UNITED NATIONS

UNFCCC Framework Convention on Climate Change

Distr.
GENERAL

FCCC/SBSTA/2003/9
31 March 2003

Original: ENGLISH

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
Eighteenth session
Bonn, 4–13 June 2003
Item 7 of the provisional agenda

RESEARCH AND SYSTEMATIC OBSERVATION

Issues relating to the second report on the adequacy of the global observing system for climate in support of the UNFCCC

Note by the secretariat

Summary

The Subsidiary Body for Scientific and Technological Advice (SBSTA) has been considering the status of the global observing system for climate since it was requested to do so by the fourth session of the Conference of the Parties (COP). As part of this ongoing process, the Global Climate Observing System (GCOS) secretariat has developed a second report on the adequacy of the system. This note introduces the second report on the adequacy of the global observing system for climate in support of the UNFCCC and discusses issues the SBSTA may wish to consider with reference to Articles 4.1 (g) and 5 of the Convention. Possible issues to be addressed include defining long-term needs of the Convention, setting short-term priorities for action, and addressing special needs in developing countries regarding the improvement of the global observing system for climate.

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I. INTRODUCTION

A. Mandate

1. Article 4, paragraph 1 (g), of the Convention states that Parties shall promote and cooperate in systematic observation and development of data archives relating to the climate system. To do so Parties shall, inter alia, support international and intergovernmental programmes aimed at data collection and systematic observation (Article 5).

2. The Subsidiary Body for Scientific and Technological Advice (SBSTA) at its fifteenth session endorsed the preparation by the Global Climate Observing System (GCOS) secretariat of a second report on the adequacy of the global observing system for climate. The SBSTA encouraged the GCOS secretariat to complete the report by the eighteenth session of the SBSTA in order to enable substantive consideration of the report to take place at the ninth session of the Conference of the Parties (COP).

3. At its seventeenth session, the SBSTA requested the secretariat to organize intersessional consultations, immediately before its eighteenth session, on the report under preparation by the GCOS secretariat. These consultations should facilitate the exchange of views on the use of this report, together with the national reports, for identifying gaps and priorities for actions to improve the global observing system for climate. It also requested the secretariat to report on the results of the consultations at its eighteenth session.

B. Scope of the note

4. This note introduces the second report on the adequacy of the global observing system for climate in support of the UNFCCC (hereinafter referred to as second adequacy report) released by the GCOS secretariat with a view to facilitating the consideration of the report by the SBSTA. **It is based on the draft of the second adequacy report made available to Parties on 20 December 2002.**[1] This note also provides background information on GCOS and the related UNFCCC process, and discusses issues relating to the possible use of the second adequacy report by Parties, in particular for identifying priorities for action to improve the global observing system for climate.

C. Possible action by the SBSTA

5. The SBSTA may use the second adequacy report, complemented by this note, together with national reports and regional action plans, to identify gaps in the global observing system for climate as well as priorities for action to fill those gaps, so that the needs of the Convention and of different user communities regarding climate observations can be met.

6. The SBSTA may also consider whether, and if yes, what, additional information is needed in this regard and which organizations should be involved in the related work.

II. BACKGROUND

7. GCOS was established in 1992 and is co-sponsored by the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational,

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[1] Copies of the final version of the second adequacy report will be made available by the GCOS secretariat during the intersessional consultations on the report (scheduled for 1–2 June 2003, immediately before SBSTA 18). Following the review of the draft of the second adequacy report during the GCOS steering committee meeting in April 2003, the final version of the report will also be accessible through the GCOS home page at the following internet address: http://www.wmo.ch/web/gcos/adequacy/Adequacy_Summary.htm.

Scientific and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP), and the International Council for Science (ICSU).

8. The objective of GCOS is to ensure that the observations and information needed to address climate-related issues are obtained and made available to all potential users. To do so it develops a strategy and programmes to provide high-quality climate data and products to meet the needs of the Convention and of the scientific community. The priority tasks of GCOS relating to the needs of the Convention include the earliest possible detection of climate trends and climate change due to human activities, the reduction of the major uncertainties in long-term climate predictions, and the gathering of improved data for impact analyses.[2]

9. GCOS envisages the global observing system for climate consisting of networks for the domains of meteorological/atmospheric observations, terrestrial observations, oceanographic observations, and space-based observations, at national and global levels.

10. The COP at its third session requested the SBSTA, with the assistance of the UNFCCC secretariat and in consultation with the Intergovernmental Panel on Climate Change (IPCC), to consider the adequacy of observational systems and to report on its conclusions to the COP at its fourth session. The SBSTA subsequently invited the organizations participating in the Climate Agenda to develop a comprehensive report and make it available for consideration at its ninth session. Responding to this mandate the GCOS secretariat, on behalf of the organizations participating in the Climate Agenda, submitted to the COP, at its fourth session, "Report on the adequacy of the global climate observing systems" (FCCC/CP/1998/MISC.2, summarized in FCCC/CP/1998/7).

11. The first adequacy report stated, inter alia, that available observations have major deficiencies with respect to climate needs, and therefore observations in many parts of the world are inadequate to meet the needs of the Convention. Recognizing the inadequacies of climate observations, the COP, by its decision 14/CP.4, urged Parties to undertake programmes of systematic observation and requested them to submit the related information.

12. Over several sessions of the SBSTA and the COP (decisions 14/CP.3 and 5/CP.5), a three-tiered approach was developed to analyse and improve the state of the global observing system for climate. This approach consists of:

(a) Regional workshops to develop project proposals (also referred to as regional action plans);

(b) Separate reports on the global observing system for climate as part of national communications by Parties in accordance with the UNFCCC reporting guidelines on that issue;

(c) The preparation by the GCOS secretariat of a second report on the adequacy of the global observing system for climate.

13. When endorsing the preparation of the second adequacy report by GCOS, the SBSTA stressed the importance of achieving an integrated global observing system that would facilitate the identification of observed trends and changes in the global climate system and provide information for key policy decisions. It also invited the GCOS secretariat to take into account relevant decisions of the COP on capacity-building, technology transfer and adaptation, and encouraged the exchange of views on the use

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[2] See also http://www.wmo.ch/web/gcos/gcoshome.htm and document FCCC/SBSTA/2002/INF.15.

of this second adequacy report, together with national reports, for identifying gaps and priorities for actions to improve the global observing system for climate.

III. OVERVIEW ON THE SECOND ADEQUACY REPORT

A. Preparation and review of the report

14. The GCOS secretariat presented an interim report to the SBSTA at its sixteenth session (FCCC/SBSTA/2002/MISC.10), and indicated that the final version of the report would be based on detailed reports and national communications by Parties, would use data and information on operational and research observing systems from all available sources, would draw upon a balanced range of scientific experts to develop the specific analyses and formulate scientific goals for obervations, and would take into account relevant COP decisions. The SBSTA welcomed the involvement of a broad range of experts, including those associated with the IPCC and in particular those from developing countries, in the preparation of the report.

15. Subsequently, scientific experts prepared first drafts of components of the report. These drafts were made available on the GCOS web site for an open review and were presented at several international scientific conferences.

16. The full draft of the second adequacy report, on which this note is based, was made available for review and comments by governments and scientists in December 2002; the final report will be available following the GCOS steering committee in April 2003 (see paragraph 4 above).

B. Structure and content of the report

17. The objective of the second adequacy report is to provide an up-to-date analysis of the adequacy of the global observing system for climate in regard to the needs of the Convention as well as the requirements defined by the IPCC. The main goals of the report are to determine what progress has been made in implementing climate observing networks and systems since the first adequacy report, prepared for COP 4 in 1998; to determine the degree to which the networks meet scientific requirements and conform with associated observing principles; and to assess how well the current systems, together with planned improvements, will meet the needs of the Convention.

18. The draft report has seven chapters and three appendixes:

19. The first two chapters present the political and socio-economic rationale for the systematic observation of the climate system, thereby defining the purpose and scope of the second adequacy report.

20. Chapter 3 describes the scientific basis and rationale for climate observations, and defines six main scientific goals:

(a) To characterize the state of the global climate system and its variability;

(b) To monitor the forcing of the climate system, including both natural and anthropogenic contributions;

(c) To support the attribution of the causes of climate change;

(d) To support the prediction of global climate change;

(e) To project global climate change information down to regional and national scales;

(f) To characterize extreme events important in impact assessment and adaptation, and assess risk and vulnerability.

21. Chapter 4 envisages the strategy for the system to observe the global climate – its types of networks, product and integration linkage, and its implementation strategy. GCOS currently gives priority to the establishment of key baseline networks, selected comprehensive networks, the long-term operation of a number of research networks and a select number of reference networks.

22. Chapter 5 contains analyses of the adequacy of the networks for the scientific goals by domain and on a variable-by-variable basis. This chapter contains a number of findings on each network, and recommendations for terrestrial networks.

23. Chapter 6 examines the adequacy of cross-cutting elements – the adequacy of earth observation satellites, product generation, support for regional studies, historical data sets, data management and stewardship, and planning and implementation. The chapter contains findings and recommendations.

24. Chapter 7 contains a synthesis of the second adequacy report and recommendations for basic actions and for actions to improve the observing systems and networks.

25. The three appendixes list essential climate variables (appendix 1), re-introduce the GCOS climate monitoring principles (appendix 2), and describe in general terms the progress made in addressing the recommendations and findings of the first adequacy report (appendix 3).

C. Important findings and recommendations of the report

26. Overall, the second adequacy report notes that serious deficiencies continue to exist in the global observing system for climate. These limit the ability of the system to meet the needs of the Convention.

27. There have been some improvements of the global observing system for climate, mainly due to satellite measurements, but also a decline of the in-situ atmospheric networks; moreover large parts of the global terrestrial and ocean networks remain to be implemented.

28. The report pinpoints the problems of data exchange and data quality. It recommends that Parties urgently implement the free exchange of data and climate products for the essential climate variables. This requires, inter alia, better accessibility to satellite data in developing countries, the provision of historical data (supporting the needed implementation of integrated climate re-analysis products), and the supply of data to the world data centres. To achieve the needed high quality of data, the GCOS climate monitoring principles should be implemented widely and urgently.

29. Satellite observations are considered essential for atmospheric, terrestrial and oceanographic observations. It is recommended that Parties with space agencies adopt the GCOS climate monitoring principles as operational requirements for climate monitoring and other missions as far as possible.

30. The report exposes a lack of terrestrial observation data that are homogeneous and complementary, and proposes that the Food and Agriculture Organization of the United Nations (FAO), WMO, and others, including UNESCO, establish an international technical commission to manage terrestrial observing systems and their data and products.

31. The report notes that national reports on systematic observation had a positive impact on national and regional planning. It therefore recommends that all Parties adopt active national coordination and planning processes, and proposes that international agencies and the Global Environment Facility (GEF) continue to support those processes on national and regional level, and that Annex I and Non-Annex I Parties include reporting on systematic observation in each cycle of their

national communications. Furthermore, as observations are lacking from least-developed countries and small island developing states, the report suggests that Annex I Parties explore the possibility of supporting climate-observing projects with those countries, as well as with some countries with economies in transition.

32. In general, the report states the need for networks to be improved, with the help of specialized agencies.

IV. DISCUSSION

33. The first adequacy report noted deficiencies in the global climate observing system, thus providing the basis for the first substantial discussion on this issue in the context of the Convention during COP 4. It identified the need for action arising mainly from large gaps in the global meteorological/atmospheric networks, the inadequacy of regional coverage, in particular in developing countries, insufficient quality of observation, and data-exchange problems. During the discussions at COP 4, attention was drawn to a number of regions of the globe, particularly in Africa, Asia and South America, where the quality of atmospheric observations had deteriorated or where observations were no longer being made. The COP expressed concern and noted the need for action to overcome these constraints.

34. Following its consideration of the first adequacy report, the COP, by its decision 5/CP.5, invited GCOS to launch a regional workshop programme to facilitate improvements in global observing systems for climate.

35. Furthermore, separate reporting guidelines were adopted at COP 5. These guidelines request Annex I Parties and invite Non-Annex I Parties to report on their actions regarding the global observing system for climate (and on data exchange), and to conform with the GCOS climate monitoring principles. Furthermore, they request Annex I Parties to provide support for developing countries.

36. In addition, the SBSTA, at its sixteenth session (FCCC/SBSTA/2002/6), noting the interim report by the GCOS secretariat (FCCC/SBSTA/2002/MISC.10), explicitly urged Parties to give priority to the following:

(a) Remedying deficiencies in traditional monitoring systems and taking advantage of the increasing contribution of new and emerging technologies;

(b) Adhering to the climate monitoring principles provided in the UNFCCC guidelines for reporting;

(c) Exchanging data, particularly with international data centres;

(d) Enhancing capacity to access and communicate data and to use them as inputs to decision-making.

37. The second adequacy report comprehensively addresses all observational domains – atmospheric, oceanographic, terrestrial, and space-based – as well as the availability of data and products gained from these networks and the adherence to the climate monitoring principles. The report asserts that these aspects do not meet the needs of the Convention. Therefore Parties need to enhance their efforts to promote and cooperate in systematic observation and development of data archives to achieve compliance with Article 4, paragraph 1 (g) of the Convention.

38. The following remarks and questions are intended to stimulate considerations by the SBSTA on the second adequacy report, in order to define further steps to support improvements of the global observing system for climate.

39. The outcomes from the COP and the SBSTA, recalled above, address the most important needs to improve the global observing systems for climate in general terms. The SBSTA may wish to consider what concrete actions are needed now, based on a clear definition of long-term needs of the Convention and on the setting of short-term priorities concerning the support of systematic observation and networks, in particular taking into account the needs in developing countries.

What are the long-term needs of the Convention?

40. The second adequacy report could help to ensure that the future global observing system for climate will meet the needs of the Convention. However, Parties to the Convention have never identified the uses to be made of such a system, and in particular what should be given priority. Heretofore, other institutions such as the WMO, IOC, ICSU and the International Geosphere–Biosphere Programme (IGBP) have identified various scientific needs. The SBSTA may consider, if, and how, diverse scientific communities (such as the global climate modelling community) and impact assessment groups could be brought together with the observational community to identify the needs of the Convention in more detail. This could provide a platform to discuss subjects such as requirements for global climate modelling and impact analysis. The SBSTA may wish to determine if a process is needed to define the needs of the Convention more specifically.

What are the short-term priorities and how can they be determined?

41. The financial resources of Parties will not allow all scientific needs in all domains of the global observing system for climate to be addressed at once. So the SBSTA will need to focus on a limited number of issues.

42. What framework might the SBSTA use to address short-term priorities? In this regard, the SBSTA may wish to leave consideration of the oceanographic, terrestrial and space-based domains to the longer-term process noted above, although they are highly relevant and important to a comprehensive global observing system. A further basis for a discussion of priorities could be the scientific goals identified in the second adequacy report and referred to in paragraph 20 above.

43. Alternatively, Parties may wish to identify a few critical questions that an atmospheric observational system should contribute to answering, for example:

(a) What is the state of the global climate system and how has it changed over the past 100–150 years?

(b) Is the climate-relevant chemical composition of the atmosphere changing and if so, how and why?

(c) How can changes in the atmospheric composition and related forcings of the climate system affect global and regional climate?

44. Parties may also wish to give consideration to a few criteria that might affect a priority-setting process, such as cost-effectiveness, technical feasibility and political acceptability. For example, the compilation and sharing of historical data could be a very cost-effective way to respond to the scientific goal of giving support to the attribution of courses of climate change, in particular. The WMO and other organizations have historically encouraged the exchange of data, but the SBSTA may wish to consider whether there are any specific actions the COP might wish to take.

45. If the SBSTA decides to address the short-term priority needs, it may also wish to consider how to monitor whether actions have been taken in response to any decisions. This could be done through national communications or further reports by the GCOS secretariat.

How can the special needs in developing countries be addressed?

46. The second adequacy report ascertains that most of the high-priority deficiencies of the global observing system for climate are in developing countries. It states that the deficiencies in atmospheric observing networks are greatest in Africa and Latin America. However, it provides no information on the cost of fixing these deficiencies. Some developing countries, particularly the least developed countries, may not have the resources to address those deficiencies.

47. Acknowledging this, the SBSTA may wish to give special attention to deficiencies in developing countries and identify the special needs of developing countries and how they should be addressed most efficiently. This could, for instance, include consideration of whether and how the long-term operation of key stations in developing countries could be supported. In this regard the SBSTA may wish to recall that the GCOS secretariat, in consultation with the GEF and relevant regional and international bodies, has started a regional workshop programme to identify needs and prepare project proposals. The SBSTA may wish to ask how well this process is working. The SBSTA may also wish to draw the attention of the Subsidiary Body for Implementation (SBI) to the need to support, through the GEF, the above-mentioned project proposals, provided that those projects conform exclusively with the priorities identified by Parties following their consideration of the second adequacy report. Additionally, the SBSTA may wish to consider other possibilities for financing.

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