antarctic. The possibilities for utilizing some of these ships in programmes to monitor currents and sea surface conditions are now developing in conjunction with the GARP need for increased coverage of meteorological data from the southern oceans, and particularly by plans for using satellites to monitor movements of inexpensive drifting buoys.

The promise of an extensive buoy programme during the First GARP Global Experiment (1977) has been increased and made more immediate by the results of the first successful EOLE satellite monitoring of the drift of a large Antarctic iceberg in 1971/1972 by expectations of valuable information from a number of the thirteen EOLE transponders placed on icebergs by ships of seven nations in the 1972/1973 austral summer and by the plans for a pilot programme in 1974 for monitoring Antarctic oceanographic buoys by the NIMBUS F satellite.

WG 38 will need to examine the proposals for an extensive buoy programme during FGGE to secure the interest and help of appropriate supply ships in setting out the buoys, to formulate proposals for measurements which supply ships can make in direct support of such programmes and recommend how these measurements should be made and utilized. It seems probable that the recommendations for supply ship programmes related to GARP needs should be limited to measurements of sea surface temperatures and possibly bathythermograph observations, although emphasis must also be placed on the need for supply ships to ensure they take and transmit full meteorological observations.

Supply ships could be used to deploy many of the buoys, and possibly to make supporting observations, but it will be necessary to maintain the interest of their officers and crews by prompt publication of positive results from their activities.

The Working Group feels that something should be done to make full use of existing marine meteorological observations made by supply ships before asking these ships to expand their activity. Recent atlases and other publications have not incorporated the wealth of marine meteorological data collecting during and since the IGY, and WG 38 urges SCOR to invite WMO to advise how these data can be archived and extracted. Such analysis must add considerably to understanding of the influence of the Antarctic oceanic regions on world climate and will possibly reveal specific requirements for additional observations which supply vessels might provide.

The Working Group believes that research ships should mainly be left to plan their work in the light of their own special abilities and programmes, but the group would like to see emphasis on studies of water transport and recommends multi-ship operations in active regions on a scale approaching those of the MEDOC and MODE experiments. It would specially recommend a multiple ship on and near a convenient part of the Antarctic continental slope, and another in the boundary region between the Weddell Sea and Scotia Sea Currents in 60° - 61°S, 47° - 52°W. Both studies would give useful information about final stages of mixing between the surface, deep and bottom layers. They should be made as soon as possible after the winter cooling, and last long enough to study the effects of the passage of two or three major atmospheric depressions. The terminal area in 55° - 60°S, 20° - 30°E, influenced by the flow of water across the Atlantic Ocean from the Weddell Sea is another significant region.

The Working Group has noted the recommendation of IGOSS for the collection of additional bathythermograph data in the Southern Hemisphere, and particularly the Pacific sector of the Southern Ocean during FGGE. While supporting this the WG hopes that those vessels equipped for deep ocean studies will give some priority to deeper observations likely to throw more light on transfers between the surface, deep and bottom layers, and on the problems of meridional and zonal transport, with as many observations as possible near the continental slope. Meanwhile, to meet the requirements of FGGE, it will be necessary to establish studies of existing Antarctic bathythermograph data comparable in scope with the existing effective studies of the Northern Hemisphere BT data.

WG 38 will discuss the capabilities of the supply ships for contributing to BT and XBT programmes.

The possibilities of successful study of the Antarctic water circulation are developing rather rapidly and WG 38 needs the advice and assistance of WG 34. I propose that WG 34 be asked to invite a small group of Antarctic enthusiasts to make a concise presentation of their ideas at its meeting and workshop in late 1973. If this proposal is acceptable to SCOR, the expertise of WG 34 will be available to WG 38 in its discussions and the formal membership of WG 38 can be kept small. It is proposed that, for the time being, the membership be:

Sir George Deacon
Dr. A.L. Gordon
Professor V. Kort
Professor P. Tchernia
Chairman of WG 34

The group has recently become aware of proposals being developed in the United States of America for an International Southern Ocean Dynamics Experiment. Whilst the details of such a proposal are not yet available, it is apparent that such a project would provide a much needed stimulus for furthering the understanding of circum-Antarctic oceanic processes and will deserve the fullest possible international support and collaboration.

If these proposals become available before the proposed meeting of WG 38 in late 1973, the group will examine them carefully, together with the earlier USSR collaborative proposal, to see what useful contribution the supply ships could make to achieve the stated goals.

List of Abbreviations

BT	Bathymograph
EOLE	Experiment of France in which some 500 constant-level balloons were launched in 1971 and tracked with the French Eole satellite
FGGE	First GARP Global Experiment
GARP	Global Atmospheric Research Experiment
IGOSS (of IOC)	Integrated Global Ocean Station System
IGY	International Geophysical Year
MEDOC	Mediterranean Occidental Survey
MODE	Mid-Ocean Dynamics Experiment
SCAR (of ICSU)	Scientific Committee on Antarctic Research
WG	Working Group
WMO	World Meteorological Organization
XBT	Expendable Bathymograph