

Report of the 9th Session of the SPARC Scientific Steering Group

Honolulu, Hawaii, USA, December 4-7, 2001

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This ninth session of the SPARC Scientific Steering Group (SSG) was held in Honolulu, Hawaii, thanks to the kind invitation of Kevin Hamilton. The session was opened by the co-chairs M. Geller and A. O'Neill who both pointed out in their preliminary comments the fact that SPARC was at a turning point and should move forward with the integration of activities as discussed at last year's SSG. They mentioned the present situation with IGAC in preparing a new phase and the close relationship that might develop between the two projects during this phase change. A. O'Neill remarked that the chemistry/climate issue was not yet prominent in either the SPARC or IGAC programs, whereas the subject was going to be a priority issue in the following years.

After the logistical and practical information given by K. Hamilton, the meeting started by a review of the



Participants of the SSG in Honolulu.

First row: K. Hamilton, M. Geller, A. O'Neill, M.-L. Chanin

Second row: M. Shiotani, V. Ramaswamy, P. Udelhofen, R. Vincent, Ph. deCola, V. Yushkov, J. Gille.

Third row: T. Peter, W. Randel, L. Thomasson, M. Baldwin, A.R. Ravishankara, C. Michaut, U. Schmidt, M. Proffitt, R. Newson, D. Karoly, Y. Koshelkov, T. Shepherd, S. Pawson.



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main events which took place in the last year, in particular the meeting of the WCRP Joint Scientific Committee (JSC), that took place in Boulder, USA, in March 2001. During the JSC the SPARC co-chairs, M.-L. Chanin and M. Geller made presentations of the SPARC programme, including the results from the SSG meeting in Buenos Aires, some of the discussion on SPARC future and a summary of recent results relating to solar effects on climate.

According to R. Newson, the JSC thought SPARC was going well. He noted that there were good working relationships between GRIPS and the WGNE, and that SPARC was playing an important role to achieve a closer cooperation between WCRP and IGBP. Therefore the JSC did endorse the idea of a joint SPARC/IGAC Planning Group for the future. The JSC also asked S. Solomon and G. Brasseur to initiate discussions meant to look into a future chemistry/climate project. They also thought it would be good to look into the possibility of an AO/NAO workshop that might involve ACSYS/CLIC, CLIVAR, and SPARC. The JSC did support the SPARC suggestion of a joint SCOSTEP/SPARC Working Group to assess upper atmosphere temperature trends. They did not support the idea of a joint WCRP/SCOSTEP Working Group to assess the role of the sun in climate change. They did, however, ask GEWEX to look into the cloud data sets that have been used recently to indicate solar effects on cloud cover and to comment on the use of those data sets to conclude the existence of solar effects on cloud cover.

Modelling stratospheric effects on climate

Intercomparison of stratospheric models

The progress report of GRIPS ("GCM Reality Intercomparison Project for SPARC") was given by S. Pawson. After the important activity leading to the publications of the first GRIPS results in 2000 (BAMS and JGR), it was recognized that GRIPS had grown considerably both in the number of groups involved and the range of tasks being tackled. A complete discussion of the ongoing activities took place during the GRIPS workshop, which was held in March 2001 in Hamburg, Germany. The state of achievement varies for the different tasks, while

some tasks of phase 1 (model intercomparison) are completed (basic climatology, travelling waves/tides, spatial spectra), others are ongoing, and some are stagnating. Within task 2 (parameterisations/impacts), the test of radiation schemes is in progress and will facilitate moving forward with the gravity wave (GW) drag parameterisation, while the study of model response to mesospheric drag is completed. Activities related to phase 3 (forcing by changes in aerosols, ozone, solar radiation, CO₂), are being tackled by a few groups, some of them in connection with the European projects SOLICE and EuroSPICE. One of the main challenges of GRIPS this year should be to address the reasons for the divergence between different predictions of evolution of the Arctic, as a contribution to the upcoming WMO-UNEP Ozone Assessment.

It was agreed that the development of phase 3 should be discussed in relationship with the integration of models/data activities within SPARC, as well as the integration of the troposphere/stratosphere coupling issue. The primary goal of GRIPS is to ensure that the coupled models have a good stratosphere model, which implies a close cooperation with WGCM.

The project for 2002 is to hold a new workshop in March 13-17 at Tsukuba, Japan, to wrap up phase 1 (which should be near completion at that time) and to review phase 2 with the aim to complete it in 2003.

Following an invitation by the co-chairs, S. Yoden made a presentation of the Japanese Frontier Project. One of his purposes was to investigate a possible cooperation between SPARC and the Earth Simulator modelling activities, for example on the atmospheric chemistry/climate issue. It was suggested that a presentation on this subject should be made at the next JSC meeting and at the future GRIPS workshop to develop the ideas further.

Stratospheric reference climatology

W. Randel presented the recent inputs into the technical report "SPARC Intercomparison of Middle Atmosphere Climatologies" to be published as a SPARC Report in mid 2002. They mainly consist of the inclusion of rocketsonde and lidar data into the data intercomparisons, which allowed the extension of the climatology of temperature and winds up to the middle mesosphere. He presented their comparison with global satellite data and

indicated the difficulties due to the scarcity of sites and the non-simultaneity of the data sets, most of the rocket series having been discontinued. A group meeting took place in Boulder in September 2001 to complete the report and in particular to identify the biases in each data set, to identify the quantities, which have high uncertainty, and to discuss the strategies for comparison with models. The question was discussed whether or not to include ERA40 from ECMWF into the data intercomparison with the consequence of postponing the publication of the report. It was decided to try to finish the report before spring, and include the ERA40 data only if available.

SPARC data assimilation

The new working group on SPARC data assimilation has now been constituted under the acting chairmanship of A. O'Neill, who presented the project. The goal of the project is to exploit the technique of data assimilation to provide quality-controlled, internally consistent global data sets of the dynamical and chemical state of the stratosphere (as well as, where possible, the upper troposphere and mesosphere). The data sets will be targeted at SPARC-related activities to understand chemical-climate interactions. The initial focus will be on exploitation of research satellite data from the ENVISAT and EOS AURA satellites. Additional outputs from the project will be error statistics relevant to utilization/validation of instruments and to evaluation of numerical models.

Specific activities will include:

- Comparison of global data sets produced by participating groups,
- Development of documentation at the SPARC Data Centre on data production methods and data quality,
- Workshops to improve data assimilation methodology for the stratosphere (e.g. to assimilate new variables such as aerosols amounts),
- Liaison with WGNE,
- The project will also produce reports on specific aspects of the data sets of topical interest (e.g. stratospheric water vapour and its evolution).

The SPARC working group will foster collaboration and information exchange. Its first meeting took place at the AGU, held in San Francisco the week following the SSG. A working group meeting, to be held at the Data Assimilation Office, Goddard Space Flight Center, is being arranged for June 2002.

Long-term changes in the stratosphere

Stratospheric temperature trends

The summary of the first phase, which covered the period 1979-1994, was published in *Reviews of Geophysics* in February 2001, and the results were used in IPCC/TAR 2001. The full account of the work is also in preparation as a SPARC Report to be edited by NOAA and SPARC in 2002.

V. Ramaswamy presented the update of the annual-mean trend for the period 1979-2000 (see the report in this issue). It confirmed nicely the conclusions published earlier of a general cooling of the stratosphere, but the significance has been much improved. These results will be a contribution to WMO-UNEP Report 2002. He also mentioned new corrections in homogeneities in radiosonde records and new trend results obtained from rocket data. The more recent comparisons between the observed trend and the simulation by models taking into account updated knowledge of the trends in species (ozone and CO₂) changes indicate a reasonable agreement up to 0.5 hPa. The priority should now be to look at the variability both observed and simulated and its implications for trends.

The SPARC/SCOSTEP project of assessing the mesospheric trends was discussed during the IAGA workshop held in Prague in July 2001, which was co-sponsored by SPARC (see report in this issue) and its output was commented by V. Ramaswamy and M.-L. Chanin who attended the workshop, as well as by M. Geller. They greeted with pleasure the proposal by F.-J. Lübken to organise the next workshop on this issue to be held in Kùlungborn, Germany in May 2002, and the SSG provided suggestions of a few extra names of participants and offered the experience gained in the 3 successive assessments led by SPARC, to ensure that such a work lead soon to a thorough assessment of the mesospheric temperature trends. M. Baldwin agreed to be the SPARC Chair in this working group.

Understanding ozone trends

N. Harris, unable to attend, had sent a report on the activities of the group during the year. It was mainly related to the SPARC/IOC workshop on Understanding Ozone Trends which was held at the University of Maryland, March 7-9, 2001, in preparation for the WMO-UNEP Ozone Assessment 2002.

The main aims of the workshop were to identify the major current issues concerning ozone trends, to improve quantification of the contributions and uncertainties of the chemical and dynamical mechanisms to observed ozone trends, particularly at mid-latitudes and to identify how to assess the consistency of these proposed contributions. The main emphasis was on the dynamical influence on the ozone trends. W. Randel, lead author of Chapter 4 - Global Ozone, presented the current state of the chapter. T. Shepherd and N. Harris are jointly preparing the chapter on the influence of dynamics on the 'observed' trend. T. Shepherd commented on the difficulty to identify separate dynamical forcings in terms of an ozone response. They decided to organise a comparison of the statistical analyses including dynamical factors so that they can be compared for certain baseline periods and it was suggested that this comparison be considered as a SPARC activity.

To move forward on the issue of Arctic ozone, a workshop on Arctic Ozone Loss will be held at the Alfred Wegener Institute in Potsdam, Germany from March 4-6, 2002.

T. Peter presented the European report on THESEO entitled "European Research in the Stratosphere 1996-2000" (see review in this issue). He also provided news about the Geophysica Project for which 5 proposals have been accepted for support by the European Commission, including TROCCINOX on tropical deep convection and its influence of NO_x, and EUPLEX dealing with PSCs and Lee Wave detection. This was seen as very encouraging for SPARC related activities and a letter indicating this will be sent to the EC by the co-chairs.

Stratospheric and upper tropospheric water vapour

The Water Vapour Assessment, SPARC Report N° 2, 2000 (and WCRP-113, and WMO-TD-N° 1043), which investigated the concentration, distribution, variability and trends of water vapour in the stratosphere and upper troposphere, has been very well received by the community. 400 copies have been distributed and more copies are requested regularly at the SPARC Office, as well as many requests to use figures from the report. The results have been presented widely during different meetings and they are now being used as background material by the community. SPRINGER has offered to publish it as a book and the question is under study.

SPARC Aerosol Assessment

This new project entitled "Assessment of Stratospheric Aerosol Properties" (ASAP) is being led by L. Thomason and T. Peter. Its status was presented at the SSG by L. Thomason.

It is recognized that aerosol in the upper troposphere/lower stratosphere (UT/LS) can have a significant impact on climate through radiative effects and on stratospheric chemistry, particularly impacting ozone. The magnitude of these effects is also highly variable and, as a result, can complicate isolating human-derived changes in the stratosphere. Accounting for aerosol effects properly is a key component of modelling climate/chemistry effects properly.

The goal of this new SPARC initiative is to evaluate the scientific understanding of UT/LS aerosol and aerosol measurements. The assessment was initiated with a workshop in Paris, France on November 4-6, 2001. The questions to be addressed in this work and how they will be tackled are described in the report from this workshop published in this issue. The goal is to complete the assessment in less than 2 years. The results will be published as a SPARC Report and the data will be available at the SPARC Data Center.

Stratospheric processes

Gravity wave processes and their parameterisation

K. Hamilton reported on a 2-week school held in Trieste, Italy on the "Physics of the Equatorial Atmosphere" (see report in this issue).

R. Vincent announced that results from the H.R. radiosonde initiative extended to the S.H. was presented at IAMAS and that the work should be largely completed in 2002 with the submission of several papers to a special JGR section and the organization of a workshop. K. Hamilton described DAWEX (Darwin Area Wave Experiment). An Intense Observational Period (IOP) was ongoing while the SSG was in session, corresponding to the period when Hector (regular occurrence of intense convection) was occurring almost daily and often reached the stratosphere. He described the instruments involved, showed preliminary results and indicated how it will help in preparing for the larger scale ETCE (Effects of Tropical Convection Experiment) campaign.

R. Vincent and K. Hamilton presented and discussed with the SSG the plans for the next 3 years. The analysis of DAWEX data will likely span 2002-2003. They expect most papers resulting from DAWEX (including an overview paper) to be submitted by the end of 2003. Then the gravity wave initiative should continue to be involved in planning for a much larger field experiment (ETCE) to study effects of Hector convection in 2005 or later.

Future efforts will focus on reviewing existing data and encouraging appropriate new observational and modelling projects to characterise the spectrum of gravity wave momentum fluxes, including its geographical and seasonal dependence and its short-term intermittency. The aim will be to distil the available observational data and limited-area model results to provide as much guidance as possible for the formulation of source specifications and saturation mechanisms for parameterisation schemes. The gravity wave initiative will concentrate on this aspect, while leaving the main focus of gravity wave parameterisation to GRIPS.

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They proposed to initiate two specific activities. First will be a fairly large (about 70 participants) Chapman Conference in late 2003, which would initiate a general discussion of gravity wave parameterisation issues and which could be considered a follow up to the 1996 NATO meeting in Santa Fe. This could possibly be a joint activity with GRIPS, and second to hold a much smaller workshop in 2004 similar in scope and spirit to the 1998 La Jolla workshop on the QBO. This workshop would be focussed on producing a critical review/assessment of our knowledge of the gravity wave spectrum and the implications for practical parameterisation. The "deliverable" would be a refereed journal article.

Lower stratospheric/ upper tropospheric processes

This project concerns the transition region between the troposphere and stratosphere. The separation in time and space of chemical, radiative and dynamical processes in this region is not feasible as they are all strongly coupled. This region's key features are very low temperatures, high gradients and variability of water vapour, ozone and other species. Understanding the processes involving these species is of high priority for both understanding

climate and long-term changes in ozone. By an integrated approach this project looks at the processes that occur within and the interactions between the UT and the LS.

The main highlights in SPARC activities on this issue have been the publication of the review paper on "Atmospheric chemistry of small organic peroxy radicals" (Tyndall *et al.*, JGR, 106, D11, 12157-12182, 2001, see also report in Newsletter N° 15), the organisation of 2 workshops on Atmospheric Chemistry and the SPARC Tropopause Workshop.

A.R. Ravishankara, mentioned that the Tyndall *et al.* paper is being used for the NASA/JPL evaluation and will be used for the IUPAC data evaluations, thanks to the help of the SPARC Data Centre. Workshops were also held in the framework of joint SPARC-IGAC activities on chemical processes in the UT/LS, at the University of Heidelberg in March 2001 (see report in this issue) on Nitrogen oxides in the LS and UT, and at Breckenridge, Co, USA on laboratory studies of UT/LS processes, in July 2001 (the report will be published in Newsletter N°19).

T. Shepherd reported on the workshop, which took place in Bad Toelz, Germany, in April 17-21, 2001, and which was organised under his leadership together with P. Haynes, (see report in SPARC Newsletter N° 17). As already mentioned in this early report, the workshop gave the opportunity for intense debates on this very important region of interface between the stratosphere and the troposphere and help formulating key questions on the issue of chemistry/climate interactions. A review paper is being prepared which should be useful in defining further research that should feed into the SPARC/IGAC chemistry-climate activity.

Other scientific issues

Dynamical coupling of the stratosphere and troposphere

An update on recent developments on this issue was given by M. Baldwin and A. O'Neill. The apparent coupling between the stratosphere and the troposphere, as indicated by correlations in time series of the so-called Arctic Oscillation (AO), remains a subject of considerable interest and debate. By selecting time series of AO amplitudes after strong stratospheric warmings, M. Baldwin has shown evidence of

apparent downward propagation of anomalies from the stratosphere to the troposphere, implying that knowledge of the state of the AO in the stratosphere could increase predictive skill for the troposphere. A. O'Neill showed results (derived by A. Gregory) that give a measure of support to this suggestions. The potential improvement in predictive skill was shown, however, to be small though statistically significant. It seems likely that very strong events dominate the statistical results, and ensemble modelling experiments are needed to understand causal connections and mechanisms.

The clarification of stratosphere-troposphere links exhibited by variability in the AO signal will be a major focus of research for SPARC, in collaboration with other projects of WCRP.

A presentation of SOWER (Soundings of Ozone and Water in the Equatorial/Pacific Mission) results was given by M. Shiotani. The project has been strongly encouraged by SPARC since its beginning; it took place in San Cristobal-Galapagos, from 1998 to 2000. Besides presenting very interesting results, M. Shiotani raised the question of the possibility for upper air observations of San Cristobal as one of the GUAN stations being shut down in the near future and the SPARC SSG approved a letter to be written urging that station operations be continued at San Cristobal.

Chemistry-Climate interaction

Much of the IGAC and SPARC research agendas have their ultimate application in understanding chemistry-climate interactions. For instance, a central problem in stratospheric-climate interactions is to predict how polar stratospheric ozone will evolve in the future, taking account of increasing greenhouse gas concentrations together with decreasing "effective chlorine" resulting from the actions of the Montreal Protocol and its subsequent amendments. Substantial differences exist in present model predictions probably resulting from differing planetary wave transports in the future stratosphere.

In the troposphere, a central problem is to model the future greenhouse warming from troposphere ozone, methane, etc. In reality, of course, predicting how the future vertical structure of atmospheric ozone from the troposphere through the stratosphere is desired. Another problem is to predict how the changing atmosphere

might lead to changing upper troposphere-stratosphere water vapour concentrations. This will feed back on troposphere-stratosphere chemistry, which in turn will affect tropospheric climate. Cloud microphysics in the UT/LS is also a key issue, as it plays an important role in radiative forcing of the troposphere.

To more effectively attack these chemistry-climate problems will require the active participation of both the IGAC and SPARC communities. As a first step, it is proposed that SPARC and IGAC jointly convene a chemistry-climate workshop with the goal of developing a IGAC/SPARC chemistry-climate research agenda. The hope is that this research agenda can be advanced under the joint auspices of SPARC and IGAC.

Review of overall SPARC strategy and status of implementation

Understanding stratospheric climate change

The proposal of a new integrated SPARC initiative, with a view towards "Understanding Stratospheric Climate Change (1979-1998)", was discussed at length during the 2000 SSG meeting, under the leadership of V. Ramaswamy. The implementation was discussed further at the 2001 SSG.

The activity foreseen for SPARC in the future will aim to understand the observed stratospheric trends of temperature, ozone and water vapour, and solar effects, through modelling studies. These would be particularly aimed at elucidating UT/LS variability and its role in the overall climate system by building on the modelling work carried out in the stratospheric temperature trends study and GRIPS. New SPARC initiatives on stratospheric data assimilation are being undertaken. Within this framework, the main priority for SPARC is to continue to facilitate research on stratospheric processes and their role in climate by providing a forum or umbrella for international co-operation and encouraging inter-disciplinary exchanges. With the availability now of a sizeable body of information on the parameters of relevance describing stratospheric changes over the last two decades, it is appropriate to ask the following scientific questions:

- Are the different observed variations providing a consistent picture of stratospheric climate variations, including

the possibility of a trend over the past two decades, upon which shorter time scale variations are superposed?

- Can model simulations, employing the known forcings that have acted upon the system over the past two decades, be used in conjunction with the observed data to reproduce the changes in the observed parameters, and thereby lead to identification of the causes of these changes?

- Do conditions and processes in the stratosphere have an effect on tropospheric climate down to the surface?

The principal motivation arises from the fact that, over the period from the late 1970s to 2000, a number of changes, some dramatic, have been witnessed in the stratospheric climate: changes in ozone that are not the same from one decade to the next; aerosols from two volcanic eruptions perturbing the chemical and radiative budgets; water vapour data that indicate changes of various sorts depending on the times considered; pronounced temperature changes but with varying trends over the low and the middle and high latitudes, punctuated by sharp transient warmings in the aftermath of the volcanic eruptions; solar irradiance changes conforming to the 11-year cycle variations; variations in stratospheric circulation; and climate changes in the Arctic and Antarctic stratospheres especially during the winter-spring seasons.

Additional motivation arises from the fact that the coupling of the stratospheric and tropospheric climatic states is gathering increasing interest. The possibility that the tropospheric modes of variability may be related to stratospheric ones, and vice versa, is of considerable significance for climate change in the overall Earth system.

Thus, a SPARC-centred focus on understanding stratospheric change could have a direct bearing on changes from the upper troposphere down to the surface. The answers to these questions would also constitute useful inputs to the IPCC and WMO assessments. SPARC is uniquely placed to tackle the questions.

Interactions with other programmes and activities

SPARC maintains strong links and/or interacts widely as appropriate and necessary with several other projects of WCRP (WGNE, WGCM) and IGBP (IGAC). It was however noted that more cooperation should be established with CLIVAR and ACSYS, mostly

on the Arctic Oscillation. Particularly noteworthy is the joint SPARC-IGAC activity on UT/LS chemical processes which has been the best example of cooperation up to now. The proposed joint action on Chemistry-Climate interaction, which is going to be discussed further at the IGAC planning meeting in January 2002, should lead to an enlarged overlap between the two projects.

Reference was also made to the collaboration with SCOSTEP on upper stratospheric temperature trends and on the issue of solar influence on climate. The joint SPARC/SCOSTEP working group on the first issue will start its activity at the K lungsborn meeting in May 2002.

J. Gille presented the plans for the next COSPAR Scientific Assembly to be held in Houston, Texas, USA in October 2002 and where several sessions will be closely related to SPARC (see announcement in this issue).

M.-L. Chanin informed the SSG that the project IGACO (Integrated Global Atmospheric Chemistry Observations) was finally accepted by IGOS (Integrated Global Observing Strategy). This will be the opportunity to create an intellectual framework for integrated research in tropospheric and stratospheric chemistry. A committee under the chairmanship of G. Brasseur has been put in place and met for the first time in November in Geneva, Switzerland. The write up of IGACO will be largely based, at least for the stratosphere, on the report written for the WMO/CEOS Report (WMO N  140) entitled "Strategy for integrating satellite and ground-based observations of ozone".

M. Kurylo, SPARC ex Officio member representing NDSC, was unable to attend but sent his deep regrets and a message describing a possible interaction between NDSC and SPARC. He mostly suggested the publication in Newsletter N  19 of the summary of the NDSC Symposium which was held in Arcachon in September 2001, as well as the publication of a report from a recent workshop on Spectroscopic Needs for Atmospheric Sensing held in San Diego in October 2001. This was accepted without hesitation and the establishment of a closer link between SPARC and NDSC was welcome by the SSG.

The SPARC Data Center

The SPARC Data Center, supported by NASA, operated by P. Udelhofen at the State University of New York at Stony Brook has been continuing

assembling key stratospheric data sets in a readily accessible form. Established in June 1999, the number of data sets is growing rapidly. Several data sets are now online. Reference data sets based on UARS measurements and model analyses are available. High-resolution temperature and wind data from radiosondes, which were purchased from NOAA, are currently available for 1998, but will be augmented in the near future. Solar forcing and historic ozone data have been acquired. Data from the GRIPS model intercomparisons are now available. The Water Vapour Assessment (WAVAS) archive includes H₂O data from ground-based, airborne and satellite instruments.

The new data sets added this year include rocket data and the small organic peroxy radicals data. (<http://www.sparc.sunysb.edu/>).

The SPARC Office

As well as its regular activities (compiling and editing SPARC Newsletters, updating the SPARC mailing list, maintaining contacts with the SPARC community of scientists, organising various SPARC meetings and maintaining the SPARC home page), the SPARC Office had a large production during the year 2001. The SPARC water vapour assessment report was published in February 2001. The Proceedings of the SPARC 2000 General Assembly was produced as a

CD-ROM in March 2001. A new SPARC Brochure and posters were prepared and edited for the Global Change Conference of Amsterdam in July 2001.

Next SSG meeting

S. Yoden invited the SSG to meet in Kyoto, Japan in November 18-21, 2002, the week following the international symposium on "Stratospheric variations and climate" which will be held in Fukuoka, in November 12-15, 2002. The first circular for this symposium can be found on the WEB page: <http://fx.geo.kyushu-u.ac.jp/IntSympo/1st.html>. The invitation for both the SSG and the symposium was welcomed unanimously.

Next SPARC General Assembly

Five invitations had been received to hold the next SPARC General Assembly in 2004. The invitations came from:

- Dr Gufran Beig, for a General Assembly to be held in Pune, India.
- Dr Brian Connor, for a General Assembly to be held in Queenstown, New Zealand.
- Pr Daren Lu, for a General Assembly to be held in Beijing, China.
- Pr Norman McFarlane, for a General Assembly to be held in Victoria (BC), Canada.
- Dr Eugene Rozanov, for a General Assembly to be held in Davos, Switzerland.

The SSG was very impressed by such a manifestation of interest and there was considerable debate before making the final decision. The choice was motivated by the strong interest for SPARC to work more closely with the climate modelling community at a time when the stratospheric models are being implemented in the Climate GCM's. That led to the enthusiastic acceptance of the invitation from the Canadian Centre for Climate Modelling and Analysis (CCCma) of the University of Victoria, and to hold the General Assembly in Victoria, British Columbia, Canada. The date of the General Assembly is now fixed in July 19-23, 2004.

Announcement

A New Journal: Atmospheric Chemistry and Physics

Atmospheric Chemistry and Physics (ACP) is dedicated to the publication and discussion of studies of the atmosphere and the underlying chemical and physical processes. It is published by the European Geophysical Society, with an international Editorial and Advisory Board.

An innovative two-stage publication process ensures rapid peer-reviewed publication of papers, initially on the Atmospheric Chemistry and Physics Discussions (ACPD) web site. To foster scientific discussion, reviewer comments, short comments by other interested parties, and author replies appear alongside the original paper. Fully revised papers are published in ACP in both on-line and print versions.

On-line registration and subscription to ACP is free. It is financed on a non-profit basis by modest page charges. Colour graphics, supplementary material, and animations can be included at no extra cost.

ACP has been launched on 3 September 2001. To submit, view, or comment on papers, and for further information, please visit the web site: <http://www.atmos-chem-phys.org>.