NATIONAL RESEARCH COUNCIL
NATIONAL ACADEMY OF SCIENCES NATIONAL ACADEMY OF ENGINEERING
2101 CONSTITUTION AVENUE WASHINGTON, D.C. 20418

U.S. COMMITTEE FOR THE
GLOBAL ATMOSPHERIC RESEARCH PROGRAM
DIVISION OF PHYSICAL SCIENCES

January 2, 1970

MEMORANDUM

TO: Members, Executive Committee, USC-GARP

FROM: Duane S. Cooley, Acting Executive Scientist

1. There is enclosed a draft of the Joint NAS-U.S. Government statement on the proposed U. S. participation in GARP for the period FY 1971-1975. This statement has been worked out jointly between the USC-GARP and the ESSA staff under the supervision of Dr. Robert M. White, and incorporates many of the concepts and terminology discussed by the USC-GARP Review Subcommittee.

2. It should be kept in mind however that this document is primarily a policy document designed to secure policy decisions by the government on the principal program components requiring planning and budgetary lead times; it should not be viewed as a scientific document outlining detailed justification for specific aspects of the component programs being recommended.

3. This document is being made available to each member of the USC-GARP Executive Committee by the means of delivery to hotels prior to arrival. Copies will not have been so provided to the government representatives that will be present at the meeting, with the exception of Dr. R. M. White. Additional copies of the present draft will be available at the time of the meeting at the Joseph Henry Building, Room 400A, 9:00 a.m.

Duane S. Cooley

the roots of success for this program.

5.2.5 It is recommended that scientists from foreign nations be invited to work at the two principal U.S. centers for mathematical modeling and with other suitable university groups.

5.2.5.1 Because of the advanced computer technology in the U.S., it is likely that the two U.S. centers for mathematical modeling will become the principal foci internationally as well. It is important that the mathematical modeling effort be international in nature. Opening our laboratories to foreign scientists ~~will be~~ a ~~forward looking move. It~~ will enable the GARP program to tap and use the extensive scientific competence of foreign scientists in the fields of mathematics and fluid dynamics.

5.3 Field Expeditions

5.3.1 It is recommended that the GARP field ~~expeditions~~ experiments which the United States will undertake and participate in during the period 1970 through 1975 be principally focused on obtaining a description and understanding of the energy transfer and transformation processes in the atmosphere of the tropics.

5.3.1.1 The most critical deficiency in our knowledge of atmospheric global processes centers on the manner in which the energy enters the atmosphere through small scale convective processes

in the tropics and is transferred to the large scale motions. Although other desirable field expeditions have been recommended and while some (as detailed below) will be conducted, the highest priority activity must be the exploration of the tropical atmosphere.

5.3.2 It is recommended that the United States agree in principle to the general concept of the tropical field program as proposed by the NAS and WMO/ICSU and agree to participate in the more detailed specifications of the experiment.

5.3.2.1 A number of tropical investigations are envisaged by both the international and national GARP planning groups to study the interaction between individual convective cells, ensembles of convective cells, large regions of intensive convective activity (cloud clusters) and the large scale circulations in the tropics.

5.3.2.2 A most important expedition, which is clearly tractable with the technology available today and which can be accomplished through international cooperative actions among nations, is concerned with the manner in which energy and momentum in the lower parts of the atmosphere are redistributed in the atmosphere through moist convection. This experiment requires observations of cloud clusters, and more detailed observations of the smaller ensembles of convective cells.

5.3.3 It is recommended that the United States participate with facilities and personnel in the proposed international tropical experiment to take place in 1973 or 1974, and that the United States propose 1974 as a realistic date.

5.3.3.1 The proposed expedition ~~will~~ be conducted in either the Eastern Pacific or the Atlantic over a three-month period, and will embrace an area of 1,000 kilometers by 1,000 kilometers. The characteristics of the tropical cloud cluster and its immediate environment will be observed through an array of approximately 15 ships stationed in a grid.

5.3.4 It is recommended that the United States offer to provide 5 suitably instrumented ships as one of its proposed contributions to the expedition.

5.3.4.1 Of these five ships contributed by the United States, four would be required full-time. Possible sources of the ships will be Federal agencies and research centers. There would also be support vessels (buoy tender, fast carrier vessel, and resupply) required, which needs should be partially met by the U. S. The remaining ships would probably come from among other participating nations.