

**INTERNATIONAL ASSOCIATION OF  
METEOROLOGY AND ATMOSPHERIC PHYSICS**

**INTERNATIONAL UNION  
OF GEODESY AND GEOPHYSICS**

**REPORT OF PROCEEDINGS**

**SECOND SPECIAL ASSEMBLY**

**(CONDUCTED JOINTLY WITH IAGA)**

**AND**

**EXTRAORDINARY GENERAL ASSEMBLY**

**SEATTLE**

**AUGUST — SEPTEMBER 1977**



**IAMAP PUBLICATION No. 16a**



**BOULDER 1978**

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## FOREWARD

At the IAMAP First Special Assembly in Melbourne, January 1974, the final plenary voted unanimously to accept the invitation from the U.S. National Academy of Sciences to hold the IAMAP Second Special Assembly in the United States together with IAGA.

The Assembly in Seattle was a full success. The combined programs of both Associations comprised a total of 54 Symposia of which four were Joint IAGA/IAMAP Symposia covering fields of common interest, and 14 were IAMAP Symposia. A total of over 400 papers for these 18 Symposia alone and almost 700 papers for the 36 IAGA Symposia were presented. It was unavoidable with this large program to have many simultaneous sessions but at the same time it offered broad opportunities for information on all important areas of research in the field of both Associations. Four Frontier Lecturers gave expert overviews of some of the most actual topics in atmospheric and planetary research.

This very extensive scientific program was well organized. It was complemented by an excellently-arranged social program. All participants enjoyed the large variety of visiting tours mostly to the interesting and scenic surroundings, including delicious food and good services. The banquet was superb and the after dinner speaker highly entertaining.

IAMAP expresses its appreciation to the cosponsors of the Assembly: the U.S. National Committee for the IUGG, the American Geophysical Union, the American Meteorological Society, and the World Meteorological Organization.

Moreover, IAMAP would like to express sincere thanks to all those responsible for the arrangements and to those responsible for providing the necessary funds and local support. Only those who have ever been involved in organizing such big meetings can appreciate the amount of hard work necessary to have everything running so smoothly, efficiently, and satisfactorily. In particular, we are grateful to the American Geophysical Union and the University of Washington conference staff who were responsible for the excellent organization. The World Meteorological Organization, and several U.S. Government agencies (Energy Research and Development Administration, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and the United States Geological Survey) made generous financial contributions to support the organization and conduct of the meeting.

There were, of course, many activities going on during the Assembly besides the scientific and social programs, most importantly, the business meetings of the Associations and Commissions. IAMAP formed two new Commissions: one on Climate and one on Planetary Atmospheres and their Evolution, to adjust its activities to new

and vital fields of Atmospheric Physics of a highly interdisciplinary nature. Excellent progress was made in improving cooperation with IAGA. Besides establishing very pleasant personal relationships between the officers of both Associations, a joint body was formed to ensure this fine cooperation also for the future.

There were two invitations from member countries to host the IAMAP Third Special Assembly--Israel and the Federal Republic of Germany. At the final plenary meeting, the majority voted to have the next Assembly in Hamburg, FRG in 1981. It was further decided to arrange this Third Assembly as a IAMAP-only affair and not with a sister Association as cosponsor; it was further decided, however, to plan the IAMAP Assembly to follow in time immediately after the IAGA Assembly, planned to be held in the UK. The hope was expressed that the various IAMAP Commissions would concentrate as much as possible their own activities on the 1981 Assembly in order to turn it into a comprehensive representation of modern meteorology.

Christian Junge  
President, IAMAP

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I. OPENING CEREMONIES -- 22 August 1977

1. Arthur Maxwell, Chairman, USNC/IUGG
2. Ronald Geballe, Vice President and Dean of Graduate School, University of Washington
3. Dixie Lee Ray, Governess, State of Washington
4. Attia Ashour, President, IUGG
5. Christian Junge, President, IAMAP
6. Juan Roederer, President, IAGA
7. A group of musicians from the Seattle Symphony provided a most enjoyable interlude.

II. JOINT PLENARY -- 22 August 1977

The Chemical Evolution of the Earth's Atmosphere in the Light of Geochemical Evidence

Christian Junge

The development of atmospheric gases during the Earth's history was different for different categories of gases. The noble gases (except helium) and the rather inert nitrogen simply accumulated in the atmosphere as a result of the degassing of volatiles by volcanic activities and their present concentrations are determined by their original abundance in crust and upper mantle and the degree of exhalation.

Water vapor and carbon dioxide behaved quite differently because by far most of the huge amounts released to the Earth's surface became deposited as ocean and sediments. Their present atmospheric concentrations are and have been controlled by the oceans which were already in existence at least  $3.8 \times 10^9$  years ago. For  $\text{CO}_2$ , complex silicate-carbonate equilibria in the oceans may be the determining factor, perhaps modulated to some degree by the various carbon dioxide cycles, particularly the carbon dioxide which is released by volcanos, removed by weathering of igneous and metamorphic rocks and recycling through the crust.

The abundance of the atmospheric trace gases, i.e., those with less than  $10^{-5}$  mixing ratios, are determined dynamically by their atmospheric cycles because of their rather short atmospheric residence times of a few years and less. Studies of these global cycles which are in some cases rather complex have become an important and very topical subject of recent atmospheric research due to their potential environmental impact.

Oxygen is the only gas which had an entirely different history: It was over large time spans present in the atmosphere only in minute quantities and acquired its present abundance geologically speaking only in very recent times. There is ample evidence that up to about  $2 \times 10^9$  years ago the oxygen level was rather low: The occurrence of large deposits of pyrite and uraninite placers, and of banded ironstone sediments, all of which are not being formed under present oxygen levels. In addition the formation of early life more than  $3.8 \times 10^9$  years ago required the absence of free oxygen in the atmosphere. Not until  $2 \times 10^9$  years ago the appearance of red beds signalled the presence of sufficiently high oxygen partial pressures to oxidize iron on land or in shallow waters. Since then the oxygen level has risen--with some fluctuations perhaps--to the present level. The present atmospheric oxygen reservoir is, however, only about 5% of the total amount of oxygen produced, of which 95% was used to oxidize sulfur to sulfate and ferrous to ferric iron. By far most of this oxygen was produced by some form of photosynthesis and only a small fraction may have resulted from dissociation of atmospheric water vapor and escape of hydrogen into space during the Earth's history.



There is little doubt that the development of the total oxygen reservoir on the one hand and the development of free atmospheric oxygen on the other hand occurred quite differently: Total oxygen apparently developed in large quantities already rather early, whereas most of the atmospheric oxygen did not accumulate until the last  $1$  to  $2 \times 10^9$  years. Why this was so and how the atmospheric oxygen partial pressure increased as function of time are interesting geochemical problems. Whereas the rise of the atmospheric oxygen level is only very vaguely known, we have much better information on the development of the total biogenic oxygen. Geochemical budgets show that over the last several million years--in the postcambrian time--about 20% of the carbon in sediments was deposited as organic carbon and about 80% as carbonates. This organic carbon corresponds to an equivalent oxygen reservoir according to the stoichiometric composition of  $\text{CO}_2$ . The  $^{13}\text{C}$  content of the organic carbon is isotopically depleted by about 25% compared to that of carbonates due to biological fractionation and the  $^{13}\text{C}$  budget of organic and carbonate carbon matches that of carbon itself. Studies of the  $^{13}\text{C}$  composition of organic and carbonate carbon back to the oldest known Precambrian sediments,  $3.8 \times 10^9$  years ago, show that the isotopic composition remains the same which leads to the conclusion that already at this early date considerable fractions of carbon were deposited as organic carbon accompanied by equivalent production of oxygen. Since the appearance of small fractions of this oxygen in the atmosphere occurred much later it must be assumed that the oxygen produced in the early times was almost completely used up to oxidize sulfur, iron and other elements in the sedimentary shell. Not until this oxidation had reached a sufficient level (even the oxidation of the present sedimentary shell is far from being completed) could oxygen accumulate in the atmosphere to the present level. If and to what degree this present level is controlled by some processes is still an open question. There are strong indications that it was somewhat higher about  $400 \times 10^6$  years ago.

The development of oxygen at the Earth's surface and in particular in the atmosphere was primarily the result of biological activity. On the other hand there is little doubt that the rise of atmospheric oxygen in turn had important repercussions on the development of higher life on Earth. This mutual feedback between the oxygen geochemistry and the development of the biosphere is certainly a very exiting phenomenon and may be a much more unique one within the universe than the development of the primitive anoxic life which apparently formed very rapidly on Earth, certainly in less than  $700 \times 10^6$  years after the formation of the Earth by accretion from meteoritic bodies.

### III. EXTRAORDINARY GENERAL ASSEMBLY

#### A. FIRST SESSION -- 22 August 1977

1. Agenda. The IAMAP Executive Committee proposed to add two new items to the agenda; the establishment of a Commission on Climate, and the establishment of an Ad Hoc Commission on Planetary Atmospheres and their Evolution. The National voting delegates adopted, without opposition, these modifications of the agenda.

2. Report of the General Secretary. S. Ruttenberg circulated copies of a brief summary of IAMAP activities since IUGG, Grenoble. This report is included. Secretary Ruttenberg reviewed a few of the highlights; there were no questions nor discussion, and the report was adopted. Also circulated was a brief summary of plans adopted by the IUGG Executive Committee for the next IUGG General Assembly, Canberra, Australia, 3-14 December 1979.

3. Addition to Statutes of Financial Aspects in Case of Dissolution. Secretary Ruttenberg reviewed briefly the reasons why this statute addition is proposed and mentioned that IUGG is taking similar action.

The proposed text statute was adopted by the National voting delegates without opposition. The text is as follows:

#### IX. Dissolution de l'Association

30. Si jamais l'association devait être dissoute, son avoir financier reviendrait à l'UGGI afin d'être utilisé par elle à la continuation d'activités scientifiques et d'enseignement, par exemple, à l'organisation de réunions scientifiques et de symposiums, à la diffusion d'information scientifique et à la coordination d'activités de recherche internationales.

#### IX. Dissolution of the Association

If the Association should ever be dissolved, its financial assets will revert to the IUGG to be used for the continuation of scientific and educational activities, such as the organization of scientific meetings and symposia, the dissemination of scientific information, and the coordination of international research activities.

4. Establishment of Commission on Climate. President Junge introduced this proposal pointing out that there is now considerable new research activity on the physical basis of climate and the physical factors and dynamics involved in climate variability. There is also considerable interest in other organizations, such as the UN and WMO, and among the nations. It therefore seemed to the Executive Committee timely and necessary to establish this new body, taking care that its membership and work should complement that of related Commissions and also should include related areas such as research on the ocean-atmosphere coupling and on retrieval of quantitative data on past climatic variability from deep ice and ocean sediment cores. The final name and terms of reference of the new Commission would be proposed by the organizer to the Executive Committee for further approval.

The representative of the WMO strongly supported the establishment of this Commission as needed and timely, and informed the Assembly of the newly established World Climate Program by the WMO. The new Commission would provide a useful interface between this WMO program and the research interests of IAMAP.

The proposal to establish the Commission on Climate was adopted without opposition by the National voting delegates.

5. Establishment of Ad Hoc Commission on Planetary Atmospheres and their Evolution. President Junge introduced this proposal pointing out that the new spacecraft missions to the planets now provide us with a broad set of information on many aspects of the meteorology and chemical nature of the planetary atmospheres and their evolution, the study of which will also assist in understanding better some of the earth's atmosphere.

The proposal was adopted without opposition by the National voting delegates.

6. Nature and Location of Next IAMAP Assembly, 1981. President Junge informed the Assembly that the Executive Committee considered some possibilities of organizing the next Assembly jointly with another Association, but recommends that the Assembly be organized by IAMAP only with the possibility of some co-sponsorship for special symposia by other bodies.

President Junge also informed the Assembly that two formal invitations to host the next Assembly have been received, and introduced Professor H. Hinzpeter, Institute of Meteorology, University of Hamburg, Hamburg, Federal Republic of Germany, and Professor L. Berkovsky, Institute of Desert Research, Ben Gurion University of the Negev, Beer Sheva, Israel, to make their formal invitations and answer questions.

Professor Hinzpeter, representing the IUGG National Committee of the FRG, presented an invitation on behalf of the City of Hamburg and the State of Hamburg to hold the 1981 Assembly at Hamburg, sometime in the period 15 August to 15 September. It would be held in the Congress Center at the center of the city; there are hotels nearby ranging from deluxe to pension class, but there may not be university lodging available. The City and State of Hamburg are committed to substantial financial support of the Assembly.

Professor Berkovsky, representing the IAMAP National Committee of Israel, presented an invitation to hold the Assembly in Israel, probably in Jerusalem if that were to be considered desirable. The Hebrew University of Jerusalem has adequate meeting facilities and may also have lodging available. There are many hotels in the vicinity and there is also the possibility of lodging and meeting facilities in several kibbutzes very near Jerusalem. There would also be good possibilities of special flights or tour arrangements to Israel. There may be financial support for the meeting, but no firm plans could be reported at this time.

After some discussion on the general desirability of keeping registration fees low, and providing opportunity for younger scientists to participate (by availability of low cost arrangements), to which both representatives responded by affirming that every possibility would be investigated to meet these points, a vote was taken by a show of hands of the National voting delegates.

It was decided, by a vote of 12 to 2, to accept the invitation from the Federal Republic of Germany.

7. Close of Extraordinary General Assembly. As the last item was also the end of the proposed agenda, and there were no further matters raised by delegates, President Junge thanked those present for their participation and closed this Extraordinary General Assembly. He reminded the participants that there would be a short Plenary session at the end of the Seattle Assembly, 3 September, to consider any action or information items that might arise from the meetings of the Commissions.

#### SUMMARY OF IAMAP ACTIVITIES SINCE IUGG, GRENOBLE

Following is a very brief resumé of some of our activities since Grenoble. I have not tried to be complete, but rather presented some highlights to our membership. . . . S. Ruttenberg, Secretary-General, IAMAP.

1. Activities of Commissions. The Cloud Physics Commission organized a symposium in Boulder, Colorado, USA, July 1976, followed by a Weather Modification Conference organized jointly with the WMO. Proceedings of the Weather Modification Conference have been published by the WMO and are for sale for \$40.

The Ozone Commission and the Commission on Atmospheric Chemistry and Global Pollution, in cooperation with WMO, organized a symposium on Ozone at Dresden, German Democratic Republic in August, 1977. The proceedings of the Ozone Symposium has been published by the National Committee for Geodesy and Geophysics of the Academy of Sciences of the GDR.

The Radiation Commission and the Commission on Atmospheric Chemistry and Global Pollution, in cooperation with WMO and COSPAR, organized a symposium on "Radiation in the Atmosphere with Special Emphasis on Structure and Radiation Properties of Aerosols and Clouds including Remote Sensing and Satellite Measurements," in Garmisch-Partenkirchen, Federal Republic of Germany in August 1976. The proceedings are being distributed gratis to all registered participants and members of the two organizing Commissions; the volume is for sale (\$45) by the publisher, Science Press, Princeton, New Jersey, USA. A special report of a working group of the Radiation Commission, "Standard Procedures to Compute Atmospheric Radiative Transfer in a Scattering Atmosphere," has been published by IAMAP and is available for \$6.00.

Reports of the Commission meetings mentioned above will be contained in the Proceedings of the Seattle Assembly.

Other Commissions have been active mainly in preparations for the Seattle Assembly.

## 2. Activities in Association with Other ICSU Bodies.

a. Joint Organizing Committee for GARP. Dr. M. Kuhn, Secretary of the Polar Commission, represented IAMAP at a JOC working group meeting on the POLEX program for the First GARP Global Experiment.

b. Scientific Committee on Oceanographic Research (SCOR). Dr. H. Hinzpeter represented IAMAP at the meeting of the Executive Council at Stellenbosch, Republic of South Africa, September, 1975; President Junge and Secretary Ruttenberg participated in the General Assembly of SCOR at Edinburgh, September 1976, and May 1977. There are a number of SCOR working groups that treat problems in which meteorology and atmospheric physics and chemistry play a role, and IAMAP has been cooperating closely with SCOR to help recruit suitable experts to join these working groups.

IAMAP is also cooperating with SCOR in establishing a Committee on Oceanography, which will be advisory in oceanographic matters related to climate research.

IAMAP has cooperated with SCOR, IAPSO, WMO, IOC, and the German Meteorological Society in arranging the problem of the GATE Symposium on Oceanography and Boundary Layer Meteorology, Kiel, Federal Republic of Germany, May 1978.

IAMAP was also associated with the program of the Joint Oceanographic Assembly in September 1976, Edinburgh, Scotland.

c. Committee on Space Research (COSPAR). IAMAP and COSPAR cosponsored several symposia, e.g., the Symposium on "Meteorological Observations from Space--Their Contributions to the First GARP Global Experiment," held at COSPAR XIX, Philadelphia, June 1976, and the William Nordberg Memorial Symposium on Food Information Systems, held at COSPAR XX, Tel Aviv, June 1977. The proceedings are available gratis from Stan Ruttenberg, NCAR. It is planned that the Radiation Commission of IAMAP be involved at a symposium on remote sensing of the atmosphere at COSPAR XXI, Innsbruck, May 1978. The IAMAP/COSPAR Joint Working Group on Calibration of Radiation Equipment carried on Satellites and Rockets has been active in studying calibration and intercomparison aspects of radiometers for satellite-based observations of the earth's radiation budget.

Dr. R. Hide represented IAMAP at discussions of an international program of solar-system research, which is now being developed under COSPAR auspices.

d. Scientific Committee on Problems of the Environment (SCOPE). SCOPE has organized workshops on the carbon-dioxide cycle and has under study the environmental problem of the ozone layer and its possible anthropogenically-induced changes. IAMAP has informed SCOPE of the various ozone symposia that we have organized or planned.

e. International Union of Theoretical and Applied Mechanics (IUTAM). The fluid dynamics group of IUTAM planned a general fluid dynamics symposium in India in 1977 and invited IUGG to participate in organizing sessions on the Monsoon, an example of a large-scale anomaly in the general circulation of the atmosphere. IAPSO and IAMAP have assisted in the organization of this meeting and are contributing to the support of invited participants.

f. International Association of Aeronomy and Geomagnetism (IAGA). We have, of course, been working very closely with IAGA in arrangements for the Seattle Joint Assembly. However, our relations with IAGA extend to many other areas of interest; for example, the Middle Atmosphere Program (MAP) which is now being planned as a major international cooperative effort in the 1980s. Moreover, the IUGG Executive Committee had previously suggested that some sort of working agreement be drawn up between IAMAP and IAGA in order to provide a mechanism for collaboration in planning symposia and activities that relate to the physical area of common interest to the two Associations, the middle atmosphere.

An *Ad Hoc* Joint IAGA/IAMAP Joint Body was established prior to the Grenoble IUGG Assembly. This Joint Body met several times and assisted in formulating the program for the joint activities here at the Seattle Assembly. The organization of this work of the Joint Body suggested some formal guidelines for a more permanent joint body and we tried our hand at several ideas, and discussions took place with IAGA and IAMAP at the Executive Committee level. Development of a suitable formal mechanism, however, has not been completed and will be discussed further on the occasion of the joint assembly. Nevertheless, a good working relationship and understanding exists between IAGA and IAMAP and that spirit of cooperation will, in the absence of any formal agreement, continue to be a good basis for continued cooperative planning.

3. Activities Related to the WMO. As mentioned above, the WMO has cooperated with IAMAP in co-sponsoring several of the Commission symposia and has given financial support to these meetings as well as to the Seattle Assembly.

WMO has invited IAMAP to be represented at many of its technical and planning sessions, in which there are research aspects on the agenda. Budget limitations have prevented IAMAP from sending special representatives to most of these meetings, but some written material was prepared as appropriate as input to these WMO sessions and on a few occasions someone was participating anyway who could represent IAMAP. Our relations with the WMO continue to be constructive and fruitful and we can anticipate a growing area of common interest, for example with respect to research on stratospheric mechanisms related to the ozone concentration, the life cycles of pollutants in the atmosphere, and the growing interest in a broad-based climate research effort.

4. Next IUGG Assembly. It is currently planned that the next General Assembly of the IUGG will take place the first two weeks of December 1979, Canberra, Australia. IAMAP is exploring several symposia topics with sister IUGG Associations. The program will be decided upon at the next meeting of the IUGG which will have taken place just prior to our Seattle Assembly and will be reported on there.

5. Next General Assembly of IAMAP. It is presumed that IAMAP will plan its next General Assembly in 1981. An invitation to host this meeting has been received from the IAMAP Committee of Israel, and the IAMAP Committee of the Federal Republic of Germany has informed us that they are considering extending an invitation at Seattle. This matter will be discussed at the General Assembly at Seattle.

6. IAMAP Finances. Below is a summary of the IAMAP financial state as reported to the IUGG for the period 1976:

Total Receipts during 1976:

IUGG	\$15,000.00
Publication Sales	345.23
Bank Interest	<u>1,188.72</u>
	\$16,533.95

Reserve from previous years	22,700.81
TOTAL	39,234.76

Total Expenditures 1976:

To Commissions	\$10,550.00
IAMAP rep at meetings	1,212.72
Other	<u>261.93</u>
Reserve as of 31 December 1976	\$27,210.11

(NOTE: This does not include cash-on-hand of Commissions or a grant from WMO to purchase copies of the Proceedings of the Radiation Symposium, Garmisch-Partenkirchen.)

Estimated Expenses 1977:

Support of Seattle meeting	\$ 6,000.00
To Commissions	5,000.00

SCOR Working Groups--Terms of Reference and Membership (as of November 1976)

1. WG 55: Regional Study of "El Niño." Affiliated organizations involved: IAMAP, IAPSO.

Terms of Reference: To examine possible prediction schemes and indices for "El Niño" and to recommend the research needed to define the processes that should be taken into account in such a forecasting procedure.

Members: M. Kanamitsu, Japan; P. Lagos, Peru; J. Namias, USA; J.O'Brien, USA; R. Parra, Colombia; K. Wyrtki, USA. (Chairman to be appointed.)

Executive Committee Reporter: C. Junge

2. WG 56: Equatorial Upwelling Processes. Affiliated organizations involved: IAPSO, IAMAP, IABO.

Terms of Reference: To bring together all available observational evidence on spatial and temporal variability of equatorial upwelling processes in the Pacific, Atlantic, and Indian Oceans and to attempt as much generalization as possible in the light of the present hydrodynamical knowledge of the phenomenon; to investigate the coupling of equatorial upwelling processes with the coastal upwelling in the adjacent areas along eastern boundaries of the oceans in association with WG 49; to suggest lines of multidisciplinary enquiry into the processes of equatorial upwelling for the planning of future expeditions, in particular those of FGGE (through WG 47 of SCOR); to exchange information on the research programmes and plans of relevant expeditions.

Membership to be established.

Executive Committee Reporter: H. Postma

3. WG 43: Oceanography Related to GATE. Affiliated organizations involved: IAPSO, IAMAP.

Terms of Reference: To develop plans for an oceanographic programme to be associated with the GARP Atlantic Tropical Experiment; to propose means for its implementation and coordination.

Members: G. Siedler, FRG (Chairman); V.A. Burkov, USSR; W. Düing, USA; C.R. Mann, Canada; G.T. Needler, Canada; F. Ostapoff, USA; M. Sturm, GDR; J. Woods, UK; I. Galindo, Mexico; J.A. Gonella, France.

Executive Committee Reporter: R.W. Stewart

4. WG 44: Ocean-Atmosphere Materials Exchange (OAMEX). Affiliated organizations involved: IAMAP, IAPSO.

Terms of Reference: To review present knowledge of processes and methods of measurement related to the exchange between ocean and atmosphere of minor constituents of gaseous and particulate material, both natural and anthropogenic; to propose improved methods for studying the exchange processes and to consider development of relevant cooperative research projects.

Membership to be established.

Executive Committee Reporter: C. Junge

5. WG 47: Oceanographic Programmes during FGGE. Affiliated organizations involved: IAMAP, IAPSO.

Terms of Reference: To develop plans for comprehensive oceanographic programmes associated with FGGE and to assist other appropriate international and national bodies in the implenting of such programmes.

Members: H. Stommel, USA (Chairman); P.J. Hisard, Ivory Coast, M. Miyata, Japan; R. Pollard, UK; A.F. Treshnikov, USSR.

Executive Committee Reporter: P. Tchernia

6. WG 48: The Influence of the Ocean on Climate. Affiliated organizations involved: IAMAP, IAPSO.

Terms of Reference: To identify the major influences of the ocean on global climate and to advise on the design of programmes for their investigation.

Members: H. Charnock, UK (Chairman); other members to be appointed. This group has not yet been activated--see Report of XIII SCOR.

## B. SECOND SESSION -- 3 September 1977

1. Information Items. President Junge reported to the Assembly that IAGA and IAMAP agreed to form a Joint Advisory Body to assure close coordination and avoidance of conflicts insofar as possible of timing and subject matter of symposia and meetings of mutual interest to the two Associations. Each Association has nominated three members:

IAGA: Chairman of Division II, B. Tinsley, Univ. of Texas at Dallas  
Chairman of Division III, G.-G. Falthammar, Royal Institute  
of Technology, Sweden  
Chairman, Interdivisional Committee on MAP, Dr. R. McGill,  
Utah State University, Logan, Utah

IAMAP: President, Commission on Atmospheric Chemistry and Global Pollution; Dr. E.A. Martell, NCAR, Boulder, Colorado  
President, Commission on Ozone; Dr. H. Dütsch, ETH Atmosphären-  
physik, Zürich, Switzerland  
President, Radiation Commission; Dr. J. London, University of  
Colorado, Boulder, Colorado.

IAMAP has decided to appoint as its two representatives to the Interim MAP Steering Committee scientists working in atmospheric chemistry and atmospheric dynamics. Several appropriate persons are under consideration and will be contacted to see if they will agree. (NOTE: As of March 1978, Dr. I. Hirota, Japan has been confirmed as a IAMAP representative. A second representative is being sought.)

## 2. Action Items.

a. Recommendations from Commissions. The Assembly adopted without opposition, seven recommendations put forward by Commissions.

b. Other Recommendations. The recommendation put forward by the Executive Committee on SCOSTEP/MAP was adopted without opposition.

The recommendation on the People's Republic of China and Taiwan put forward by the Executive Committee was discussed in the light of the thorough discussion and action taken at IUGG, Durham, UK, 6 August 1977. The Chief Delegate of the German Democratic Republic suggested that, in view of the IUGG action, no further action is appropriate by IAMAP. However, since no motion was made to table or modify the proposed recommendation, it was put to the Assembly for a vote by country, with the following result: In favor, 14; Opposed, 2. The motion was declared adopted.

3. Resolutions of Thanks. Resolutions of thanks were proposed to Dr. John Gregory and the Ad Hoc IAGA/IAMAP Joint Body for their work in preparations of the Seattle Joint Assembly and to the conveners of the Joint Symposia, and to the AGU and the University of Washington for their work in planning and supporting the Assembly. The resolutions were adopted by acclaim.

President Junge closed the meeting with a proposal of thanks to all those who had worked to make the Assembly a success, those mentioned above, the local staff, the conveners of the IAMAP sessions, and the General Secretary. The statement of thanks was adopted by acclaim.

## C. RESOLUTIONS ADOPTED BY IAMAP AT THE EXTRAORDINARY GENERAL ASSEMBLY

### 1. On the World Network of Dobson Spectrophotometers

The International Ozone Commission noting with appreciation

(1) the strong support given by WMO to the modernization and recalibration of several instruments (notably No. 50 (Reykjavik) and Nos. 8, 14, and 56 (Norway), and the work done on these instruments by the National Oceanic and Atmospheric Administration of the USA under the direction of Mr. W. Komhyr,

(2) the organization by WMO of an intercomparison at Boulder, Colorado, in August 1977, during which almost all those instruments designated as secondary reference instruments by the Commission at Dresden in 1976 were overhauled and compared with the primary reference instrument (No. 83, USA),

(3) the work of Mr. W. Komhyr in convening and conducting the intercomparison and the excellent facilities made available by NOAA, and

(4) the work of the National Aeronautics and Space Administration of the USA in processing the data from the Backscattered Ultraviolet (BUV) Experiment on Nimbus 4 and other satellites

### recommends

(1) that the users of secondary reference instruments now take urgent action to ensure the highest possible performance of the instruments in



their area and to arrange the necessary intercomparisons in cooperation with WMO and the Commission,

(2) that the results of intercomparisons of individual stations with the BUV experiment should be sent when available to the countries concerned through WMO, together with a summary of the statistical results for all Dobson stations for comparison.

#### 1. Sur le réseau mondial de spectrophotomètres Dobson

La commission internationale d'ozone prenant en considération et appréciant:

(1) le support vigoureux accordé par l'O.M.M. à la modernisation et recalibration de plusieurs instruments (notamment le n° 50 de Reykjavik et les n° 8, 14 et 56 de Norvège) et le travail fait sur ces instruments par la "National Oceanic and Atmospheric Administration" des Etats-Unis sous la direction de Mr. W. Komhyr,

(2) l'organisation par l'O.M.M. d'une intercomparaison à Boulder (Colorado) en aout 1977, durant laquelle la plupart de tous les instruments désignés comme des instruments de référence secondaire par la Commission à Dresde en 1976 étaient vérifiés minutieusement et comparés avec l'instrument de référence primaire (n° 83, Etats-Unis),

(3) le travail de Mr. W. Komhyr en convoquant et organisant l'intercomparaison ainsi que les excellentes facilités mises à la disposition par NOAA, et

(4) le travail de la "National Aeronautics and Space Administration" des Etats-Unis en traitant les données de l'expérience de l'Ultraviolet rétrodiffusé (BUV) sur Nimbus 4 et sur d'autres satellites

#### recommande

(1) que les utilisateurs des instruments de référence secondaire entreprennent maintenant une action urgente pour assurer des performances aussi hautes que possibles à leurs instruments dans leur domaine, et organiser les intercomparaisons nécessaires en coopération avec l'O.M.M. et avec la Commission,

(2) que les résultats des intercomparaisons des stations individuelles avec l'expérience BUV soient envoyés dès qu'ils sont disponibles aux pays concernés à travers l'O.M.M. en même temps qu'un résumé des résultats statistiques de toutes les stations Dobson pour comparaison.

#### 2. On Measurement of the Vertical Distribution of Ozone

The International Ozone Commission noting

(1) the importance of balloonsonde measurements in the WMO Global Ozone Research and Monitoring Project,

(2) with appreciation the plans made by WMO and the Meteorological Service of the Federal Republic of Germany for an intercomparison of electrochemical balloonsondes at Hohenpeissenberg in April 1978,

(3) the value of rocketsondes in measuring the upper part of the distribution