

AOPC-IX: CONSOLIDATED LIST OF CONCLUSIONS, RECOMMENDATIONS AND ACTION ITEMS

(Asheville, USA, 23-27 June 2003)

1. The AOPC concurred with the desirability expressed by the UNFCCC/SBSTA for close cooperation between GCOS and IPCC in defining and implementing the observing systems needed to meet the needs of the UNFCCC. The Panel agreed that it would continue and enhance such cooperation in appropriate areas, including coordination in the development of a GCOS Implementation Plan with the IPCC activities leading to its Fourth Assessment Report.
2. The AOPC reiterated the crucial role played by the World Data Centres in assembling and making available to all users, on a free and open basis, the data from GCOS networks. It also emphasized the importance of the complementary role of international analysis centres, such as GPCC, in developing and making available needed products from data which might have restrictions on their distribution in original form.
3. The AOPC noted that the GSN Archive (WDC-Asheville) does not have historical (monthly and daily) data from many stations in the GSN, and that where data have been provided, the record length is often quite short. The Panel requested the archive to assess and document the availability of data from each of the GSN stations to assist the relevant CBS Lead Centre for GCOS Data (NCDC) in approaching countries to obtain the missing data. It noted that there are several possible causes for the unavailability of the historical data, including the fact that many of these data are recorded only in paper form at the source and hence cannot be transmitted electronically. The AOPC requested the CBS Lead Centre (NCDC) to determine the extent to which non-digitization is the limiting factor in the availability of GSN data in the WDC, with a view to having the Panel seek funding for an international project to recover, digitize and analyze such historical data.
4. The AOPC requested that the GSN Archive (WDC-Asheville) and Analysis Centre (NCDC) review the scope and performance of the World Data Centres in relation to variables of interest to the Panel with a view to identifying any problems or shortcomings, and to recommend whether ICSU should be approached on any of these issues.
5. The AOPC noted the request from the Chairman of the GCOS Steering Committee (SC) for concrete and clear examples of data exchange problems which could be provided to SBSTA, and that such examples would be available from the analysis in Item 3. above and from the routine analyses of the GCOS Monitoring Centres.
6. The AOPC reviewed and approved the atmospheric section of the Technical Supplement to the Second Adequacy Report (i.e. the 'Variables Annex').

Statements of Guidance

7. The AOPC reviewed the draft Statements of Guidance on Monitoring Climate Variability and Monitoring Climate Change. It requested that the Secretariat send them to the other GCOS Panels, representatives of CBS, CCI, WCRP and other appropriate individuals for additional review prior to completion of a final version by the AOPC Chairman for presentation to the CBS ET-ODRRGOS at its next session.

AOPC Plan

8. The AOPC approved the latest modifications to the AOPC Implementation Plan for Atmospheric Observations (the 'AOPC Plan') that had been made by the Chairman to ensure consistency with the Second Adequacy Report, and requested the Chairman to solicit review comments from representatives of WCRP, CCI, CBS, the other GCOS

Panels and some specific individuals prior to final completion of the document.

GSN and GUAN

9. The AOPC recognized the large effort being devoted by the GCOS Monitoring Centres (DWD, JMA, Hadley Centre, ECMWF), Analysis Centres (NCDC, Hadley Centre) and Archive (NCDC/WDC-Asheville) in fulfilling their roles, and reiterated its appreciation for their major contributions in support of GCOS. The Panel also expressed its appreciation to JMA and NCDC for their agreement to act as CBS Lead Centres for GCOS Data.
10. The AOPC welcomed the routine reporting of monthly performance results by the GSNMC based on CLIMAT messages received within 21 days following the month in question. It nevertheless noted that such results represented only a snapshot of message reception at a particular time, and that further assessments at later times would be of great benefit to determine the total amount of data eventually available to users. The panel requested that Climate Research Unit (CRU) of the University of East Anglia (UEA), in cooperation with the GSNMCs, carry out an analysis of GSN data reception for 2001 to determine the extent to which the current MC monitoring procedure might be underestimating the amount of data actually being made available from the GSN network. It also requested that the GSN Archive develop comparable statistics based on the total data actually received by the archive.
11. The AOPC reiterated the important role of GSN and (especially) GUAN stations as ground-validation sites for satellite observations and welcomed the interest in this function being expressed by the satellite community. It noted in particular that it might be useful to have supplementary soundings from GUAN stations that would coincide with satellite overpass times.
12. The AOPC reiterated the value of the provision of CLIMAT and CLIMAT TEMP messages from the GSN and GUAN stations, *inter alia* because they provided an additional level of quality assessment of the observations contributing to these reports. It requested station operators to maximize their efforts to develop and provide these reports on a routine and timely basis.
13. The AOPC fully endorsed the activities being carried out to develop a network of high-altitude surface stations in several regions. It noted that such stations might be beneficial for filling gaps in the GSN network, and requested the AGG to review the current composition of the GSN and the plans for the regional high-altitude stations to assess the potential of the latter stations in this regard.
14. The AOPC expressed its appreciation to the USA for its targeted support for implementation of the GCOS networks. It welcomed in particular the establishment of a GCOS Implementation Project Officer position within the GCOS Secretariat, noting that this would help *inter alia* to ensure appropriate coordination with the WWW and the GCOS data centres on implementation issues.
15. The AOPC welcomed the progress being made in identifying performance problems and potential solutions for GUAN stations identified as especially high priority by the AGG. It emphasized the importance of implementing solutions as soon as possible in collaboration with the WWW and other relevant partners. The Panel requested that these efforts be continued on an urgent basis, noting the need to identify priority actions for the GSN as well as other non-performing GUAN stations.

16. The AOPC noted with appreciation the progress in developing the Web sites for the GUAN Monitoring and Analysis Centres and the various network performance indicators being made openly available through this mechanism. It emphasized the usefulness of information on the time evolution of network performance, as indicated by reception rates over time of both TEMP and CLIMAT TEMP messages. The Panel requested that the centres collaborate in the development and presentation of these and other appropriate products which would clearly demonstrate network performance on a regular basis, including for example time series of the total volume of GCOS data in the WDC archives.
17. The AOPC noted the potentially large, and possibly negative, impacts of anticipated modifications to Vaisala radiosondes on the ability of many GUAN stations to continue regular operations. It urged the AGG to monitor developments in this regard and bring them to the attention of AOPC, WWW/OSY and other entities as appropriate.
18. The AOPC welcomed the proposal by Dian Seidel (NOAA/ARL) to initiate a study into the optimal geographical distribution of a limited, global network of very-high-quality reference upper-air stations in support of GCOS and other climate monitoring objectives. It recommended that such a study include an assessment of the current GUAN target requirement for radiosonde ascents to 5 hPa, as well as the spatial resolution needed for monitoring large-scale trends in the stratosphere. The Panel welcomed and encouraged the continuation of studies on improving radiosonde instrumentation which would support the eventual establishment of such a very-high-quality reference network.
19. The AOPC welcomed the US initiative to carry out a study on the reconciliation of observed temperature trends at the surface with those in the free atmosphere and looked forward to participating in an initial meeting of experts planned for 27-28 October 2003 in Asheville, USA. The Panel agreed to establish an AOPC Working Group on Reconciling Vertical Temperature Trends (WG-VTT) and expressed its appreciation to Tom Karl for agreeing to chair the group. It requested the AOPC Chairman to collaborate with Tom Karl in developing terms of reference and a membership list for the working group.
20. The AOPC reiterated the potential benefits for GCOS station operators of concrete recognition of their contributions to GCOS through operation of their stations. It requested the GCOS Secretariat to pursue the development of such recognition, for example through the awarding of certificates of performance for display at the stations.
21. The AOPC endorsed the recommendations for network composition adjustments and specific implementation activities that had been developed by the AGG during the session and requested that these recommendations be implemented as soon as possible.

GAW Issues

22. The AOPC welcomed the presentation by Jim Butler on CMDL networks for CO₂ and other trace gases and noted that many of the stations enjoyed the long-term institutional support desired for GCOS networks. It requested the Chairman to work with CMDL and other research institutions through GAW to determine the feasibility of developing a GCOS baseline network for CO₂ to monitor key global indices, such as the trend in the meridional gradient of CO₂.
23. The AOPC welcomed the comprehensive presentation by Ellsworth Dutton on the history, status and future plans for the BSRN, and congratulated its organizers for the excellent progress and many successes achieved over the years since its inception. It recognized in particular the important contribution of the BSRN in providing the validation data needed for the satellite-based radiation measurements which were fundamental to the observation of radiative balance on the global scale. The Panel noted that while BSRN was formally regarded as a research network, many of the stations also enjoyed the long-term institutional support desired for GCOS networks and stations. It welcomed the

proposal of the GEWEX Radiation Panel that the ad-hoc BSRN task group exploring the concept of BSRN participation in GCOS continue its activities in light of the discussions at this meeting. The Panel offered its full cooperation in carrying out this activity and looked forward to any proposals which might be developed.

24. The AOPC expressed its appreciation to the Chairman for his successful efforts in increasing the collaboration between the GCOS and GAW communities in the area of greenhouse gas monitoring and radiation measurements. The Panel encouraged the continuation of these efforts, particularly in relation to aerosol monitoring.

Satellite Issues

25. The AOPC noted the activities and plans for the CM-SAF in DWD, including the workshop planned for 2004. It looked forward to cooperating with the organizers in holding the workshop and nominated Phil Arkin to represent the panel in this activity. The Panel requested members to review the questionnaire from the CM-SAF and to provide responses to the GCOS Secretariat by end July 2003.
26. The AOPC expressed its appreciation for the cooperation of CGMS in development of the GCOS Climate Monitoring Principles, which had been formally endorsed through a Resolution of the WMO Congress at its fourteenth session in May, 2003. It noted with satisfaction that CGMS had initiated a number of actions at its thirtieth session which would assist in meeting the objectives of the Principles. The Panel noted in particular the CGMS proposal to organize a workshop on developing an inventory of sensor calibrations and looked forward to participating in this activity as appropriate.
27. The AOPC noted the consolidated list of metadata for satellite parameters proposed by CGMS-XXX and agreed to provide comments on its adequacy for GCOS applications to CGMS-XXXI.
28. The AOPC welcomed efforts by the operational space agencies to incorporate climate requirements into their planning and activities, including archiving of data and metadata and reprocessing of archived data in a globally consistent manner. It noted in particular the progress demonstrated by recent studies of surface albedo and looked forward to the eventual development of operational monitoring products. The Panel looked forward to continuing cooperation with the space agencies in defining and establishing the satellite component of the GCOS baseline networks.
29. The AOPC strongly endorsed the efforts being carried out in GEWEX, in cooperation with I-TOVS and other relevant groups, to develop a consolidated report on needs and capabilities for the measurement of tropospheric water vapour. The Panel looked forward to the results of this effort, noting that the study could provide a strategy for the identification of baseline systems for water vapour.

Marine Issues

30. The AOPC noted with appreciation the availability of time-series on the performance of many of the GCOS ocean observing networks and requested the GCOS Monitoring and Analysis Centres to cooperate in the development of similar products for GSN and GUAN.
31. The AOPC recognized the great value of the information on voluntary observing ships, instrumentation and other metadata published in the WMO Ship Catalogue (WMO Publication #47). It noted the restructuring and updating of this publication currently in progress and encouraged completion of this work and resumption of publication on a regular basis in a timely manner.
32. The AOPC noted with appreciation the organization of a surface pressure workshop by

the Surface Pressure Working Group (WG-SP) in November 2002. It welcomed the progress in development of a global monthly surface pressure data base and the plans for a separate data base of sub-daily observations and looked forward to the comparisons of analyses from these efforts in the future.

33. The AOPC welcomed Gil Compo as a new co-convenor of the WG-SP (along with Rob Allan) and thanked outgoing co-convenor Ed Harrison for his contributions to the WG-SP in that capacity.
34. The AOPC welcomed the progress achieved by the SST/Sea-Ice Working Group (WG SST-SI), as reported by its Chairman, Dick Reynolds. It noted in particular the increasing focus on evaluation of sea-ice products and sea-ice-to-SST conversion algorithms and encouraged the continuation of this work.
35. The AOPC welcomed the assessment of needs for additional surface drifting buoys for improving the accuracy of SST analyses. It reiterated the recommendation that surface pressure sensors be included on buoys deployed in otherwise poorly-sampled regions, especially in the southern oceans, noting the importance of SLP observations for monitoring climate variability and change as well as for improving operational analyses of marine surface conditions. The Panel requested Dick Reynolds and David Parker to develop an AOPC statement of justification for the deployment of SLP sensors on all southern hemisphere drifting buoys.
36. The AOPC noted the clearly-demonstrated need for bias correction for SST data from satellite observations due to instrument decay over time, orbital variations and similar problems.

NCDC Activities

37. The AOPC welcomed the presentations by NCDC staff on their activities in support of the GSN and GUAN Analysis Centres (NCDC and Hadley Centre), the GSN and GUAN Archives (NCDC/WDC-Asheville), and the CBS Lead Centre for GCOS Data (NCDC and JMA). The Panel reiterated its strong appreciation to both NCDC and the staff for these invaluable contributions to GCOS.
38. The AOPC noted that the number of GSN stations for which recent daily data were available in the Integrated Surface Hourly (ISH) database (over 950) considerably exceeded the number for which CLIMAT reports were being received on a regular basis at the GSN Monitoring Centres (typically around 630). The panel requested that the GSN Analysis Centre carry out a study to determine the number of the ISH/GSN stations for which CLIMAT reports could be calculated and compare CLIMAT information determined for a sample of those with that from corresponding CLIMAT messages received at the Monitoring Centres.
39. The AOPC requested that the existing GSN historical database in the GSN Archive (around 380 stations) be extended to include all data available to the archive in addition to those data received in response to direct requests for the data. It requested in particular that the GSN Analysis Centre and Archive collaborate to incorporate data from the Integrated Surface Hourly database into the GSN Archive.
40. The AOPC noted the efforts underway at the GUAN Analysis Centre (NCDC) to update the metadata for all GUAN stations, and encouraged the continuation of this activity in cooperation with the WWW Secretariat and the GUAN Monitoring Centre (ECMWF). It also noted the usefulness in this regard of metadata for all stations in WMO Publication 9, Volume A and similar documents, and recommended that such information be retained whenever updates are made to that document, even in cases when stations are closed.

Re-analysis and Precipitation Products

41. The AOPC noted the progress in developing high-resolution global rainfall analyses at the Global Precipitation Climatology Centre (GPCC) and urged publication and exploitation of the results of this work.
42. The AOPC, reaffirming the great value of re-analysis activities to GCOS objectives and the benefits of international cooperation and collaboration in carrying them out, requested the Chairman and Phil Arkin to pursue the possible establishment of an AOPC coordinating committee focussed on these matters. It also requested them to coordinate contacts with ECMWF regarding the importance of data from the ERA-40 re-analysis and the need to make them available to users in a more cost-effective manner.
43. The AOPC welcomed the US initiative to develop a national programme for ongoing analysis and re-analysis of the climate system, including the workshop focused on this effort planned for August 2003, and requested that it be kept informed of developments in this regard.

Climate Indices

44. The AOPC noted the plans for the fifth Asia-Pacific Network (APN) workshop on monitoring trends in climate extremes (Australia, 2004), as well as plans for similar workshops in other regions such as those being organized under the NOAA/NCDC Climate and Global Change Programme. The Panel welcomed and strongly endorsed these and similar efforts under the START programme, recognizing their major contribution to capacity-building in developing regions as well as the importance of the results themselves.
45. The AOPC welcomed the work being carried out at the Climate Research Unit of UEA on developing regional climate indices for Europe using a subset of the STARDEX indices. It noted the lack of homogeneity in the large majority of the data available for the 20th century as a whole and encouraged the continuation of efforts to resolve these difficulties.
46. The AOPC strongly endorsed the concept of developing a series of standardized GCOS climate indices and making these available through a distributed Web site or equivalent means. It expressed appreciation to Chris Folland (UK Met Office) for leading investigations into this concept and requested that this initiative continue to be pursued in collaboration with other relevant groups, possibly through the organization of a dedicated workshop on the issue.

Other Issues

47. The AOPC welcomed the presentation by Sandy MacDonald on the Global Universal Profiling System (GUPS) and its 'Pacific Plus' component. It noted that there remain significant data gaps in observation of the free atmosphere over the oceans, especially in the south eastern Pacific, and welcomed investigations that could lead to eliminating these gaps.
48. The AOPC welcomed the presentation by Dave Easterling on the Paleoclimatology Branch of NCDC, including its role as the World Data Centre for Paleoclimatology. The Panel encouraged the continuing contribution of paleoclimatic data to the archive from all sources to assist in efforts to reconstruct climatic variation at annual resolution over the last millennium.

49. The AOPC noted the continuing problem in the exchange of snow-depth data in WMO Region II (Asia) in spite of modifications to coding procedures that had been implemented in order to assist in improving the situation. The Panel requested the GCOS and WWW Secretariats to investigate this issue further with a view to overcoming the difficulties involved.
50. The AOPC reconfirmed its support for the convening of a jointly-sponsored (AOPC, CBS, CCI, and possibly others) Implementation Conference focused on the GCOS global baseline networks, particularly GSN and GUAN. It welcomed support offered by Tom Karl and NCDC for the organization of such a conference and requested the Chairman to cooperate with him in the development of a prospectus and plans for such a meeting.
51. The AOPC agreed that the Tenth Session of the panel should be held on 19-23 April 2004 in Geneva, Switzerland.
52. The AOPC expressed its appreciation to the NCDC and its staff for their strong support and kind hospitality in hosting the session.