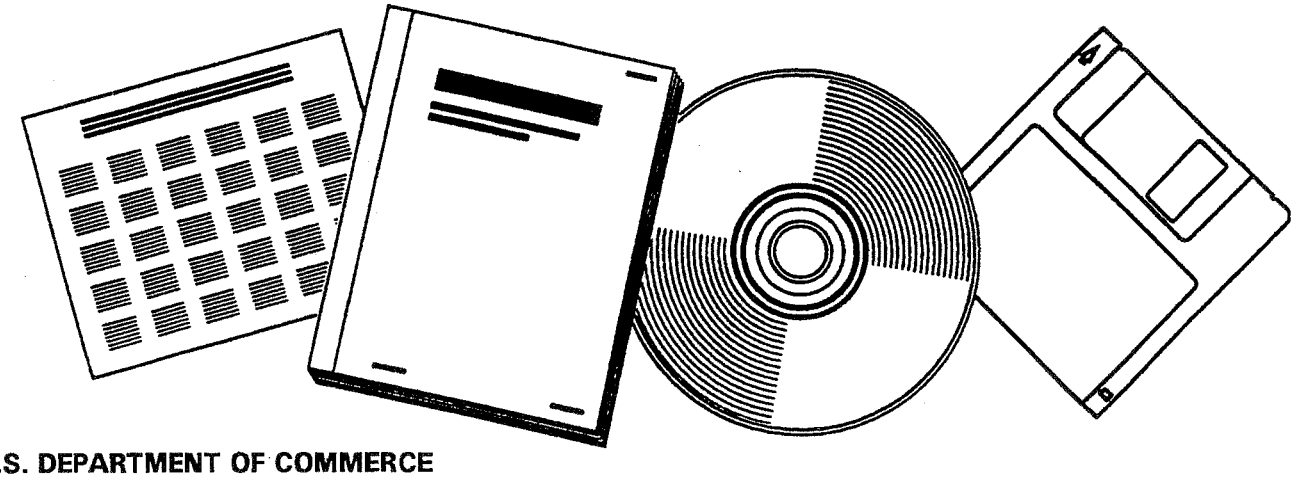
PB99109936

PILOT INSTITUTE ON GLOBAL CHANGE ON TRACE GASES AND THE BIOSPHERE, 1988

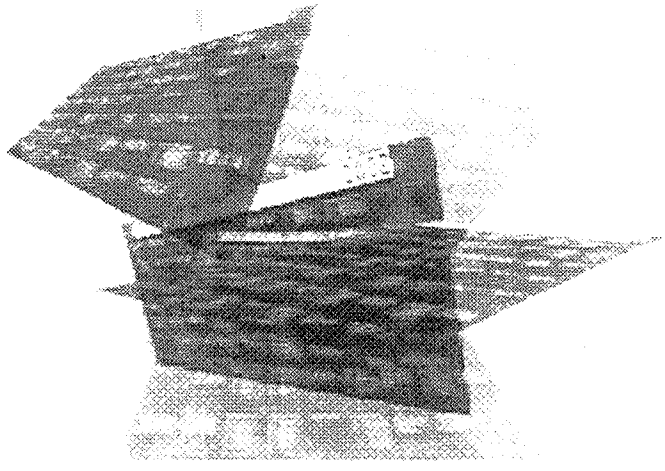
UNIVERSITY CORP. FOR ATMOSPHERIC RESEARCH, BOULDER, CO. OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

1998



U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

Tailored to Your Needs!



Selected Research In Microfiche

SRIM® is a tailored information service that delivers complete microfiche copies of government publications based on your needs, automatically, within a few weeks of announcement by NTIS.

SRIM® Saves You Time, Money, and Space!

Automatically, every two weeks, your SRIM® profile is run against all *new* publications received by NTIS and the publications microfiched for your order. Instead of paying approximately $15-30 for each publication, you pay only $2.50 for the microfiche version. Corporate and special libraries love the space-saving convenience of microfiche.

NTIS offers two options for SRIM® selection criteria:

Standard SRIM®–Choose from among 350 pre-chosen subject topics.

Custom SRIM®–For a one-time additional fee, an NTIS analyst can help you develop a keyword strategy to design your Custom SRIM® requirements. Custom SRIM® allows your SRIM® selection to be based upon *specific subject keywords*, not just broad subject topics. Call an NTIS subject specialist at (703) 605-6655 to help you create a profile that will retrieve only those technical reports of interest to you.

SRIM® requires an NTIS Deposit Account. The NTIS employee you speak to will help you set up this account if you don't already have one.

For additional information, call the NTIS Subscriptions Department at 1-800-363-2068 or (703) 605-6060. Or visit the NTIS Web site at *http://www.ntis.gov* and select SRIM® from the pull-down menu.

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Technical Information Service
Springfield, VA 22161 (703) 605-6000
http://www.ntis.gov

DOE/ER/69012--11

PB99-109936

NATIONAL SCIENCE FOUNDATION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
DEPARTMENT OF ENERGY
ENVIRONMENTAL PROTECTION AGENCY

For Support of the

1988 PILOT INSTITUTE ON GLOBAL CHANGE

on

TRACE GASES AND THE BIOSPHERE

* * * * * * * *

Submitted by

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES
University Corporation for Atmospheric Research
Boulder, Colorado

Principal Investigator
Dr. John A. Eddy
Director
Office for Interdisciplinary
Earth Studies

Co-Principal Investigator
Dr. Berrien Moore III
Director
1988 Pilot Institute on Global
Change

Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
303-497-1680

DISCLAIMER

DISCLAIMER

Portions of this document may be illegible electronic image products. Images are produced from the best available original document.

TABLE OF CONTENTS

I. SUMMARY

This proposal seeks multi-agency funding to conduct an international, multidisciplinary 1988 Pilot Institute on Global Change to take place from August 7 through 21, 1988, on the topic: Trace Gases and the Biosphere. The institute, to be held in Snowmass, Colorado, is envisioned as a pilot version of a continuing series of Institutes on Global Change (IGC). This proposal seeks support for the 1988 pilot institute only. The concept and structure for the continuing series, and the definition of the 1988 pilot institute, were developed at an intensive and multidisciplinary Summer Institute Planning Meeting in Boulder, Colorado, on August 24-25, 1987.

The 1988 Pilot Institute on Global Change (1988 PIGC) will bring about 50 scientists from relevant disciplines to work together at Snowmass for a period of two weeks. About half of the participants will be scientists, from this country and abroad, who are recognized leaders in research in the fields involved. The remainder will be divided equally between junior faculty, postdoctoral fellows, and advanced graduate students, each selected on the basis of interest, promise and future potential in the program.

The theme for the 1988 PIGC, Trace Gases and the Biosphere, will focus a concerted, high-level multidisciplinary effort on a scientific problem central to the Global Change Program. Dramatic year-to-year increases in the global concentrations of radiatively-active trace gases such as methane and carbon dioxide are now well documented. The predicted climatic effects of these changes lend special urgency to efforts to study the biospheric sources and sinks of these gases and to clarify their interactions and role in the geosphere-biosphere system. Reports from a number of recent workshops and symposia, including those of the Global Tropospheric Chemistry Program, have called attention to the need for transdisciplinary research on this question. This theme is also fundamental in the working group reports of the International Council of Scientific Unions (ICSU) that led to the establishment of the International Geosphere-Biosphere Programme (IGBP), and in the choice of the coordinating panels that have been established by the ICSU Special Committee for the IGBP.

The 1988 PIGC will illuminate, in a multidisciplinary arena, what we know and what we do not know about biospheric sources and sinks of critical trace gases. As a first step it will identify critical problems that now stand in the way of progress and formulate the specific research initiatives that are needed to address them. For this purpose the 1988 PIGC will begin with a series of presentations by international scientific leaders in the fields involved. The institute will produce reports and papers that will be widely distributed. What is more important is its primary goal: to further the process of transdisciplinary research by bringing working scientists together to focus on a specific topic, and to establish lasting working associations that will lead to collaborative research and publications. Thus, the 1988 PIGC is a critical step in the development of the Global Change Program: it represents a move beyond the planning stage and into the first elements of scientific investigation. To this end, the design for the 1988 PIGC includes provision for an adequate library, for computer access, and sufficient word-processing equipment. Scientific presentations will be complemented with small-group working sessions. In brief, the institute will be a working meeting.

Preliminary inquiries to potential senior participants have elicited an enthusiastic response. Participation by an outstanding group of leading scientists is assured.

The Institutes on Global Change (IGC) are planned as a continuing activity of UCAR's Office for Interdisciplinary Earth Studies (OIES), with the advice of a Long-Term Institute Planning Committee. The Scientific Director for the 1988 Pilot Institute on Global Change (1988 PIGC) will be Prof. Berrien Moore III, who chairs the Organizing Committee for the 1988 PIGC.

This proposal seeks total funding of $258,112 to be apportioned among the five agencies to whom this request has been directed.

II. BACKGROUND

Scientists who study the Earth and life upon it now recognize the need for change in the motives and the methods through which their research is done. The structure of Earth science, pushed by the expansion of knowledge and the needs of global models, is fast outgrowing the bounds that once defined the disciplines. At the same time, world concerns of impending climatic change, together with continued anthropogenic stresses on the natural environment, lead to calls for action, and for answers to practical questions that are broader than the scope of single disciplines and deeper than the reach of single scientists. Maturing scientific developments have produced an intellectual framework for Earth system science. Urgent practical needs, coupled with the promise of new technology and the power of international collaboration, have combined to launch a new multidisciplinary program of organized research, the IGBP, that will immediately and severely test this infant science.

We stand now at a critical point, when planning at the vanguard of the movement must be transformed to initial implementation. Until now, efforts in this country in support of Earth system science and the Global Change Program have been largely devoted to definition and advocacy. For most of the more than 50 nations that have now endorsed the IGBP, this initial phase is only beginning. At the same time, ordered steps from planning to implementation must now begin in preparation for the start of the operational phase of the IGBP in 1992.

A logical progression in the design of such a program is from the drawing of conceptual plans to workshops that define particulars and then to initial implementation in extended working sessions where hands-on work is done. The unique, multidisciplinary nature of the Global Change Program lends particular importance to the third stage, for it requires the collaboration of scientists from different disciplines. These working sessions must also recruit new scientists, particularly the younger scientists who will lead the program ten or twenty years from now.

We propose to undertake these tasks through a series of extended multidisciplinary learning and working sessions to be held in the same place each summer. These summer Institutes on Global Change (IGC) will bring senior and

junior scientists from different fields together to examine specific topics that are at the core of the Global Change Program.

The notion of interdisciplinary Institutes on Global Change is an essential feature in the OIES Program Plan. OIES was established within UCAR in 1986 to support the Global Change Program (Attachment 8). The fundamental rationale and framework for a series of summer Institutes on Global Change (IGC), and the particular design of the critical initial institute, are drawn from an intensive, multidisciplinary working meeting organized by OIES and held in Boulder with UCAR support on August 24-25, 1987 (Attachments 1, 2). This meeting, which was chaired by Prof. Richard Somerville of the Scripps Institution of Oceanography, University of California, San Diego, involved 16 scientists representing atmospheric science, oceanography, biology, solar-terrestrial physics, and global modeling, with agency representation from NSF and NOAA. Included in the participants were the Chairman (Prof. J. J. McCarthy) and the Executive Director (Dr. T. Rosswall) of the ICSU Special Committee for the IGBP (SCGB). An essential feature was the international character of the institute concept; it was also necessary to design the IGC to be consistent and in phase with the multinational planning for the IGBP.

That meeting established two committees to oversee the program of Institutes on Global Change (IGC): a Long-Term Planning Committee of 15 members, with agency liaison, chaired by Prof. Richard Somerville (Attachment 3); and a 1988 PIGC Organizing Committee of 11 members (Attachment 4), chaired by Prof. Berrien Moore III, who will act as Scientific Director of the 1988 PIGC. The August 1987 Planning Meeting also developed the list of prospective senior scientist participants for the 1988 Institute (Attachment 5.)

The general concept of an ordered series of summer Institutes on Global Change (IGC) is summarized in Section III. In Section IV we describe the initial 1988 Pilot Institute on Global Change (1988 PIGC), for which funds are sought in this proposal.

III. GENERAL FRAMEWORK FOR A SERIES OF SUMMER INSTITUTES ON GLOBAL CHANGE

A. NEEDS AND RATIONALE

The goals of the Global Change Program -- to understand the Earth as a coupled system, and ultimately, to forecast impending change and its consequences -- are as difficult as any that science has ever tackled. We need new and imaginative ways to bring leading scientists in different disciplines together to work on common problems. At present there are few institutions that are in a position to address problems that are genuinely transdisciplinary, or that possess the needed critical mass of scientific talent. As a rule, scientists who work on problems of global change come in contact with one another all too infrequently and for all too short a time. Further, the pool of scientists who are informed and available to tackle problems of global change is limited: there are many who are interested but only a few who are close enough to the planning effort to be engaged in the action. In short, the human resource base needs to be broadened. This task will require the recruitment, stimulation and training of scientists at mid-career, of post-doctoral and other young scientists, and of promising graduate students. A new echelon of scientists, and particularly those who will be active in research in decades ahead, needs to be brought into the fold.

At this early stage, there is a special need for extended periods of close, working contact that will concentrate limited resources for critical periods of time. On such occasions, plans can be laid and work begun that far exceed what is possible at a three-day meeting. Crucial problems impeding progress can be addressed in depth. In the stimulating atmosphere of an extended summer institute, scientists of different disciplines can not only meet, talk, and plan together, but can actually work together. The distinction is crucial. At such times, geoscientists and bioscientists can exchange ideas and methods and data, formulate needed experimental programs, and learn from each other. These requirements define the basic nature of the IGC: a regular summer institute that is interdisciplinary, that brings leading scientists who work on problems of global change together, and that recruits and trains each year a significant number of new Earth system scientists.

If carefully planned and constituted, such a summer institute could expect to recruit the participation of top scientists in many disciplines and from many countries. Once established, it could serve as a catalyst in yet another way: as a model to be copied in other places and so to enlarge the cadre of scientists who will work in the Global Change Program.

The proposed IGC program is designed to do this, to start carefully and prudently, but to start at once, recognizing the pressing need to begin actual research and to recruit and train additional scientific talent.

The IGC are designed to address the special needs of planning and executing transdisciplinary research. They will be guided, to provide continuity, by an ongoing, multidisciplinary Long-Term Planning Committee that will select a specific subject and a qualified director for each summer institute. The Director will then form his/her own Organizing Committee and select and recruit the participants.

Topics for emphasis in summer institutes will be carefully weighed and selected, and leaders in relevant disciplines chosen with equal care to provide the needed understanding of basic processes, terminology, and analytical approaches. In many instances, the IGC will go beyond planning and into joint research, taking advantage of the concentration of expertise and the potential of a common focus on a specific problem. We expect that associations formed at the IGC will continue to grow through the years, and to serve as an example for subsequent, ongoing collaborations between the disciplines. In other cases, the IGC will chiefly review existing information, articulate ideas and hypotheses, and describe how the research might be accomplished.

The rationale for the IGC is that they will provide an active forum for intensive discussion and study of a single, high-priority topic, in an environment that permits maximum communication among disciplines. Since they will involve both experienced and more junior investigators, the IGC will serve as an effective mechanism for educating young scientists, and for obtaining the most innovative ideas from a cross-section of the scientific community. In addition to producing a group of highly motivated and informed scientists, the publications and other products from each Institute will enable the broader scientific community to

benefit from the IGC and to become involved in a set of scientific topics that are of central importance to the Global Change Program. Since each institute session will address a different topic and include different groups of scientists, it will concentrate talent on the most important questions in a rapidly advancing research program, and at the same time will continually recruit new talent.

B. NATURE AND GOALS

The underlying purpose of the IGC is **to bring together highly skilled scientists from different disciplines to work on central research themes of the Global Change Program and to systematically add to the cadre of scientists that are needed to guide and accomplish the program.**

The IGC will provide an opportunity for scientists to meet in a stimulating environment for discussions on specific topics of central relevance to the Global Change Program. At Snowmass, the institutes will offer a unique and appealing setting for bridging gaps between scientific disciplines: a step which is essential for both the development and the implementation of the Global Change Program. The tangible and intangible products of institute sessions will promote and strengthen the Global Change Program and serve as a focus and an example for developing transdisciplinary studies of the total Earth system. In a framework of dialogues lasting several consecutive weeks we can hope to advance our abilities to address global environmental problems in a truly transdisciplinary manner.

The Global Change Program is a long-term commitment. Many of the scientists who will carry out research in the program are now graduate students and post-doctoral fellows. Furthermore, the training of the next generation of scientists will come through those who are now junior faculty members. The institute will thus strive to bring scientists in the earlier stages of their careers into contact with the more senior scientists who provide much of the present leadership in developing the IGBP.

The IGC will be organized by the UCAR Office for Interdisciplinary Earth Studies (OIES) and sponsored by a number of U.S. Federal Agencies, but the institutes will be international in character. Each year a significant number of both senior and junior participants will be recruited from abroad to extend the reach of the program and to ensure that it involves the best talent available.

C. CHARACTERISTICS

The Institutes on Global Change (IGC) will be designed as a series with the following invariant and essential characteristics:

Institutes will be:

1. Transdisciplinary in nature, both in the choice of topic and in the senior and junior participants who take part;

2. Focused on specific scientific questions at the heart of the Global Change Program;

3. International in character, to include senior and junior-level participants, as appropriate, from abroad;

4. Composed of scientists at varying levels of experience, including senior scientists, junior-level faculty, and graduate students, so as to broaden the base of talent that will work on the Global Change Program;

5. Directed primarily at research, mixed with education, rather than at program planning;

6. Focused each year on a different topic, with a different scientific director and with different participants, to insure breadth of coverage and to avoid the disadvantages of control by a small unchanging group.

7. Designed to give considerable autonomy to each year's scientific director and organizing committee in such matters as the choice of participants, the structure of the institute and the nature of reports and other tangible products;

8. Held each year at the same location, to build the recognition needed to recruit top-level scientists;

9. Three to five weeks in duration, to afford adequate time for effective interaction, and scheduled in the summer to allow the necessary participation of university faculty and students;

10. Required to produce papers and other tangible products that will be published in journals and distributed widely through the OIES directory to reach a broad spectrum of users;

11. Guided by an ongoing long-term planning committee, to ensure continuity and provide maximum benefit to the Global Change Program;

12. Supported by stable, multi-agency funding, to be generated after the first year by multi-year proposals.

IV. THE 1988 INSTITUTE ON TRACE GASES AND THE BIOSPHERE

A. NEEDS AND RATIONALE

Recent reports from workshops and symposia, including reports of the Global Tropospheric Chemistry Program, have called attention to the need for transdisciplinary research related to biospheric sources and sinks of trace gases. This theme is also fundamental in the workshop reports of the International Council of Scientific Unions (ICSU) that led to the establishment of the IGBP. Both the working group on Terrestrial Biosphere-Atmosphere Interactions and that on Marine Biosphere-Atmosphere Interactions made specific recommendations for research on biospheric sources and sinks of radiatively active trace gases, the effects of climate changes on these biogeochemical processes, and the consequent feedback to climate. Not surprisingly, two of the four areas recently selected by the ICSU SCGB for initial focus in this program are "Biosphere-Atmospheric Chemistry Interactions" and "Marine Biosphere-Atmosphere Interactions."

The general objective of the IGBP is "to describe and understand the interactive physical, chemical, and biological processes that regulate the total Earth system, the unique environment that it provides for life, the changes that are occurring in this system, and the manner in which they are influenced by human actions." The IGBP will focus most intently on the interactive and least understood components of the Earth system and those that are most susceptible to change. ICSU has specifically recommended that priority be given to those areas of each of the fields involved that deal with key interactions and significant change on time scales of decades to centuries, that most affect the biosphere, that are most susceptible to human perturbation, and that will most likely lead to practical, predictive capability.

It is heartening that the separate communities of scientists who are working on various aspects of this fundamental question are now eager to collaborate by reaching across traditional disciplinary boundaries. In some instances, and particularly in the Global Tropospheric Chemistry Program and in the Global Ocean Flux Study, plans are underway for large regional and global-scale studies that will benefit from this interaction.

Dramatic, year-to-year increases in the global concentrations of radiatively-active trace gases such as methane and carbon dioxide are now well documented. It is well-known that biological processes on the land and in the ocean provide dominant sources and sinks for the atmospheric trace gases that are important for climate and the chemistry of the troposphere. What is yet uncertain are the relative sizes of various sources and sinks; the relative importance of different processes of exchange, and the natural controls that limit them. For example:

- Does an increasing concentration of atmospheric CO_2 increase carbon storage in terrestrial ecosystems?
- What is the oceanic uptake of atmospheric CO_2?
- What controls the terrestrial release of CH_4?
- Does acid precipitation increase the flux of N_2O from terrestrial ecosystems?
- How do plankton control the release of dimethylsulfide?

We cannot expect to answer all of these questions in a single summer institute. What we can do is to take initial steps and in the process establish a unique, cooperative environment that will pave the way for subsequent investigations. What is certain is that what we do in a 1988 Pilot Institute on Trace Gases and the Biosphere will have far-reaching effects in the formative stage of the development of a new science.

B. NATURE AND GOALS

In this first year, we propose a pilot institute that is flexible and in a sense experimental with regard to structure and products. Moreover, the 1988 Pilot Institute on Global Change (1988 PIGC) will be shorter by at least a week than the subsequent institutes.

The 1988 Pilot Institute on Global Change will bring about 50 scientists from appropriate disciplines to live and work together in Snowmass for a period of two weeks (August 7 through 21, 1988). Accommodations will be arranged at the "Top of the Village" condominium complex in Snowmass, Colorado. Participation will include about 30 scientific leaders in the fields involved, drawn from the initial candidate list (Attachment 5) that was generated at the August 1987 Planning

Meeting. Based on preliminary responses from these candidates we can be confident of a very strong representation both by discipline and internationally. The remaining participants will be made up of about ten junior faculty, and another ten advanced graduate students, each selected for ability and promise on the basis of recommendations of senior participants.

C. CHARACTERISTICS

Prof. Berrien Moore III (vita in Attachment 7) will serve as Scientific Director for the 1988 PIGC, and will chair the Organizing Committee that is listed in Attachment 4. On 2-4 March 1988, the Organizing Committee will meet at Snowmass to establish the program and set the day-to-day procedures for the 1988 Institute.

Two types of publications are planned: a summary report reviewing the findings, recommendations, and scientific accomplishments of the institute, and a collection of papers submitted by workshop participants to be published in a special issue of Global Biogeochemical Cycles. This special issue has been approved, in concept, by the editor, Prof. J. J. McCarthy. Other tangible products to be considered at the March organizing meeting include an informal collection of papers giving preliminary conclusions printed in a "desk-top" publishing mode, and the possible video-taping of key lectures for wider distribution.

V. BUDGET

	Weeks:		
SALARIES:			
OIES Director	6	$8529	
OIES Program Manager	8	6474	
Meeting Coordinator	12	6208	
Administrative Assistant	8	3000	
Secretary	12	4408	
Graduate Student	4	1600	
Subtotal (1.0 FTE)			30219
BENEFITS (26.5%)			8008
MATERIALS AND SUPPLIES:			
Library Materials		2000	
Postage		600	
Office Supplies		2500	
Subtotal			5100
PURCHASED SERVICES:			
Communications		4500	
Computer Software		1500	
Equipment Rental & Maintenance		5500	
Space Lease		3555	
Meeting Expenses		9000	
Insurance		300	
Freight		2000	
Report Layout/Design		18000	
Graphics		2000	
Printing		10000	
Honoraria		20000	
UCAR/NCAR Administrative Support Services		5125	
Subtotal			81480
TRAVEL:			
Subsistence ($26/day x 14 days x 50 participants)		18200	
Domestic Travel ($500/trip x 35 participants)		17500	
Foreign Travel ($1400/trip x 15 participants)		21000	
Accommodations ($88/night x 14 nights x 50 participants)		61600	
Incidentals		5000	
Subtotal			123300
TOTAL DIRECT COSTS:			248107

MODIFIED DIRECT COSTS:[1]	211507
UCAR G&A at 1.68% of Modified Direct Costs:[2]	3553
FEE at 3% of Modified Direct Costs plus G&A:	6452
TOTAL BUDGET:	258112

[1]Modified Direct Costs equals Total Direct Costs minus equipment and the excess over $25,000 on subcontracts.

[2]Subject to final negotiations with the National Science Foundation.

VI. LIST OF ACRONYMS

DoE	Department of Energy
EPA	Environmental Protection Agency
GOFS	Global Ocean Flux Study
GTCP	Global Tropospheric Chemistry Program
IGBP	International Geosphere-Biosphere Programme
ICSU	International Council of Scientific Unions
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
OIES	Office for Interdisciplinary Earth Studies
PIGC	OIES **Pilot (1988) Institute on Global Change**
SCGB	ICSU Special Committee on the Geosphere-Biosphere Programme
IGC	OIES **Institutes on Global Change**
UCAR	University Corporation for Atmospheric Research

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING
24-26 August 1987

Participants List

Richard Anthes
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1111

Robert Corell
Directorate for Geosciences
National Science Foundation
1800 G Street, Room 510
Washington, DC 20550
(202) 357-7673

Vernon Derr
National Oceanic and Atmospheric Administration
Environmental Research Laboratory
Mail Code R/E
325 Broadway
Boulder, CO 80303
(303) 497-6000

Robert Dickinson
Atmospheric Analysis and Prediction Division
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1319

John Eddy
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1680

J. Michael Hall
Oceanic and Atmospheric Research
National Oceanic and Atmospheric Administration
R/CAR, Room 825
Rockville, MD 20852
(301) 443-5381

Frank Harris
Division of Biotic Systems and Resources
National Science Foundation
1800 G Street, NW, Room 1140
Washington, DC 20550
(202) 357-7332

James McCarthy
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1685

Laura Lee McCauley
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1683

Jerry Melillo
Ecosystems Studies Program
National Science Foundation
1800 G Street, NW
Washington, DC 20550
(202) 357-9596

Berrien Moore
Institute for the Study of Earth, Oceans and Space
Science Engineering Research Building
Fourth Floor
University of New Hampshire
Durham, NH 03824
(603) 862-1792

Clifford Murino
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1652

Paul Risser
University of New Mexico
108 Scholes Hall
Albuquerque, NM 87131
(505) 277-5064

Thomas Rosswall
Department of Water in Environment and Society
Linkoping University
S-58183 Linkoping
Sweden
(46)-13 281 000

Eileen Shea
Global Climate Change Office
National Oceanic and Atmospheric Administration
R/CAR, Room 6811
Rockville, MD 20852
(301) 443-8631

Richard Somerville
Centre National de Recherche Meteorologique
42, Avenue G. Coriolis
31057 Toulouse Cedex
France

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING
Richard Somerville, Chair

AGENDA

Monday, 24 August 1987

8:30 am	Welcome	Cliff MURINO
8:45 am	Purpose of Planning Meeting -- Framework for an Institute	Jack EDDY
9:15 am	Scientific Needs	Jim McCARTHY Tom ROSSWALL
9:45 am	Need for an Institute	Robert CORELL
10:00 am	BREAK	
10:20 am	Round-Table Discussion	
NOON	LUNCH	
1:30 pm	Related Examples	

Chapman Conferences
Gordon Conferences
Dahlem Conferences
NATO Advanced Research Workshops
NATO Advanced Study Institutes
Woods Hole Geophysical Fluid Dynamics Summer Study
NCAR Advanced Study Program Summer Colloquia
Other Examples

Other Types of Gatherings

3:30 pm	BREAK	
3:45 pm	Building a Framework -- Discussion of Issues 1 and 2	

Goal
Nature

5:30 pm	Adjourn for the Day	

Tuesday, 25 August 1987

8:30 am Building a Framework -- Discussion of Issues 3 through 7

- Topics
- Format
- Number of Participants
- Balance
- International

10:15 am BREAK

10:30 am Continue Discussion of Issues 3 through 7

NOON LUNCH

1:15 pm Building a Framework -- Discussion of Issues 8 through 12

- Organization
- Duration
- Location
- Product
- Funding Strategy

3:15 pm BREAK

3:30 pm Writing Groups

5:30 pm Adjourn for the Day

Wednesday, 26 August 1987

8:30 am Review of the Draft Framework

10:00 am BREAK

10:15 am Development of Specific Plans for the 1988 Pilot Institute

NOON Close of Institute Planning Meeting

University Corporation for Atmospheric Research
OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING

Purpose and Plan of Institute Planning Meeting

1. PRESENT STATUS OF GLOBAL CHANGE AND EARTH SYSTEM SCIENCE

   - o Widespread feeling that the era of advocacy is ending; case for a GC Program is now established; next need is for scientific implementation, education and pilot progress in core science while international planning develops
   - o Limits of short meetings and weeklong workshops; present status of individual university efforts
   - o Potential of progress were strong scientists in fields of earth system science to work together, side by side, for a protracted period under suitable conditions.
   - o Evolution of strong university programs and an eventual, possible ongoing institute

2. A SUMMER INSTITUTE AS A STEP IN THIS DIRECTION

   - o 10 to 20 scientists at one place for up to two months
   - o Strong leadership under an advisory council with a designated director for each session
   - o Truly multidisciplinary
   - o Focussed topic for each session
   - o Dual emphasis on mutual education and research
   - o A continuing event, once proven and established, that would last for at least 5 years, during the start-up and well into the IGBP
   - o Tangible (and intangible) products: joint research; planning in depth; broadening of knowledge; recruitment of strong scientists needed for the Global Change Program

3. ADVANTAGES

   - o As an advanced study institute, could hope to attract the summer involvement of leaders in disparate fields: challenging, front-line research plus the opportunity to learn from other fields

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING

List of Established Institutes and Workshops

1. CHAPMAN CONFERENCES

   - o Organized through AGU
   - o Funded by proposal by agencies
   - o Up to 100 people for 3 days
   - o Essentially a scientific meeting of contributed papers

2. GORDON CONFERENCES

   - o Organized through a Gordon Conference Institute by AAAS
   - o Funded by proposals to funding agencies
   - o 60-75 people for 5 days, at a New England campus setting
   - o Interactive, working meeting
   - o Emphasis on chemistry

3. DAHLEM CONFERENCES

   - o Organized through a Dahlem Conference Office
   - o Sponsored and funded by Federal Republic of Germany
   - o 40 people for 5 days, in a West Berlin hotel
   - o Interactive, working meeting, with previously prepared papers
   - o Product -- a book

4. NATO ADVANCED RESEARCH WORKSHOPS

   - o Organized by host universities, most often in Europe
   - o Sponsored and funded by NATO Brussels through competitive proposals
   - o Up to 45 people for 5 days
   - o A program of invited and contributed papers
   - o Emphasis on current research topics

5. NATO ADVANCED STUDY INSTITUTES

   - o Organized by host universities, most often in Europe
   - o Sponsored and funded by NATO Brussels through competitive proposals
   - o Up to 60 people for 2 weeks
   - o A program of prepared lectures
   - o Emphasis on education -- large student and post-doc involvement

6. WOODS HOLE GEOPHYSICAL FLUID DYNAMICS SUMMER STUDY

- o Organized and directed by the GFD Summer Study group
- o Year-to-year funding sought from agencies
- o Up to ___ people for ___ days, at Woods Hole
- o Research oriented

7. NCAR ADVANCED STUDY PROGRAM SUMMER COLLOQUIA

- o Organized and funded by NCAR through the ASP
- o About ___ people for ___ weeks
- o Emphasis on graduate student, post-graduate education

- o A timely, cost-effective option
- o A paradigm for the IGBP and an example for emerging university centers
- o Neutral in terms of disciplines: self standing; not an appendage to a disciplinary center or disciplinary program

4. OPTIONS are many, and chiefly limited by prospects for funding:
   - o Character: mutual education vs. sleeves-up research
   - o Size: optimum number of participants, and mix between senior and junior researchers
   - o Duration: Minimum needed to produce results
   - o Location: optimum site for drawing interested persons; in one spot, or moving, perhaps between the US and Europe
   - o Timing: need for initial demonstration; pilot institute, possibly associated with other, existing summer programs
   - o Possible international character: advantages vs. costs; optimum mix

5. INTEREST OF UCAR/OIES
   - o To do what we can to make it happen, however it happens
   - o Charter of OIES, and developing nature
   - o Present role and multidisciplinary backing

6. PURPOSE OF THIS PLANNING MEETING
   - o A brainstorming session
   - o To weigh the need for and the necessary features of an Institute
   - o To frame a plan for an Institute that meets the needs of the Global Change program, starting from scratch
   - o Given positive endorsement, to produce a planning document that would serve as a charter for the Institute, and the basis for appeals for funding

- o A timely, cost-effective option
- o A paradigm for the IGBP and an example for emerging university centers
- o Neutral in terms of disciplines: self standing; not an appendage to a disciplinary center or disciplinary program

4. OPTIONS are many, and chiefly limited by prospects for funding:
   - o Character: mutual education vs. sleeves-up research
   - o Size: optimum number of participants, and mix between senior and junior researchers
   - o Duration: Minimum needed to produce results
   - o Location: optimum site for drawing interested persons; in one spot, or moving, perhaps between the US and Europe
   - o Timing: need for initial demonstration; pilot institute, possibly associated with other, existing summer programs
   - o Possible international character: advantages vs. costs; optimum mix

5. INTEREST OF UCAR/OIES
   - o To do what we can to make it happen, however it happens
   - o Charter of OIES, and developing nature
   - o Present role and multidisciplinary backing

6. PURPOSE OF THIS PLANNING MEETING
   - o A brainstorming session
   - o To weigh the need for and the necessary features of an Institute
   - o To frame a plan for an Institute that meets the needs of the Global Change program, starting from scratch
   - o Given positive endorsement, to produce a planning document that would serve as a charter for the Institute, and the basis for appeals for funding

- o A timely, cost-effective option
- o A paradigm for the IGBP and an example for emerging university centers
- o Neutral in terms of disciplines: self standing; not an appendage to a disciplinary center or disciplinary program

4. OPTIONS are many, and chiefly limited by prospects for funding:
   - o Character: mutual education vs. sleeves-up research
   - o Size: optimum number of participants, and mix between senior and junior researchers
   - o Duration: Minimum needed to produce results
   - o Location: optimum site for drawing interested persons; in one spot, or moving, perhaps between the US and Europe
   - o Timing: need for initial demonstration; pilot institute, possibly associated with other, existing summer programs
   - o Possible international character: advantages vs. costs; optimum mix

5. INTEREST OF UCAR/OIES
   - o To do what we can to make it happen, however it happens
   - o Charter of OIES, and developing nature
   - o Present role and multidisciplinary backing

6. PURPOSE OF THIS PLANNING MEETING
   - o A brainstorming session
   - o To weigh the need for and the necessary features of an Institute
   - o To frame a plan for an Institute that meets the needs of the Global Change program, starting from scratch
   - o Given positive endorsement, to produce a planning document that would serve as a charter for the Institute, and the basis for appeals for funding

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING

List of Established Institutes and Workshops

1. CHAPMAN CONFERENCES

   - o Organized through AGU
   - o Funded by proposal by agencies
   - o Up to 100 people for 3 days
   - o Essentially a scientific meeting of contributed papers

2. GORDON CONFERENCES

   - o Organized through a Gordon Conference Institute by AAAS
   - o Funded by proposals to funding agencies
   - o 60-75 people for 5 days, at a New England campus setting
   - o Interactive, working meeting
   - o Emphasis on chemistry

3. DAHLEM CONFERENCES

   - o Organized through a Dahlem Conference Office
   - o Sponsored and funded by Federal Republic of Germany
   - o 40 people for 5 days, in a West Berlin hotel
   - o Interactive, working meeting, with previously prepared papers
   - o Product -- a book

4. NATO ADVANCED RESEARCH WORKSHOPS

   - o Organized by host universities, most often in Europe
   - o Sponsored and funded by NATO Brussels through competitive proposals
   - o Up to 45 people for 5 days
   - o A program of invited and contributed papers
   - o Emphasis on current research topics

5. NATO ADVANCED STUDY INSTITUTES

   - o Organized by host universities, most often in Europe
   - o Sponsored and funded by NATO Brussels through competitive proposals
   - o Up to 60 people for 2 weeks
   - o A program of prepared lectures
   - o Emphasis on education -- large student and post-doc involvement

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING

Building a Framework

* * *

Issues to be Addressed

WG1 1. GOALS

What is the general purpose of the institute? What should each institute accomplish?

WG1 2. NATURE

What is the appropriate balance between pedagogy and/or research? How focussed and specific should it be? How much emphasis on the reeducation of more experienced scientists?

3. TOPICS

We need to choose a topic for the 1988 Pilot Institute and develop a list of possible topics for subsequent years.

WG2 4. FORMAT

What should the daily schedule of activities be? How should time be allocated? What is the optimum physical setting?

WG2 5. NUMBER OF PARTICIPANTS

What is the optimum number of participants for effective interaction and practicalities of funding?

WG2 6. BALANCE

What is the optimum balance among professional participants (e.g., senior scientists, junior scientists, post docs, and graduate students) and among disciplines?

WG2 7. INTERNATIONAL

What level of international participation should be sought?

WG3 8. ORGANIZATION

What organizational structure would best support individual institutes and the long-term planning needs of all institutes? What are the roles of the director and advisory groups?

WG3 9. DURATION

What is the optimum duration of each institute?

WG3 10. LOCATION

Should each institute be held in Boulder or the front-range area? Should the institute move around?

WG1 11. PRODUCT

What should each institute produce?

WG4 12. FUNDING STRATEGY

How and for what length of time should funds be secured for the institutes, and from what organizations?

University Corporation for Atmospheric Research
OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

INSTITUTE PLANNING MEETING

List of Other Types of Gatherings

Functions that bring
scientists of different disciplines together
in support of the Global Change Program

1. MEETINGS of the US CGC

DURATION:	one to three days
FREQUENCY:	two or three times/year
PARTICIPATION:	19 members
PURPOSE:	planning, direction, review of the US GC Program

2. MEETINGS OF THE SCGB

DURATION:	several days
FREQUENCY:	twice/year
PARTICIPATION:	19 members
PURPOSE:	planning, direction, review of the IGBP

3. PROPOSED MEETINGS OF THE (ICSU) SCIENTIFIC ADVISORY COUNCIL FOR THE IGBP

DURATION:	one day?
FREQUENCY:	biennial
PARTICIPATION:	100 or more participants, representing member nations, unions of ICSU
PURPOSE:	to inform of plans and progress of the international program

4. ORGANIZED SYMPOSIA at Association meetings (such as SCOPE, AGU, AAAS, etc.)

DURATION:	one day
FREQUENCY:	one or two per year in recent years
PARTICIPATION:	100 or more in audience
PURPOSE:	to inform and elicit interest

5. SPECIFIC WORKSHOPS

DURATION:	typically 3 days, sometimes up to 5 days
FREQUENCY:	several are held per year
PARTICIPATION:	typically 20 to 60
PURPOSE:	to examine specific problems, recommend research plans

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

GLOBAL CHANGE INSTITUTE

Long-Term Planning Committee

* * *

Membership

Richard Somerville, Chair
Centre National de Recherche Meteorologique
42, Avenue G. Coriolis
31057 Toulouse, Cedex
France

D. James Baker
Joint Oceanographic Institutions, Inc.
1755 Massachusetts Avenue, Suite 800
Washington, DC 20036
(202) 232-3900

Kevin Burke
Lunar and Planetary Institute
3303 NASA Road 1
Houston, TX 77058
(713) 486-2138

Ralph Cicerone
Atmospheric Chemistry Division
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1434

William Clark
Science, Technology and Public Policy Program
J.F. Kennedy School of Government
Harvard University
Cambridge, MA 02130
(617) 495-1853

Robert Dickinson
Climate and Global Dynamics Division
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1319

John Eddy
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1680

James McCarthy
Museum of Comparative Zoology
Harvard University
26 Oxford Street
Cambridge, MA 02138
(617) 495-2330

Laura Lee McCauley
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1683

Jerry Melillo
Ecosystems Studies Program
National Science Foundation
1800 G Street, NW
Washington, DC 20550
(202) 357-9596

Harold Mooney
Department of Biological Sciences
Stanford University
Stanford, CA 94305
(415) 723-9253

Berrien Moore, III
Institute for the Study of Earth, Oceans, and Space
University of New Hampshire
Science Engineering Research Building, 4th Floor
Durham, NH 03824
(603) 862-1792

Paul Risser
Vice President for Research
University of New Mexico
108 Scholes Hall
Albuquerque, NM 87131
(505) 277-5064

Thomas Rosswall
Water in Environment and Society
University of Linkoping
S-58183 Linkoping, Sweden
46-8-15 04 30

AGENCY LIAISONS

Robert W. Corell
Assistant Director for Geosciences
National Science Foundation
1800 G Street, NW
Washington, DC 20550
(202) 357-7673

J. Michael Hall
Oceanic and Atmospheric Research
National Oceanic and Atmospheric Administration
R/CAR, Room 825
Rockville, MD 20852
(301) 443-5381

Frank Harris
Division of Biotic Systems and Resources
National Science Foundation
1800 G Street, NW
Washington, DC 20550
(202) 357-7332

Shelby Tilford
Earth Science and Applications Division
National Aeronautics and Space Administration
Mail Code EE
600 Independence Avenue, SW
Washington, DC 20546
(202) 453-1706

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

1988 GLOBAL CHANGE INSTITUTE: TRACE GASES AND THE BIOSPHERE

Organizing Committee

* * *

Membership

Berrien Moore, III, Chair
Institute for the Study of Earth, Oceans, and Space
University of New Hampshire
Science Engineering Research Building, Fourth Floor
Durham, NH 03824
(603) 862-1792

John Eddy
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1680

James McCarthy
Museum of Comparative Zoology
Harvard University
26 Oxford Street
Cambridge, MA 02138
(617) 495-2330

Laura Lee McCauley
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1683

Michael McElroy
Center for Earth and Planetary Physics
Harvard University, Pierce Hall
29 Oxford Street
Cambridge, MA 02138
(617) 495-4359

James McWilliams
Climate and Global Dynamics Division
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307
(303) 497-1352

Jerry Melillo
Ecosystems Studies Program
National Science Foundation
1800 G Street, NW
Washington, DC 20550
(202) 357-9596

Ronald Prinn
Department of Earth, Atmospheric and Planetary Sciences
Massachusetts Institute of Technology
Cambridge, MA 02139
(617) 253-2452

Paul Risser
Vice President for Research
University of New Mexico
108 Scholes Hall
Albuquerque, NM 87131
(505) 277-5064

Thomas Rosswall
Water in Environment and Society
University of Linkoping
S-58183 Linkoping, Sweden
46-8-15 04 30

Richard Somerville
Centre National de Recherche Meteorologique
42, Avenue G. Coriolis
31057 Toulouse, Cedex
France

University Corporation for Atmospheric Research

OFFICE FOR INTERDISCIPLINARY EARTH STUDIES

1988 GLOBAL CHANGE INSTITUTE: TRACE GASES AND THE BIOSPHERE

Prospective Senior Participants

ATMOSPHERE

Andy Andreae
Abtelung Chemie der Atmosphare
Max Planck Institute for Chemistry
Postfach 3060
D-6500 MAINZ
F.R.G.
06 131 3051

Bert Bolin
Department of Meteorology
Arrhenius Laboratory, Fack
University of Stockholm
S-106-91 STOCKHOLM
Sweden
(46 8) 162401

Ralph Cicerone
Atmospheric Chemistry Division
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307, U.S.A
(303) 497-1434

Paul Crutzen
Abtelung Chemie der Atmosphare
Max Planck Institute for Chemistry
Postfach 3060
D-6500 MAINZ
F.R.G.
06 131 305 218

Robert Dickinson
Climate and Global Dynamics Division
National Center for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307, U.S.A
(303) 497-1319

Robert Duce
Graduate School of Oceanography
University of Rhode Island
Narragansett Bay Campus
Kingston, RI 02882, U.S.A
(401) 792-6256

Dieter Ehhalt
Institut fur Chemie der KFA(3)
Postfach 1913
D-5170 JULICH
F.R.G.
0246 61 4692

Robert Harriss
Atmospheric Science Division-MS 483
National Aeronautics and Space Administration
Langley Research Center
Hampton, VA 23665, U.S.A.
(804) 865-3237

Michael McElroy
Center for Earth and Planetary Physics
Harvard University
Pierce Hall, 29 Oxford Street
Cambridge, MA 02138, U.S.A
(617) 495-4339

Ronald Prinn
Department of Earth, Atmospheric and Planetary Sciences
Massachusetts Institute of Technology
Cambridge, MA 02139, U.S.A.
(617) 253-2452

Henning Rodhe
Department of Meteorology
Arrhenius Laboratory
University of Stockholm
S-10691 STOCKHOLM
Sweden
(46 8) 163696

OCEAN

Wolfgang Berger
Geological Research Division, A-015
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, CA 92093, U.S.A.
(619) 534-2750

Francis Bretherton
National Center for Atmospheric Research
Visiting: University of Wisconsin
Space Science and Engineering Center
Madison, WI 53706, U.S.A.
(608) 262-7497

Peter Brewer
Department of Chemistry
Woods Hole Oceanographic Institution
Woods Hole, MA 02543, U.S.A.
(617) 548-2896

Wallace Broecker
Lamont Doherty Geological Observatory
Palisades, NY 10964, U.S.A.
(914) 359-2900

Patrick Holligan
Marine Biological Association of the United Kingdom
The Laboratory, Citadel Hall
PLYMOUTH, Devon PL1 2PB
United Kingdom

B.B. Jorgensen
Department Ecology and Genetics
University of Aarhus
AARHUS
Denmark

John Martin
San Jose State University
Moss Landing Marine Laboratories
Box 450
Moss Landing, CA 95039, U.S.A.
(408) 633-3304

James McCarthy
Museum of Comparative Zoology
Harvard University
26 Oxford Street
Cambridge, MA 02138, U.S.A.
(617) 495-2330

J.F. Minster
Groupe de Recherche de Geodesie Spatiale
18 Avenue, Edouard Belin
S-31055 TOULOUSE
France

Jorge Sarmiento
Program in Atmospheric and Oceanic Sciences
James Forrestal Campus
P.O.Box 308
Princeton University
Princeton, NJ 08542, U.S.A.
(609) 452-6571

Ray Weiss
Geological Research Division, A-020
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, CA 92093, U.S.A.
(619) 534-2598

John Woods
Marine Sciences
Natural Environment Research Council
Polaris House, North Star Avenue
SWINDON, Wiltshire, SN3 3EH
United Kingdom
(44 793) 40101

TERRESTRIAL

John Aber
Institute for the Study of Earth, Oceans and Space
University of New Hampshire
Science Engineering Research Building
Durham, NH 03824, U.S.A.
(603) 862-1792

Ralf Conrad
University fo Konstanz
Faculty of Biology
POB 5560
D-7750 KONSTANZ
F.R.G.

John Freney
Division of Plant Industry
CSIRO
CANBERRA CITY, ACT
Australia

G.A. Zavarzin
Institute of Microbiology
U.S.S.R. Academy of Sciences
MOSCOW
U.S.S.R.

Jerry Melillo
Ecosystems Studies Program
National Science Foundation
1800 G Street, NW
Washington, DC 20550, U.S.A.
(202) 357-9596

Harold Mooney
Department of Biological Sciences
Stanford University
Stanford, CA 94305, U.S.A.
(415) 723-9253

Berrien Moore
Institute for the Study of Earth, Oceans and Space
University of New Hampshire
Science Engineering Research Building
Durham, NH 03824, U.S.A.
(603) 862-1792

Thomas Rosswall
Department of Water in Environment and Society
University of Linkoping
S-58183 LINKOPING
Sweden
(46 13) 281000

James Tiedje
Department of Crop and Soil Science
Michigan State University
East Lansing, MI 48824-1325, U.S.A.
(517) 353-9021

Peter Vitusek
Department of Biological Sciences
Stanford University
Stanford, CA 94305, U.S.A.
(415) 725-1866

ICE CORES

Claude Lorius
Laboratoire de Glaciologie et Geophysique de l'Environnement
B.P. 96
38402 SAINT-MARTIN-D'HERES, Cedex
France
(33) 76 42 58 72

Paul Mayewski
Institute for the Study of Earth, Oceans and Space
University of New Hampshire
Science Engineering Research Building
Durham, NH 03824, U.S.A.
(603) 862-3146

Hans Oeschger
Physics Institute
University of Berne
CH-3012 BERNE
Switzerland

Lonnie Thompson
Institute of Polar Studies
Ohio State University
Columbus, OH 43210, U.S.A.
(614) 292-6531

OTHER

John Eddy
Office for Interdisciplinary Earth Studies
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307, U.S.A.
(303) 497-1680

James Lovelock
St. Giles on the Heath
Coombe Mill
LAUNCESTON, Cornwall PL15 9RY
United Kingdom
566-84450

JOHN A. EDDY

Born:	March 25, 1931; Pawnee City, Nebraska
Education:	B.S. 1953, U.S. Naval Academy Ph.D., 1962, University of Colorado
Personal Life:	Married, four children
Present Position:	Director, Office for Interdisciplinary Earth Studies UCAR P.O. Box 3000, Boulder, Colorado 80307 (303) 497-1150

Prior Career:

1985-86	Senior Scientist, Advanced Studies Program, National Center for Atmospheric Research, Boulder, Colorado
1978-85	Senior Scientist, High Altitude Observatory National Center for Atmospheric Research, Boulder, Colorado
1977-78	Visiting Scientist, Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts
1974-76	Special Project Staff, High Altitude Observatory
1963-74	Research Staff, High Altitude Observatory
1961-62	Post-Doctoral Fellow, National Bureau of Standards, Boulder, Colorado
1958-61	Research Assistant, High Altitude Observatory
1953-57	Line officer, United States Navy.

Research Interests:	Earth System Science; Solar Physics; History of the Sun and of Climate; History of Astronomy; Archaeo-astronomy

Committee on Solar Terrestrial Research of National Academy of Sciences, 1978-1980.

Study Panel on Solar Terrestrial Research in the 1980's, for the National Academy of Sciences, Committee on Solar-Terrestrial Research. Chairman of Solar Physics Group, 1979-1980.

Study Panel on Atmospheric Sciences in the 1980's, National Academy of Sciences, Atmospheric Sciences Committee. Chairman Solar-Terrestrial Group, 1978.

Advisory Committee to the Administrator of NASA on "New Directions for Future Space Research". Chairman of the Solar-Terrestrial Group, 1980.

NASA Study Group on a Solar Beacon Spacecraft, 1979-1982.

NASA Advisory Group on Evolution of Complex Life, 1981-1983.

NASA Study Committee for a solar-Terrestrial Observatory, 1979-1982.

Committeeman, Solar Physics Division of the American Astronomical Society 1974-1975.

Consultant to the Hayden Planetarium, New York City; the Hansen Planetarium, Salt Lake City; and the Fiske Planetarium, Boulder, Colorado.

Honors

Arctowski Award in Solar and Solar-Terrestrial Physics, National Academy of Sciences, 1987; Visiting Scientist, University of Durham, England, 1985; James Arthur Prize Lecture in Solar and Solar Terrestrial Physics, Harvard-Smithsonian Center for Astrophysics, 1983; Research Associate, Harvard-Smithsonian Center for Astrophysics, 1977-1986; Research Fellow, National Geographic Society, 1975-1976. NCAR Award for Outstanding Performance in New Technology, 1973. Sigma Xi--RESA Boulder Scientist Award, 1965. National Academy of Sciences/National Research Council Post-Doctoral Fellow, 1962-1963.

Societies

American Astronomical Society, Solar Physics Division and History of Astronomy Division; American Association for the Advancement of Sciences; International Astronomical Union; Sigma Xi; American Geophysical Union; Astronomical Society of the Pacific.

Academic Experience

Professor Adjoint, University of Colorado, 1977-1984.

Graduate and undergraduate courses taught at the University of Colorado: Solar Physics, Infrared Astronomy, Observational Astronomy, Introductory Astronomy, Physical Science, Astroarchaeology, Atmospheric Optics.

14. New Far Infrared Observations of Atmospheric Molecular Lines (with R.M. MacQueen and P. Lena), **Nature 220**, 1112-1113, 1968.

15. Observations of the Solar Spectrum from 80-500 Microns (with J.W. Firor and H.A. Gebbie), **Astronomical Journal, 73**, S60, 1968.

16. Infrared Scattering Observations in the Upper Atmosphere (with R.M. MacQueen), **Journal of Geophysical Research 74**, 3322-3330, 1969.

17. Solar Brightness Temperature and Spectra: 80-400 Microns Wavelength (with P.J. Lena and R.M. MacQueen), **Bulletin of the American Astronomical Society 1**, 187, 1969.

18. Far Infrared Measurement of the Solar Minimum Temperature (with P.J. Lena and R.M. MacQueen), **Solar Physics 10**, 330-341, 1969.

19. The Far Infrared Transmission of the Upper Atmosphere (with P.J. Lena and R.M. MacQueen), **Journal of Atmospheric Science 26**, 1318-1328, 1969.

20. The Temperature Minimum from Far Infrared Measurements (with P.J. Lena and R.M. MacQueen), **Bulletin of the American Astronomical Society 1**, 275, 1969.

21. Hydrogen Abundance in Jupiter's Atmosphere (with J.P. Emerson and G.A. Dulk), **Icarus 11**, 413-416, 1969.

22. Search for Visual Aurorae on Jupiter (with G.A. Dulk and J.P. Emerson), **Astrophysical Journal 159**, 1123-1124, 1970.

23. Far Infrared Airborne Spectroscopy (with R.H. Lee, P.J. Lena and R.M. MacQueen), **Applied Optics 9**, 439-446, 1970.

24. A Review of "Early Solar Physics" by A.J. Meadows, **Sky and Telescope 40**, 375-378, 1970.

25. The Schaeberle 40 Ft. Eclipse Camera of Lick Observatory, **Journal for the History of Astronomy 2**, 1-22, 1971.

26. A Review of "The Golden Age of Solar Physics" in **Journal for the History of Astronomy 2**, 126-128, 1971.

27. An Atlas of the White Light Corona (with J. Goff), **Bulletin of the American Astronomical Society 3**, 261, 1971.

28. Eclipse Measurements of the Coronal Iron Abundance and Electron Temperature, **Bulletin of the American Astronomical Society 4**, 382, 1972.

29. Thomas A. Edison and Infrared Astronomy, **Journal for the History of Astronomy 3**, 165-187, 1972.

30. An Early Observation of 8542 of the Ca II Infrared Triplet, **Solar Physics 29**, 23-24, 1973.

48. Big Horn Medicine Wheel: Why was it Built? **Science 188**, 278-279, 1975.

49. Astronomy in Alice's Restaurant, Illustrations for articles by R.D. Dietz, **Mercury 4**, (1), 18-23 and **Mercury 4**, (2), 30-36, 1975.

50. The Case of the Missing Sunspots, **Bulletin of the American Astronomical Society 7**, 410-1975.

51. A New Look at Solar-Terrestrial Relations, **Bulletin of the American Astronomical Society 7**, 410, 1975.

52. The Maunder Minimum, **Science 192**, 1189-1200, 1976.

53. Solar Rotation During the Maunder Minimum (with P.A. Gilman and D.E. Trotter), **Solar Physics 46**, 410, 1976.

54. Sunspots, **Natural History Magazine 85**, (9), 56 and 63-65, 1976.

55. The Sun since the Bronze Age, **Physics of Solar Planetary Environments, Vol. 2**, (D.J. Williams, Ed.), American Geophysical Union, Proceedings of the International Symposium on Solar Terrestrial Physics, Boulder, Colorado, June 1976, 958-972.

56. Probing the Mystery of the Medicine Wheels, **National Geographic Magazine 151**, (1), 140-146, 1977.

57. Those Mysterious Sunspots, **TV Guide 25**, (5), 30-32, 1977.

58. A Practical Question in Astronomy, Review of "Possible Relationships between Solar Activity and Meteorological Phenomena", **Science 195**, 670-671, 1977.

59. Planetary Tides during the Maunder Sunspot Minimum (with C.M. Smythe), **Nature 266**, 434-435, 1977.

60. Skylab Optics: An Introduction, **Applied Optics 16**, 823-824, 1977.

61. Review of "Archaeoastronomy in Pre-Columbian America", **American Anthropologist 79**, 497-498, 1977.

62. Medicine Wheels and Plains Indian Astronomy, a chapter in **Native American Astronomy**, (A.F. Aveni, Ed.), University of Texas Press, Austin, 147-169. 1977.

63. Anomalous Solar Rotation in the Early XVII Century (with P.A. Gilman and D.E. Trotter), **Science 198**, 824-829, 1977.

64. The Case of the Missing Sunspots, **Scientific American 236**, 80-92, 1977.

65. Historical Evidence for the Existence of the Solar Cycle, a chapter in **The Solar Output and Its Variation**, (O.R. White, Ed.), University of Colorado Press, Boulder, Colorado, 1977.

84. Climate and the Role of the Sun, **Journal of Interdisciplinary History 10**, (4), 725-747, 1980.

85. A Review of "Our Changing Climate" by J.D. Hays, **Climatic Change 2**, 412-413, 1980.

86. The Historical Record of Solar Activity, in **The Ancient Sun**, (R.O. Pepin, J.A. Eddy, R.B. Merrill, Eds.), Pergamon Press, 119-134, 1980.

87. The Search for Solar History, a chapter in **Fire of Life: The Smithsonian Book of the Sun**, Smithsonian, 108-115, 1981.

88. The Sun, a chapter in **The New Solar System**, (J.K. Beatty, B. O'Leary and A. Chaikin, Eds.), Sky Publishing Corporation and Cambridge University Press, 1-22, 1981.

89. Aspects of Long-term Variability on Sun and Stars (with A. Skumanich) in **Solar Phenomena in Cool Stars and Stellar Systems**, (R.M. Bonnet and A.K. Dupree, Eds.) D. Reidel, Dordrecht, 349-397, 1981.

90. Maunder Minimum, an article in the **Academic American Encyclopedia**, Arete Publishing Company, Princeton, New Jersey, 1981.

91. Climate and the Role of the Sun, in **Climate and History**, (R.I. Rotberg and T.K. Rabb, Eds.) Princeton University Press, Princeton, New Jersey, 145-168, 1981. (Reprinted from Journal of Interdisciplinary History, 1980).

92. Forward for the book, **Our Turbulent Sun**, by Kendrick Frazier, Prentice-Hall, Englewood Cliffs, New Jersey, ix-x, 1981.

93. Some Thoughts on Archaeoastronomy Today, in **Archaeoastronomy in the Americas**, (R.A. Williamson, Ed.), Ballena Press, Los Altos, California, 21-24, 1981.

94. Overview and Recommendations, in **Solar Variability, Weather, and Climate**, National Academy of Sciences, Studies in Geophysics Series, Washington, D.C., 3-16, 1982.

95. Reconstructed Values of the Solar Constant from 1874 to the Present (with O.R. White and D.V. Hoyt), IAMAP, International Radiation Commission, Reports of the Symposium **The Solar Constant and the Spectral Distribution of Solar Irradiance**, 11-18 August 1981, Hamburg, F.R.G., (J. London and C. Frohlich, Eds.), 29-34, 1982.

96. Preface for the book **When Stars Came Down to Earth** by Von Del Chamberlain, Ballena Press, Los Altos, California, 11-12, 1982.

97. A Review of "The Moon's Acceleration and Its Physical Origins" by R.R. Newton, **Journal for the History of Astronomy 13**, 133-134, 1982.

98. An Atlas of Variations in the Solar Constant Caused by Sunspot Blocking and Facular Emissions from 1874 to 1981 (with D.V. Hoyt), **NCAR Technical Note, TN-194 + STR**, 1982.

115. Effects of Extraterrestrial Phenomena on the Evolution of Complex Life on Earth (with W.H. Berger and E.M. Shoemaker) in **The Evolution of Complex and Higher Organisms,** (D. Milne, D. Raup, J. Billingham, K. Niklaus, and K. Padian, Eds.), NASA Scientific Publications SP-478, 111-143, 1985.

116. A Review of "Tree Rings and Telescopes: The Scientific Career of A.E. Douglass," **Journal for the History of Astronomy.** 17, 69-71, 1986.

VITA: BERRIEN MOORE III

ADDRESS

Complex Systems Research Center
O'Kane House
University of New Hampshire
Durham, New Hampshire 03824

(603) 862-1792

EDUCATION

Ph.D. Mathematics, 1969
University of Virginia

B.S. Mathematics, 1963
University of North Carolina

ACADEMIC POSITIONS

Director, Complex Systems Research Center
University of New Hampshire, January 1980-Present

Visiting Research Scientist, Laboratoire de Physique et Chimie Marines, Universite Pierre et Marie Curie
Paris, France, September 1985-August 1986

Visiting Research Scientist, Institute of Meterology,
University of Stockholm, Sweden, August 1983

Professor of Systems Research
University of New Hampshire, July 1982-present

Visiting Research Scientist, Institute of Meteorology,
University of Stockholm, Sweden, May-July 1980

Coordinator, Systems Research Group
University of New Hampshire, July 1978-January 1980

Senior Research Fellow
The East-West Center (Honolulu, Hawaii), January-July 1978

Fellow, Marine Policy and Ocean Management Program
Woods Hole Oceanographic Institution, 1976-1977

Associate Professor of Mathematics
University of New Hampshire, 1974-1982

Principal investigator, National Aeronautics and Space Administration, "The Biological Problems and Experimental Program for CELSS" (1980-83)

Principal investigator, Center for New Hampshire's Future, "Revenue for the State of New Hampshire: A Computerized 'Decision Support System' for Devising Revenue-Raising Strategies" (1982-83)

Co-principal investigator, Department of Energy, "The Effects of Changes in Terrestrial Carbon Pools on the CO_2 Content of the Atmosphere: A Pilot Study in the Use of Satellite Imagery" (1980-83)

Co-principal investigator, NSF/ASRA, "Ecological Principles Applied to Prediction of Water Quality in Drainage Basins" (1979-82)

Co-principal investigator, National Endowment for the Arts, "Graphic Languages for Policy Makers: A Collaborative Design/Science Project" (1980-81, at the East-West Center)

Co-principal investigator, National Science Foundation, "The World Carbon Budget: An Analysis Through Modelling" (1979-81)

Co-principal investigator, National Science Foundation, "The World Carbon Budget: An Analysis Through Modelling" (1978-79)

Co-principal investigator, National Oceanic and Atmospheric Administration, "Decision-Making in the Capital Sector of the New England Fisheries" (1980)

Co-principal investigator, National Aeronautics and Space Administration, "An Ecosystem Descriptor and Ecosystem Closure: New Theoretical and Experimental Approaches to Ecosystem Analysis" (1978-79)

Co-principal director, National Science Foundation, "Operator Theory Institute" (1976)

Co-principal investigator, National Science Foundation, "Problems in Operator Theory" (1974-76)

Co-principal investigator, National Science Foundation, "Problems in Operator Theory" (1972-74)

Co-principal investigator, National Oceanic and Atmospheric Administration, "Data Handling and Mathematical Modelling with Project NOMES" (NOMES--New England Off-Shore Mining Environmental Study) (1973)

Co-principal investigator, National Science Foundation, "Problems in Operator Theory" (1971-72)

316, 6029:617-620.

B. Moore. 1985. Fossil fuels: carbon dioxide in the atmosphere and oceans. Wastes in the Ocean, Volume IV: Energy Wastes in the Ocean. John Wiley & Sons.

W.R. Emanuel, I.Y-S. Fung, G. Killough, B. Moore, T-H. Peng. 1985. Modeling the global carbon cycle changes in atmospheric carbon dioxide levels. In Trabalka, J. (ed.) Atmospheric Carbon Dioxide and the Global Carbon Cycle. United States Department of Energy, DOE/ER-0239, Washington, DC.

M.M. Averner, B. Moore, I. Bartholomew, R. Wharton. 1984. Atmosphere Behavior in Gas-Closed Mouse-Algal Systems: An Experimental and Modelling Study. Adv. Space Res., Vol. 4, No. 12.

B. Moore and M.N. Dastoor. 1984. The Interaction of Global Biogeochemical Cycles. JPL Publication 84-21. NASA/JPL, Pasadena, California.

W.R. Emanuel, B. Moore, H.H. Shugart. 1984. Some aspects of understanding changes in the global carbon cycle. In Moore, B. and Dastoor, M. (eds.), The Interaction of Global Biogeochemical Cycles. JPL Publication 84-21. NASA/JPL, Pasadena, California.

B. Moore, H. Morowitz, M.N. Dastoor. 1984. Biogeochemical cycles: interactions in global metabolism. In Moore, B. and Dastoor, M.N. (eds.), The Interaction of Global Biogeochemical Cycles. JPL Publication 84-21. NASA/JPL, Pasadena, California.

G.M. Woodwell, J.E. Hobbie, R.A. Houghton, J.M. Melillo, B. Moore, A. Park, B.J. Peterson, G.R. Shaver. 1984. Measurement of changes in the vegetation of the earth by satellite imagery. In Woodwell, G.M. (ed.), The Role of Terrestrial Vegetation in the Global Carbon Cycle: Measurement by Remote Sensing. SCOPE 23. John Wiley and Sons, Ltd. Chichester.

G.M. Woodwell, R.A. Houghton, J.E. Hobbie, J.M. Melillo, B. Moore, B.J. Peterson, G.R. Shaver. 1984. Global deforestation: Contribution to atmospheric carbon dioxide. Science.

B. Bolin, A. Bjorkstrom, K. Holmen, B. Moore. 1983. The simultaneous use of tracers for ocean circulation. Tellus.

R. Houghton, J. Hobbie, J. Melillo, B. Moore, B. Peterson, G. Shaver, G. Woodwell. 1983. Changes in the carbon content of biota and soils between 1860 and 1980: net release of CO_2 to the atmosphere. Ecological Monographs.

R. Kaufmann, B. Moore, M.M. Averner. 1983. Modelling gas

D. Botkin, B. Maguire, B. Moore, H. Morowitz, L. Slobodkin. 1979. A foundation for ecological theory. In Biological and mathematical aspects in population dynamics (proceedings of the Pallanza Symposium), ed. R. de Bernardi. Mem. Ist. Ital. Idrobiol., Suppl.

D. Botkin, S. Golubic, B. Maguire, B. Moore, H. Morowitz, L. Slobodkin. 1979. Closed regenerative life support systems for space travel: their development poses fundamental questions for ecological science. Life sciences and space research, ed. R. Holmquist. Oxford: Pergamon Press.

C. Hall, R. Howarth, B. Moore, C. Vorosmarty. 1978. Environmental impacts of industrial energy systems in the coastal zone. Ann. Rev. Energy.

B. Moore and E.A. Nordgren. 1975. A remark on the Jordan model for contractions of class CO. Acta Sci. Math.

B. Moore, M. Rosenblum, J. Rovnyak. 1975. Operators which intertwine two isometrics. Proc. Amer. Math. Soc.

B. Moore and E.A. Nordgren. 1975. On transitive algebras containing CO operators. Ind. J. Math.

K. Clancey and B. Moore. 1974. Transitive algebras and CO(N) Operators. Acta. Sci. Math.

B. Moore and E.A. Nordgren. 1973. On quasi-equivalence and quasi-similarity. Acta. Sci. Math.

B. Moore. 1972. A factorable weight with zero Szego infimum. Proc. Amer. Math. Soc.

B. Moore. 1971. The Szego infimum. Proc. Amer. Math. Soc.

T.L. Kriete, B. Moore, L.B. Page. 1971. Compact intertwining operators. Mich. Math. J.

B. Moore and L.B. Page. 1970. The class of operator-valued weight functions. J. of Math. and Mech.

PAPERS PRESENTED (Partial Listing)

Developing parameters for ocean carbon models by the inverse method (with A. Bjorkstrom). Sixth ORNL Life Sciences Symposium, November 1983 in Knoxville, Tennessee.

Modeling the carbon cycle. Symposium Global Environmental Effects: Carbon Dioxide Problem from an Energy Policy Perspective. American Institute of Chemical Engineers, Environmental Division, November 1983 in Washington, DC.

this imply for controlled ecological systems? 10th US/USSR Joint Working Group on Space Biology and Medicine. October 1979, National Aeronautics and Space Administration, Houston, Texas.

Modelling the global carbon cycle: where are we? Meeting of the Scientific Committee on Problems of the Environment (SCOPE). May 1979 at Marine Biological Laboratory (MBL), Woods Hole, Massachusetts.

Regional structures in global models. 6th Annual Global Modelling Conference. October 1978 at International Institute of Applied Systems Analysis, Vienna, Austria. By invitation.

A project: development alternatives for the Pacific Basin to the year 2000. 1st Annual Seminar on Pacific Prospects in Global Perspective. January 1978 at the East-West Center, Honolulu, Hawaii.

Seabrook and once-through cooling. Symposium on Energy and Environmental Stress in Aquatic Systems. November 1977 at Savannah River Ecology Laboratory, Augusta, Georgia.

Marine production and world famine (with P. Strauch). Pittsburgh Simulation Conference. April 1977, Pittsburgh, Pennsylvania.

World modelling--a policy assessment tool. Woods Hole Oceanographic Institution. December 1976, Woods Hole, Massachusetts.

An assessment of the marine capacity for alleviating world food shortages (with M.D. Mesarovic and P. Strauch). 2nd International Marine Technology Assessment Conference. October 1976, College Station, Texas.

A composite population index, with J. Richardson. World Population Society. November 1975, Washington, DC.

Canonical forms in linear systems. 11th Annual Allerton Conference on Circuit and System Theory. October 1973, Urbana, Illinois.

Transitive algebras containing CO(N) operators. Conference on Hilbert Space Operators and Dilation Theory. September 1973, Krakow, Poland.

Vector spaces via the computer. Symposium on Computer Applications in Mathematics. March 1973 at Dartmouth College, Hanover, New Hampshire.

Generalized Toeplitz operators. Symposium on Banach Algebra Techniques in Operator Theory. 1972 at the University of Georgia, Athens, Georgia.

The Szego infimum. American Mathematical Society. 1969 Winter

Department of Energy, Statement of Findings: Carbon Dioxide Problem, 1983-1985

International Assessment of the CO<2> Problem. World Meteorological Organization/United Nations Environment Program/International Council of Scientific Unions Conference; Analysis and Interpretation of Atmospheric CO<2> Data, Expert Panel on "The Carbon Cycle and Projections of Future Concentration of the Atmosphere CO<2>," 1983-1985

American Association for the Advancement of Science, Committee on Climate, 1983 (ex officio)

National Research Council, An International Geosphere-Biosphere Program, 1983

National Aeronautics and Space Administration (NASA) Science Working Group for Land-Related Global Habitability, 1983

National Aeronautics and Space Administration (NASA), Global Change: A Research Program on Biological Cycles, 1983

Global Biology. Peer Review Panel. Chairman, 1983

National Aeronautics and Space Administration (NASA), System Z: Science Working Group, 1983-1984

National Aeronautics and Space Administration, Steering Committee, Long Term Changes that May Affect the Habitability of the Earth, 1982

National Aeronautics and Space Administration (NASA) Global Biology: Science Working Group, 1982

National Aeronautics and Space Administration (NASA), Global Change: Impacts on Habitability. A Scientific Basis for Assessment, 1982

National Research Council, Space Science Board of National Academy of Science, Committee on Planetary Biology and Chemical Evolution, 1982-1984 (ex officio)

Reviewer for the Swedish Coniferous Research Project, Swedish Natural Science Research Council, 1981

National Aeronautics and Space Administration (NASA), Regenerative Life Support Research Program: Science Working Group, 1980-1981

International Federation of Institutes for Advanced Study, planning team for Scanning Our Change Planet Project, 1980

National Aeronautics and Space Administration (NASA), New Directions Advisory Panel, 1980

Reproduced by NTIS

National Technical Information Service
Springfield, VA 22161

This report was printed specifically for your order from nearly 3 million titles available in our collection.

For economy and efficiency, NTIS does not maintain stock of its vast collection of technical reports. Rather, most documents are printed for each order. Documents that are not in electronic format are reproduced from master archival copies and are the best possible reproductions available. If you have any questions concerning this document or any order you have placed with NTIS, please call our Customer Service Department at (703) 605-6050.

About NTIS

NTIS collects scientific, technical, engineering, and business related information — then organizes, maintains, and disseminates that information in a variety of formats — from microfiche to online services. The NTIS collection of nearly 3 million titles includes reports describing research conducted or sponsored by federal agencies and their contractors; statistical and business information; U.S. military publications; multimedia/training products; computer software and electronic databases developed by federal agencies; training tools; and technical reports prepared by research organizations worldwide. Approximately 100,000 *new* titles are added and indexed into the NTIS collection annually.

For more information about NTIS products and services, call NTIS at 1-800-553-NTIS (6847) or (703) 605-6000 and request the free *NTIS Products Catalog,* PR-827LPG, or visit the NTIS Web site **http://www.ntis.gov**.

NTIS
Your indispensable resource for government-sponsored information—U.S. and worldwide

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Technical Information Service
Springfield, VA 22161 (703) 605-6000