

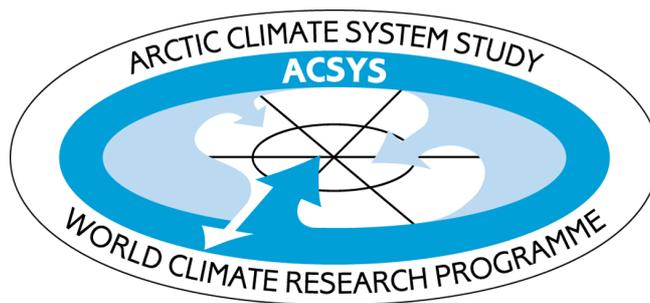
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ARCTIC CLIMATE SYSTEM STUDY (ACSYS)



Report of the Third Session of the ACSYS Data Management and Information Panel (DMIP-3)

(Boulder, CO, USA, 30 May – 02 June 2000)

September 2000

IACPO Informal Report No. 6

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Executive Summary

- (A) The Panel views its major role as providing services in data and information management for ACSYS and CliC. In this regard, the development of Data and Information Management plans separately for ACSYS and CliC are recognized as priority of the panel. This has been deferred since the last meeting given the evolving role and structure of CliC. During the meeting, the panel developed a draft data management and information strategy for CliC.
- (B) Based on the experience in the development and operation of the ACSYS Data and Information System (ADIS), the panel recommended the establishment of a similar system for CliC, which *may be* named *CLICDIS*.
- (C) The panel recommended a number of actions to ensure the identification and publication of data collected during the ACSYS period 1994 – 2003, including the production of CD-ROM documentation as required. The panel reiterated its role of supporting the activities of the NEG and the OPP and suggested that the NEG should review its data requirements and the justification for the required data to enable DMIP to be more effective in the search for, and the dissemination of, relevant data sets.
- (D) The group members recommended seeking closer links with programmes and projects such as: the Global Energy and Water Cycle Experiment (GEWEX); the Climate Variability and Predictability Programme (CLIVAR); Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), and research projects such as those undertaken in the context of the International Arctic Research Center (IARC)/Frontier Research Fairbanks, Alaska.
- (E) In the light of the changing role of DMIP, the group revised its Terms of Reference. In particular, the role of the panel is perceived as advising on and developing a consistent policy for the flow of information and the identification of relevant data and information for ACSYS and CliC and their dissemination to data users.
- (F) Participants considered suitable ways to mobilize additional resources for the operation of its services. There is serious concern over the lack of core funding for essential activities of DMIP. The panel suggested to ACSYS/CliC SSG, that they review the situation and actively pursue a solution to this important issue.
- (G) The panel nominated James Moore as the new chair of DMIP as Wolfgang Grabs has assumed duty at the WMO-Secretariat. The panel likewise noted the resignation of Markus Harder from the panel as he assumes a new position in the private sector. The panel proposed Christoph Oelke as a member of the panel to replace Markus Harder. Christoph Oelke informed the panel that he will leave the IACPO and take up a new position at the Alfred-Wegener Institute. The group noted that the ADIS web-page can be maintained from Bremerhaven by Christoph Oelke.

1. Opening of the DMIP meeting

- 1.1 The representative of the Joint Office addressed the meeting for Science Support (JOSS) which hosted the meeting. The chair thanked JOSS for the generous assistance in conducting the meeting. With all members of the panel present (see Annex 1), the meeting was formally opened.

2. Purpose and objectives of the meeting

- 1.1 The Chair reported on the expectations of the ACSYS/CLiC SSG for the results of the meeting. In particular, it was expected that the framework for two data management and information plans – one for ACSYS and one for CLiC - would be developed.

In discussing the expected deliverables of the meeting, the group agreed on the following objectives of the meeting:

- The strategy of the ADIS and its role of operation and services to ACSYS are defined.
- The strategic approach of DMIP to serve ACSYS and CLiC is agreed to.
- A review of the coverage of the data requirements, identification of gaps and facilitation of interaction between the groups is undertaken.
- An outline of the CLiC information flow and management plan is prepared.

- 1.1 The group confirmed its view of the previous two meetings that its major role is to provide service for the ACSYS/CLiC science community. In this regard, DMIP has a co-ordination function within the ACSYS/CLiC community.

3. Adoption of the agenda

- 3.1 The group discussed the explanatory memorandum of the meeting and accepted the proposed agenda as shown in Annex 2.

4. Review of actions from DMIP-2

- 4.1 The group agreed to discuss actions of DMIP-2 primarily under the relevant agenda items of the meeting. Participants noted that a draft Data and Information Flow Management Plan should have been completed by December 1999. With continuing developments of the CLiC programme and the need to understand its relation to ACSYS and generic requirements as well as the desire to make best use of the well-developed management plans of other programmes (e.g. CLIVAR), the development of the draft plan was delayed. The group felt, however, that this delay had no negative impact on the actual services delivered to the ACSYS science community.
- 4.2 The group agreed that the status and progress in the development of the ACSYS DMI plan would be presented to the SSG during the first ACSYS/CLiC session in October, 2000.
- 4.3 The representative of the IACPO informed the panel about progress made on the ACSYS Data Information Service (ADIS).
- 4.4 Activities expected of IACPO, amongst them the facilitation of the establishment of closer interactions between scientists, were delayed due to a

shortage of resources and the long-lasting vacancy of the Director's post at IACPO. With the new Director established, participants recommended that he should attend the next meeting of the panel in order to become aware of the needed support.

- 4.5 The meeting was informed that the ACSYS/NEG modelling group has created a detailed table of data requirements, which is very useful for the improvement of ADIS. The group recommended that the ACSYS/NEG group liaises with the OPP with regard to the availability and access to data. The panel further recommended that the NEG data requirements table should be reviewed by NEG and OPP to assess and more clearly justify the data requirements.
- 4.6 The group recommended that the chair of DMIP should contact the chairs of NEG and OPP and inform them about the relevant discussions under this agenda item, in particular the recommendation made by the DMIP under item 4.5 above.
- 4.7 The DMIP will send a questionnaire through IACPO to NEG and OPP scientists with specific questions about their data requirements in order to assist the DMIP to improve the information in ADIS. The draft questionnaire is included in Annex 3.
- 4.8 Participants agreed that a presentation on data management should be made at the next ACSYS/CliC SSG by a representative of DMIP. The presentation would focus on actions, activities and requirements of the DMIP for supporting ACSYS and CliC. In addition, DMIP will request further understanding of needs and requirements from the SSG.

5. Report of the International ACSYS/CliC Project Office (IACPO) on data management issues

- 5.1 The Panel noted with appreciation the work that was done during the period since DMIP-2 by IACPO on the ADIS system. The Panel appreciated the valuable assistance of JOSS in improving the ADIS web pages. The items below relate to the discussions of the group with respect to the issues presented in the report (see Annex 4).
- 5.2 The Panel considered the future organisation of ADIS as a result of the DMIP responsibilities for both ACSYS and CliC. The group recommended to the ACSYS/CliC SSG that the data management and information systems be customised for each project to satisfy the project needs. This would assist the DMIP to assure high visibility of contributed data sets in each of the programmes as appropriate. In this respect there would be the continuation of ADIS (for ACSYS) and the parallel development of the CliC Data Information Service to support CliC. The Panel recognised that there will be a transitional period at the end of ACSYS and that services will continue to be provided to ACSYS users until CliC is fully established.
- 5.3 The group discussed the resource situation of IACPO and agreed that ACSYS and CliC projects will only receive the required management and information services from DMIP if ACSYS and CliC strongly support the panel by encouraging the active participation of all scientists in ACSYS and CliC. The group further agreed that the Panel needs to pro-actively work with the research/science community to identify and obtain required data sets; and to

establish links between persons/institutions contributing and gaining service from ADIS.

- 5.4 The group discussed in detail the question of how best to promote the activities of DMIP and ADIS with the user communities and how to make the service more useful and used more frequently. Participants suggested the use of WCRP information channels to encourage participants and institutions collaborating in WCRP to make use of ADIS. The Panel suggested submitting articles on ADIS to publications such as EOS, Global Change Magazine, and Arctic Info services. The Panel recommended publishing an example of an application of data referred to in ADIS in one of the magazines mentioned above. This would demonstrate the service value of ADIS.
- 5.5 The group discussed at some length the issue of data that is not in the public domain and how active the DMIP should be in encouraging the contribution of such data to ADIS – bringing it both to the public domain and also to the clients of ADIS. Participants agreed that IACPO would have to play a lead role in this activity which needs the active support of all members of the panel as well as OPP and NEG. The group further recognized, that all the above relates also to the development of services in the CliC project.
- 5.6 Participants discussed in detail the usefulness of having a ‘participants only’ area in ADIS. Such a non-public domain in ADIS would have value for accessing data and information for researchers who wish to interact and exchange data and information on-line, thus effectively short-cutting communication delays. The group felt that the earliest point at which data and information should be encouraged to be contributed to ADIS is at the stage of submission of a paper for publication. Group members cited examples where information systems are handled in this way, which is of high attraction to researchers without compromising the need for free and unrestricted access to data and information. Reference is made here also to the discussion of the panel under item 15 of this report.
- 5.7 Reflecting the need to provide timely service, the Panel agreed to support and encourage the exchange of provisional data and information among registered scientists and researchers. The group viewed this as an important step in encouraging the submission of timely data. The Panel recognized that provisional data may not have undergone complete data quality control. Specific details on individual data exchanges were identified as the responsibility of the researchers; ADIS will mainly assist in the identification of data sets and facilitate contacts between researchers. The group agreed that this facilitation role would be adopted on a pilot/trial basis and results would be reported to the SSG.
- 5.8 The group recognized that the ACSYS/CliC SSG had recommended to DMIP that re-analysed data and modelled output be included in ADIS. The group agreed to create a catalogue in ADIS of models and available re-analysed and modelled data sets of active use and relevance to ACSYS/CliC. This listing will include a contact, a brief description and a reference to the publication of model results (including, where possible, a figure as an example or a diagram of model results). The Panel concluded that the submission to DMIP of gridded data sets should be encouraged.
- 5.9 The group noted that the list of available data sets in ADIS is incomplete and stated that it has been quite difficult to get a response from organisations and

scientists to submit information on their data sets. In the light of the discussion reported under item 5.7 above, the group agreed that more relevant data sets need to be identified and contributed to ADIS including, in particular, the contribution of recent and/or informal data sets (see discussion above). Research institutions, as well as individual researchers, need continued encouragement in contributing data and information to ADIS.

- 5.10 The Panel was informed by Vyacheslav Razuvaev, that descriptions of data sets in response to the DMIP questionnaire have been prepared by collaborators of Genrikh Alekseev and will be sent to IACPO for the ADIS web page in the near future. The GCC/EWG Atlas on Polar Meteorology will be distributed in mid-June 2000. (*GCC: Gore/Chernomyrdin Commission; EWG: Environmental Working Group*).
- 5.11 The Panel discussed at length the need for data recovery activities and investigation of difficulties in accessing data sets. The Panel recommended that the SSG should consider the strategic importance of this activity area. DMIP will be kept to be informed on the SSG's view of this issue and suggestions for implementation of this field of activities as a possible function of DMIP.

6. Response of DMIP to recommendations of the ACSYS Meeting on Data and Data Management in Support of Sea-Ice/Ocean Modelling Activities

- 6.1 The Panel decided that a DMIP representative will attend the first ACSYS NEG/Arctic Climate Model Intercomparison Project workshop planned for September 13-15 in Fairbanks, Alaska in order to follow up on these recommendations.

7. Status of the present identification and description of data for ACSYS and CliC

- 7.1 The Panel noted far reaching expectations by research communities for a much expanded description of data sets in ADIS and, in future, in the CliC Data Information Service. The Panel concluded that meeting these expectations is beyond the resources available for the IACPO at this time.
- 7.2 The group recognized that major gaps in current observation programmes have been identified by CliC. The Panel noted the gaps as presented in the CliC document:

These [gaps] include information on sea-ice thickness and ice volume, sea-ice motion in the Southern Ocean, representative mass balance data for mountain glaciers and ice caps, altimetry data and mass balance data for the Greenland and Antarctic ice sheets. Comprehensive data are also lacking on the distribution of global snow depth and snow water equivalent, as well as on fresh-water ice conditions, that can potentially be derived by optimal blending of in-situ and satellite data. Information is also needed on trends in the extent of permafrost and seasonally frozen ground, in active layer thickness and permafrost temperatures. Further identified deficiencies exist in the parameterization of cryospheric processes in climate models and their validation and intercomparison (Climate and Cryosphere (CliC) Project; Science and Co-ordination Plan, Chapter 12.)

Based on the Panel's experience with the ACSYS data management questionnaire, the Panel agreed to develop a technical questionnaire to obtain information about the data management and service requirements of CliC participants. The concept of the questionnaire will be developed for the ACSYS/CliC SSG meeting in October 2000 and the advice of the SSG is requested prior to the completion and circulation of the questionnaire to participants in CliC. Reference is made here to item 16 of this report. The ACSYS/CliC SSG is requested to prepare a specific list of people/institutions participating in CliC to whom the questionnaire should be sent.

- 7.4 The group noted that projects within CliC will have a far greater diversity than projects implemented in the ACSYS domain. Discussing this issue at length, the Panel recommended to the ACSYS/CliC SSG that a set of minimum criteria for the consideration of a proposed project as a CliC project should be developed. The main objective of this activity would be to ensure compatibility of expected results with the overall and specific objectives of CliC. The panel concluded that specific descriptions of data requirements and data management activities for each proposed project should be part of the list of criteria.
- 7.5 The Panel recommended that a data management plan should be established for each project conducted under CliC which should reflect the interests of researchers as well as of CliC in general and the public who will have access to the CliC Data Information Service.
- 7.6 DMIP will provide guidelines related to data and information management to SSG for transmission to staff developing project proposals. These guidelines will include provisions for the identification and description of data and information requirements, time frames for the contribution of information to the CliC Data Information Service and regulations on the description of data sets.

8. Identification and publication of data collected during the ACSYS period 1994–2003

- 8.1 The Panel recognized the need to define a mechanism for the permanent storage of data collected during the ACSYS period 1994-2003. Likewise, the participants agreed that to the best extent possible, data and related information should be published for the same period. The Panel also noted, that a similar mechanism should be recommended to SSG for CliC. In discussing this issue, however, the group noted that there may be some cases where there is no long-term storage planned.
- 8.2 The group recommended to the NEG, PPR and OPP Panels that they consider the issue of long-term storage of data and requested that these Panels should encourage research groups in each of the Panels to notify DMIP of the planned permanent storage of data and information produced by each project. This information is requested for November 2000.
- 8.3 The Panel recommended that the SSG should advise DMIP on the physical location(s) for the permanent storage of data sets created or collected under ACSYS and CliC projects, especially for those data sets where there has been no long-term data custodian identified. These potentially orphan data sets will be identified through the process with NEG and OPP described above.

8.4 In an effort to publish data collected during the ACSYS period, the Panel recommended the production of a CD containing:

- a catalogue of databases used
- a summary of project descriptions
- a bibliography of ACSYS publications
- other ACSYS material as recommended by the SSG
- any unique data sets that are identified that may be lost.

The production of the CD would be undertaken at the end of the ACSYS project.

8.5 The group requested the SSG to consider the availability of resources to realize this important project.

9. Review of DMIP services with regard to the status and future needs for ACSYS observational products (Programmes on Arctic Ocean Circulation, Sea-Ice, Arctic Atmosphere, and Hydrology)

9.1 The Panel noted that the available documents do not specifically refer to the ADIS services of DMIP but rather refer to data needs and requirements in general. The Panel considered what further actions were required to increase the value and utility of ADIS to serve the ACSYS community and other related projects and programmes such as CLIVAR and GEWEX. The Panel recognised the changed role of a data information service (relative to ADIS) in CliC. As the results of this discussion are relevant for several agenda items, the results are reported under the relevant items in this report.

9.2 The Panel is aware of the requirement to satisfy the data needs of NEG and OPP and considered it useful that a person (in IACPO or elsewhere) be identified to actively identify data sets relevant to ACSYS. This could be done by methods such as participating in scientific meetings and reviewing relevant literature. This person would then identify relevant data sets by discussing access to data sets identified through established contacts with researchers and/or research institutions. The resulting information would be made available to members of NEG and OPP through ADIS. Participants reiterated, however, that this undertaking would not be successful without the active participation of members of all ACSYS Panels.

10. ACSYS/CliC development relevant to DMIP areas of responsibility

10.1 With regard to Item 8.7 of the report of SSG VIII, DMIP will strive to produce a CD (see section 8.4 above). The Panel will also undertake to compare the data requirements of NEG and OPP with the available data sets in ADIS. This will be done after the revised data lists of the other Panels have been communicated to IACPO. The group agreed to work towards closing identified gaps in the data sets by providing this comparison to the Panel chairs of NEG and OPP and requesting these Panels to assist in identifying and providing relevant data sets to ADIS.

10.2 The group recommended to chairs of Panels that a member of DMIP be invited to the next meetings of the NEG and OPP and be provided with time

on their meeting agenda for a presentation of DMIP issues relevant to NEG and OPP.

- 10.3 DMIP considered the Terms of Reference of DMIP with regard to CliC developments under agenda item 18 below and proposed changes for approval by the SSG.
- 10.4 The Panel requested the SSG to keep it fully informed on actions identified at SSG VIII related to data and data-related items. For example, the criteria for archiving of model data are considered of special importance to DMIP.
- 10.5 DMIP will present a preliminary concept and outline for the CliC DMI plan during ACSYS/CliC SSG-IX (Annex 5). In this respect, the Panel took note of the data management plan of CLIVAR and observed its usefulness in the development of Data Management and Information plans for ACSYS and CliC. The Panel recognised the need for intensified links with CLIVAR and will make the necessary contacts. The group looked forward to receiving the final version of the CLIVAR Data Task Team (DTT) report which was not available at the time of the meeting. See also agenda items 14.4 and 14.5 below.

11. Information of a joint ACSYS/CliC Panel for DMIP

- 11.1 The Panel was informed about the decision of the SSG to task DMIP with activities related to both, ACSYS and CliC. The group discussed this issue at length and agreed that this purpose would best be served in a single Panel with an improved representation of the CliC community. The Panel would serve ACSYS as in the past mainly through ADIS while building up capacity to serve CliC requirements in a similar fashion.
- 11.2 Building on the experience of the DMIP through the ACSYS project, the Panel agreed to serve as the Panel for CliC.
- 11.3 The Panel agreed to allocate responsibilities and workload to members of the Panel to effectively deliver on the work of the Panel. This is seen as an active measure in a situation of severe shortages of resources. The Panel, however, cautioned that full service requirements cannot be met by DMIP including IACPO without access to additional resources. This item was further discussed under agenda item 23 below.
- 11.4 The group recommended that with regard to ACSYS activities of DMIP, Chairs of each of the panels (NEG, OPP, PPPR and DMIP) be provided with timely information on activities undertaken by the other panels to ensure efforts are effectively co-ordinated. The group further recommended, that panel Chairs should submit activity lists to ADIS to enhance cross-panel information flow.

12. DMIP-related activities of the International Arctic Research Center (IARC)/Frontier Research, Fairbanks, and implications for DMIP

- 12.1 The representative of IARC, Roger Colony, provided a presentation of the activities of IARC/Frontier with an emphasis on implications for DMIP. He noted the support of the ACSYS Project Office in a number of the activities of the IARC/Frontier and specifically noted the support of the development of the 400 year ice edge data set and the Barents Sea hydrography.

- 12.2 An agreement was reached that IARC/Frontier would provide information for an institutional link on the ADIS page.
- 12.3 IARC/Frontier informed the Panel about its requirement for all data from the Second International Polar Year and encouraged DMIP and the ACSYS/CLiC Project Office to assist determining their location. The Panel noted that it could be active in the identification of data sets by being involved with scientists and researchers in the field. The Panel reiterated its principle responsibility to facilitate the identification and exchange of data. The group agreed that this function could be enhanced through modification of the ADIS site to enable researchers to make data requests/identify data requirements in addition to available data sets.
- 12.4 The Panel noted that IARC/Frontier is actively supporting ACSYS/CLiC activities through the conduct of their projects and support of workshops/meetings on relevant topics.
- 13. Review of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM)/Global Ocean Observing System (GOOS) Polar Region Strategy and its implications for DMIP**
- 13.1 The Panel noted the report of the meeting of experts of the JCOMM/GOOS Polar Region Strategy and expressed willingness to provide advice to JCOMM/GOOS on data management activities. The Panel also noted that the report included significant information that would be of value to ADIS and recommended the use of the information presented to seek the identification of new data sets for ADIS.
- 13.2 The Panel is interested in reviewing the JCOMM/GOOS Polar Region Strategy document when it is available.
- 14. Assessment of implications of the CLIVAR and GEWEX activities for ACSYS/CLiC and DMIP**
- 14.1 The group was informed by Steve Williams on data management activities of the GEWEX Hydrometeorology Panel (GHP) of GEWEX and the CLIVAR Data Task Team.
- 14.2 The Panel expressed its wish to have close interaction with the GHP Data Management Group (DMG) and invited the GHP DMG to draw on the experience in the development of ADIS. The group suggested collaboration in the development of common data management approaches and principles. In this regard it was agreed, that DMIP and the GHP DMG would exchange information on the development of each other's activities.
- 14.3 The Panel also noted the interest of ACSYS/CLiC in the activities of the GEWEX Cloud and Radiation Panel.
- 14.4 The major CLIVAR activities to date have been the Variability of American Monsoon System (VAMOS), Pan American Climate Studies (PACS), and the planning of the Asian-Australian Monsoon Experiment. The Panel noted with interest the work of the CLIVAR Data Task Team (DTT). While current activities of CLIVAR do not have a direct impact on DMIP data activities, the Panel agreed to share information on data management with the DTT.

14.5 The Panel was informed that the implementation of the CLIVAR data management recommendations will be tested in a pilot mode in selected projects with VAMOS suggested as the pilot study. The group agreed to request CLIVAR to share its experiences with DMIP.

15. Data versus data assimilation strategies: Issues for DMIP

15.1 The Panel recalled the request by SSG-VIII to include modelled data in the ADIS.

15.2 The issue of archiving model data is expected to be raised during the ACSYS/NEG Arctic Climate Model Intercomparison Project workshop. The Panel recommended the workshop consider criteria for archiving model data. The Panel intended to be represented at the workshop to understand more clearly the data management requirements.

15.3 The Panel noted that the preparation of model data for archiving is a potentially resource intensive activity but does not view this as a responsibility of DMIP. The Panel views its role to facilitate the exchange of model data sets among the user community using ADIS.

15.4 The representative of NEG, Markus Harder, provided a briefing on the Sea Ice Model Intercomparison Project. Results of this project are available on the SIMIP homepage and this project is already reflected in ADIS.

16. Need for the identification, description and archiving of new data for CliC

16.1 In order to identify emerging data requirements for CliC, the Panel agreed to develop a questionnaire to survey scientists and research organisations. The questionnaire will seek information on the data requirements of scientists for their research within CliC. The group agreed to prepare a draft questionnaire for SSG-IX. SSG-IX is requested to provide a distribution list to which DMIP can direct the questionnaire.

16.2 As discussed in item 7.2 above, the Panel also agreed to develop an assessment of data gaps based on available information in ADIS, the CliC plan and personal knowledge. To avoid confusion, it is important to mention here, that the data information system for CliC (CLICDIS) will be developed on the basis of, and in parallel with, further developments of ADIS.

16.3 Based on the information derived from the returned questionnaires and the assessment of data gaps, the panel will produce a report on available data sets and data gaps for submission to the ACSYS/CliC SSG.

17. Development of a Data Management Strategy for ACSYS and CliC

17.1 The Panel considered carefully the elements of a Data and Information Management strategy for CliC. The Panel felt that a complete strategy for CliC was not possible at this time and would need to wait for the further development of the structure of CliC. Annex 5 contains a draft strategy that the Panel prepared given the present understanding of CliC.

17.2 The Panel felt there were some questions that the DMIP and the SSG needed to consider in the further development of the strategy:

- Q: What elements/items from ACSYS need to be continued in CliC?
- Q: How can the strategy support linkages with related programmes (e.g., modelling intercomparison)?
- Q: What is the time resolution required for the variables in CliC (e.g., historical vs. “near” real-time data needs.)? Will there be a requirement for “near” real-time data?

17.3 Considering the current understanding, the Panel agreed to the following plan of action for the CliC strategy:

- Provide overall guiding principles for Data and Information Management to CliC;
- Provide the strategic approach to Data and Information Management for CliC;
- Recommend how information can be made transparent between the science disciplines and research groups;
- Complete a data information plan for CliC.

17.4 The draft in Annex 5 provides the ACSYS/CliC SSG with substantive information on the first three elements.

17.5 With regard to the ACSYS focal items in the development of a Data and Information Management plan for ACSYS, the Panel discussed and drafted the following approach:

- Advise the ACSYS/CliC SSG, relevant Panels and PI’s on all issues relating to Data and Information Management including tools, interfaces and links;
- Co-ordinate with the SSG, Panels and PI’s as well as data centres and other projects (GEWEX, CLIVAR, JCOMM/GOOS etc.);
- Provide guidance on data and information management to projects and PI’s to create consistency with the CliC Data Management strategy;
- Assist small research groups in data and information management and it’s sharing;
- Co-ordinate the development of comprehensive data sets from different sources; (e.g. ice thickness climatology - see ACSYS NEG data requirements);
- Follow-up with OPP and NEG on data management requirements;
- Chart the transition of the DMIP from ACSYS to CliC in Data and Information Management.

18. Review of the Terms of Reference of the DMIP

18.1 Recognizing the change of requirements for DMIP and the increasing scope of activities especially for CliC, the Terms of Reference (TOR’s) for DMIP were reviewed by the Panel. The TOR’s were revised accordingly and are to be presented to the ACSYS/CliC SSG for approval. The revised TOR’s are included in Annex 6.

19. Membership in the ACSYS/CliC DMIP

19.1 Subsequent to the agreement of DMIP to serve both projects, ACSYS and CliC, the group reviewed the membership of the Panel. In addition, the group

reacted to recent developments with regard to present memberships that are discussed below. The Panel recommended the changes proposed below for endorsement by SSG-IX.

- 19.2 The Panel accepted the resignation of Wolfgang Grabs as Chair as he has assumed new duties at the WMO Secretariat, and subsequently proposed Jim Moore as the new chairman of the DMIP. Jim Moore accepted this responsibility with the provision that the responsibilities are shared with members of the Panel. The Panel noted that Wolfgang Grabs would continue to work on the Panel in particular to support the new chairman, subject to the approval of WMO.
- 19.3 The Panel noted the explanation of Christoph Oelke of the reasons for his departure from IACPO. The Panel requested the new Director of IACPO to fill this vacant position as soon as possible. The Panel strongly recommended that the Director IACPO should attend the DMIP-4.
- 19.4 In discussion, it became clear that Christoph Oelke's contributions could not be easily replaced. The Panel noted that the web site needs continued operation and maintenance. The group suggested that, for a transitional period, AWI would be formally requested to support Christoph Oelke in continuing to maintain the web site.
- 19.5 The Panel was informed that Markus Harder will be changing employment and will therefore no longer be able to work on the Panel.
- 19.6 The Panel recommended that Christoph Oelke be nominated as a member of ACSYS DMIP in place of Markus Harder to maintain some degree of continuity in the Panel. The group felt that continuity is essential at this moment to maintain effectiveness and achieve its objectives.
- 19.7 The Panel recognized that the new requirements of CliC will necessitate the expansion of the Panel with two additional scientists to respond to the expanded scientific disciplines and workload of CliC. The two scientists should be chosen to reflect the new scientific disciplines/interests present in CliC.
- 19.8 The Panel considered that further adjustments to the Panel composition might be required as CliC is further defined. The Panel wishes to reserve the right to review the composition of DMIP in the future and to invite, on an ad-hoc basis, specific experts to future meetings when required.
- 19.9 The Panel agreed to invite nominations to fill vacant positions on the Panel. A suitable candidate should ideally have operational experience in the management of data and information and scientific expertise in large ice sheets or permafrost.
- 19.10 The Panel thanked Markus Harder for his contributions to the Panel and recognised Wolfgang Grabs for his leadership of the Panel.

20. Review of ADIS presentation on the Web

- 20.1 The Panel reviewed the current ADIS web site and recommended improvements. The Panel agreed that the ACSYS literature section will be

sorted by disciplines. Panel members were requested to provide additional links, which should be included in ADIS.

20.2 The Panel agreed that the Terms of Reference of NEG, OPP and PPPR as well as membership and addresses of members of Panels will be included on the ADIS web site.

20.3 As CliC develops, the Panel agreed that the CliC Data Information Service (CLICDIS) web site will be developed in parallel with the ADIS site. The two systems, ADIS and the CliC Data Information Service are proposed to be physically separated entities. In this regard the group agreed that the CliC Data Information Service should have a separate access from the ACSYS/CliC homepage.

21. Update of the Data Management and Information Section of the ACSYS Implementation and Achievements Document

21.1 The group discussed and agreed that section 6.2 “Data Management and Information” of the ACSYS Implementation and Achievements document should be replaced once the revised Terms of Reference have been approved by the SSG.

21.2 The group further agreed that Section 6.5 of the document would be amended to include information with regard to the development of a CliC Data and Information Service (CLICDIS).

21.3 Discussing editorial changes, participants proposed the following changes to be made to specific sections of the document.

21.3.1 A new paragraph needs to be entered at the end of Section 6.1:

“The DMIP has been tasked with developing appropriate data and information management strategies for CliC. “

21.3.2 The revised Section 6.6 will read:

“Many ACSYS-DMIP activities are of direct interest to other WCRP projects like GEWEX, including GHP and its associated projects such as BALTEX, MAGS and GAME. JCOMM/GOOS and CLIVAR are also expected to benefit from GHP activities. DMIP informs G3OS JDIMP and maintains liaison on an informal basis with G3OS concerning data and information management.

The development of data and information management procedures and consistent policies for data acquisition, exchange, and dissemination in CliC will build directly on ACSYS-DMIP experience.”

21.4 Minor editorial changes were noted and will be made with the changes proposed above.

22. Task plan for DMIP for the next 12 months

22.1 From the results of the discussions of the Panel, the group compiled a Task Plan for the Panel for the next 12 months prior to DMIP-4. The Task Plan is attached as Annex 7 to this report.

23. Resources for DMIP activities

- 23.1 The Panel recalled that, at DMIP-2, the Panel concluded it would not be able to provide substantial services for CliC without additional resources. The Panel noted that the delay in the appointment of the Director of the IACPO has further aggravated the situation.
- 23.2 With increasing requirements for cross-Panel information and representation, the group recommended that support for participation (in Panel meetings and activities) by experts and scientists from other countries and institutes on an ad-hoc basis is required.
- 23.3 The group discussed the resources issue in some length and agreed on activities and options geared to obtain additional resources. The group agreed on the following items:
- (a) CliC projects need to budget for data management activities. In this regard, projects need to be encouraged to budget for data management activities including documentation, travel, quality control and archiving with an overhead for IACPO to implement project's data and information requirements on the basis of agreements.
 - (b) Reasons to re-establish the scientific officer post at IACPO need to be found as a matter of high priority.
 - (c) All members of DMIP should be actively involved in Data Management Implementation with their institutional backing:
 - JOSS – assistance to ADIS activities
 - NSIDC – assistance in data set creation and recovery
 - Collaborate in projects that contribute to ACSYS/CliC goals. (Richard Armstrong will collect information from all members on such projects and IARC/Frontier)
 - (d) Additional staff time is required to communicate with Principal Investigators (PI's), programmes/projects and to locate and document data sets world wide. This should be tasked to CliC and non-CliC PI's and projects.
 - (e) Establishment of a Trust Fund for ACSYS/CliC to support important activities.
 - (f) The ADIS web-page will be supported on an interim basis by Alfred-Wegener Institute (this information needs to be formally re-confirmed). Under this arrangement, Christoph Oelke could manage the ADIS for the time being. The group noted however, that a more permanent solution must be sought.

24. Any other business

- 24.1 Under this agenda item, the presentations made are summarized. No other issue has been discussed by the Panel under this item.

25. Presentation of JOSS

- 25.1 The Director of the UCAR Joint Office for Science Support presented the Panel with an overview of the operations, interests and achievements of the JOSS. The group learned that one of the core qualifications of JOSS was the assistance of research communities in planning, executing and monitoring complex projects. Participants expressed their thanks for the presentation and the continued support of JOSS through the participation of James Moore.

26. Presentation of NSIDC

- 26.1 A presentation of database activities at NSIDC had been organized by Richard Armstrong. Members of the Panel were particularly interested in issues of quality control of data sets and approaches to improve user services both on-line and off-line through a series of services that NSIDC is providing for its users. Several of the approaches could serve also to improve ADIS and the CliC Data Information Service, respectively.
- 26.2 As part of the visit to NSIDC, the Panel chair of the PPPR, Mark Serreze, presented data set development and results of re-analysis products to participants. As part of an effort to make interim-products available to researchers and the public, the storage of GIS-generated data products as graphic files was discussed. Such graphic displays of information are thought to be especially useful for visual comparison purposes without necessarily storing or reproducing the entire background database as models change rapidly.
- 26.3 The group thanked NSIDC for its continued support of DMIP activities and expressed its hope that this support would persist also in the framework of CliC.

27. Presentation by Tinjung Zhang

- 27.1 On the issue of data rescue and recovery, a presentation was offered by Tinjung Zhang on Chinese snow cover data. The group noted with interest efforts to digitize a large part of available time series on snow cover in China in high quality over several decades.
- 27.2 The Panel thanked Tinjung Zhang and suggested that as soon as possible, information about the snow cover data sets be communicated to ADIS for inclusion in its registry of available data sets or data sets under development.

28. Date and venue of next meeting

- 28.1 The Panel noted that it is likely that the next meeting will be a combined meeting of the Panels of the ACSYS NEG, OPP, PPPR and DMIP tentatively scheduled in 2001. The Panel suggested that the meeting be held in June 2001.
- 28.2 The Panel recommended to the Panel Chairs and the SSG, in co-operation with the WCRP, that agreement on a date and venue should be reached as soon as possible.

29. Preparation and adoption of draft report

29.1 The group reviewed its discussions, recommendations and proposed actions as documented in the draft report. The draft report was adopted by the Panel after making some changes.

30. Closure of DMIP-3 meeting

The meeting closed on Friday 2nd June at 13:00 hours.

ANNEXES

ANNEX 1

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ANNEX 1

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ANNEX 2

Agenda

**Location: Joint Office for Science Support (JOSS), 3300 Mitchell Lane,
Boulder, Colorado**

Tuesday, 30 May

- 09:00 Opening of the DMIP meeting
- 09:15 Purpose and objectives of the meeting
- 09:30 Adoption of the agenda
- 09:45 Review of actions from DMIP-2
- 10:15 Break
- 10:30 Report of the International ACSYS/CliC Project Office (IACPO) on data management issues
- 11:10 Response of DMIP to recommendations of the ACSYS Meeting on Data and Data Management in Support of Sea-Ice/Ocean Modelling Activities
- 11:30 Status on the present identification and description of data for ACSYS and CliC
- 12:00 Lunch Break
- 13:15 Identification and publication of data collected during the ACSYS period 1994–2003
- 14:00 Review of DMIP services with regard to the status and future needs for ACSYS observational products (Programmes on Arctic Ocean Circulation, Sea-Ice, Arctic Atmosphere, and Hydrology)
- 14:45 Break
- 15:00 Review of discussions for the report of the meeting
- 15:30 Presentation of JOSS
- 17:00 Meeting adjourns

ANNEX 2

Wednesday, 31 May

- 09:00 Developments in ACSYS/CliC relevant to DMIP areas of responsibilities
- 10:00 Break
- 10:15 Formation of a joint ACSYS/CliC Panel for DMIP
- 11:00 DMIP-related activities of the International Arctic Research Center (IARC)/ Frontier Research, Fairbanks, and implications for DMIP
- 11:30 Review of the JCOMM/GOOS Polar Region Strategy and its implications for DMIP
- 12:00 Assessment of implications of the CLIVAR and GEWEX activities for ACSYS/CliC and DMIP
- 12:30 Lunch Break
- 13:30 Data versus data assimilation strategies: Issues for DMIP
- 14:15 Break
- 14:30 Need for the identification, description and archiving of new data for CliC
- 15:00 Development of a Data Management Strategy for CliC (1)
- 16:00 Review of discussions for the report of the meeting
- 17:00 Meeting adjourns

ANNEX 2

Thursday, 1 June

- 09:00 Development of a Data Management Strategy for CliC (2)
- 10:45 Break
- 10:00 Review of the TORs of DMIP
- 10:45 Membership of a joint ACSYS/CliC DMIP
- 11:15 Review of ADIS presentation on the Web
- 12:00 Lunch Break
- 13:00 Update of the Data Management and Information Section of the ACSYS Implementation and Achievements Document (Section 6)
- 14:00 Break
- 14:15 Review of discussion for the report of the meeting
- 15:30 Presentation of NSIDC
- 17:00 Meeting adjourns

Friday, 2 June

- 09:00 Task plan for DMIP for the next 12 months
- 10:00 Break
- 10:15 Resources for DMIP activities
- 10:45 Review of discussions and recommendations
- 11:30 Any other business
- 11:45 Date and venue of next meeting
- 12:00 Lunch
- 13:00 Preparation and adoption of draft report
- 15:00 Closure of DMIP-3 meeting

ANNEX 3

Draft questionnaire for NEG, OPP and PPPR

- 1) Please provide your name, e-mail, and specific project affiliation including a brief project title and summary.
- 2) What data have you collected? Are they available to others? Where?
- 3) What data have you used? What is the source/contact for information?
- 4) Which data have you already shared?
- 5) Which data will you collect in the near future?
- 6) Which data sets do you plan to prepare (including model products)?
- 7) Have you registered your data set(s) with ADIS? If not, when do you intend to do so?
- 8) Is it important to you that certain model outputs be archived? If so, where and in which manner?
- 9) What models do you use? Please provide documentation reference (i.e. to a journal article.)
- 10) What model related products should be stored?
 - input fields/grids
 - output product summaries
 - model output grids
- 11) Do you have any other comments on data needs, availability, quality or other issues for the DMIP?

ANNEX 4

Report of the International ACSYS/CLiC Project Office (IACPO) on data management issues

The following items cover IACPO's support of the DMIP with data management issues during the period July 1999 to May 2000.

The ACSYS Data and Information Service (ADIS) is maintained and developed at IACPO with support of the DMIP members. It consists of a sequence of about 80 web pages that are physically located on the Microsoft web server of the Norwegian Polar Institute (NPI) in Tromsø, Norway, and can be accessed under the following address: <http://www.npolar.no/oelke/adis.html>.

- A literature page was added containing a) a list of published papers during the ACSYS period (1994 to now), and b) links to mostly external sources for Arctic literature.
- The links page was restructured and extended.
- JOSS supported the development of 2 online forms (for new data sets, and for institutional information) which were implemented on NPI's Unix web server for the ADIS system.
- Further data set descriptions were added to the data sets pages for Meteorology, Sea Ice, Oceanography, and Hydrology.
- IACPO creates some of the data set description itself whereas for other newly available data sets it approaches the individual data supplier to fill the appropriate form.
- A completely new layout has been applied to ADIS.
- In order to improve the use of ADIS, IACPO officially announced it by e-mail in August 1999, followed by an article in the ACSYS newsletter in November 1999. Subsequent requests for further input were sent out periodically to the ACSYS SSG, panel and working group members, and further experts.
- Web page access statistics show an exponential increase in number of hits during ADIS' first year of existence.
- The BarCode project was completed and a CD-ROM together with a data report were published by IACPO. Information about this hydrographic database for the Barents and Kara Seas is supplied in an ACSYS newsletter article and via the ADIS system (<http://www.npolar.no/oelke/barkode/barkode.html>). IACPO updated the section on data management and information in the document ACSYS Implementation and Achievements (<http://www.npolar.no/acsys/implan/dmip.htm>).
- Having in mind considerably reduced resources for IACPO from August 2000, an adequate support of the ACSYS DMIP can no longer be maintained.

ANNEX 5

DMIP-3 Draft Data Management and Information Strategy for CliC

Status: June 2000

This draft represents the current understanding of DMIP on the possible functions and the strategic approach to a comprehensive Data Management and Information Strategy for CliC. The ACSYS/CliC SSG is requested to endorse this general approach. The detailed approach and documentation of a Data Management and Information (DMI) plan will draw on the experience of DMI plans of GTOS, GCOS CLIVAR and IGOS.

CliC Organization

The CliC Science and Co-ordination Plan will treat the cryosphere and its most important interactions under the following headings:

- Interactions between the atmosphere, snow/ice and land
- Interactions between land ice and sea level
- Interactions between sea ice, oceans and the atmosphere
- Cryospheric interactions with the atmosphere and the ocean on a global scale

The cryosphere is also considered as an indicator of climate variability and change.

Overall CLIC DMI Organization

A central feature of the CliC Data Management and Information Plan will be the identification of contact scientists and partners for each area. These contact partners will have lines of communication with Principal Investigators (PI's) for identified CliC projects. The contact partners should be selected considering the following criteria:

- broad knowledge/understanding of the discipline;
- ability and willingness to represent the entire working community for the discipline;
- experience with data management issues.

The partners will be responsible for co-ordinating the data and service requirements of the specific discipline for the CliC DMI plan. It is recognised that individual disciplines may establish databases (of data or meta-data) of specific interest to them. The contact partners will provide the principle linkage between such databases and the CliC DMI plan.

Mission for CliC Data and Information Service (CLICDIS)

CliC Data Information Service will be established (in parallel to the ADIS model) to:

- Advise the ACSYS/CliC SSG, relevant Panels and PI's on all issues relating to DMI including tools, interfaces and links;
- Provide guidance on data and information management to projects and PI's to create consistency with CliC DMI strategy;
- Co-ordinate with the SSG, Panels and PI's as well as data centres and other projects (GEWEX, CLIVAR, JCOMM/GOOS etc.)

ANNEX 5

Components of the CliC Data Information Service

The CliC Data Information Service is proposed to be designed to include the following components:

- (a) List of accessible data sets;
- (b) Location (by discipline) of CliC data and related information;
- (c) Links to data centres, projects, researchers;
- (d) Policy/guidance for the exchange of data;
- (e) Facilitation of data access;
- (f) Cryosphere Data Master Directory approach;
- (g) Support for data rescue and potentially orphan data sets;
- (h) Advisory services in Data Management and Information for CliC projects;
- (i) Information about (preliminary) results of projects.

The model of the Global Change Master Directory will be considered in designing and developing the CliC Data Information Service.

Operating Principles

CliC Data Information Service will operate by recognizing the following principles:

- CliC does not 'own' the data;
- There may be data sets originating from projects other than CliC;
- Look at lessons learned from other projects;
- Data management is undertaken at the project level (both CliC and non-CliC);
- The CliC Data Information Service Plan is to be consistent with WCRP research principles;
- Other researchers, networks and institutions will be requested to assist with delivery of the CliC Data Information Service responsibilities;
- Use of a Global Change Master Directory approach to develop the CliC Data Information Service.

CliC Data Information Service Functions

The principle functions of the CliC Data Management and Information Service will be to:

- (a) Facilitate/co-ordinate access to data and information between projects/groups relevant to CliC;
- (b) Visualize data and information from projects for the use by other groups/projects;
- (c) Provide cross-referencing of information;
- (d) Facilitate access to and make available data and information between research groups;
- (e) Facilitate feedback from users to providers on the value/use of the data provided;
- (f) Encourage the creation of new data sets to close gaps;
- (g) Assist in data rescue activities;
- (h) Assist small research groups in Data and Information Management and sharing.

ANNEX 6

ACSYS/CliC Data Management and Information Panel (DMIP) Revised Terms of Reference

Status: June 2000

The proposed revised Terms of Reference for the ACSYS/CliC Data Management and Information Panel (DMIP) are subject to the approval of the ACSYS/CliC Scientific Steering Group.

1. Advise and inform the ACSYS/CliC SSG of ongoing data and information management issues in the implementation of a sound strategy for ACSYS and CliC.
2. Provide ACSYS and CliC data management and information advice as well as guidance and co-ordination to investigators, collaborating data centres, projects and programmes.
3. Advise on and develop a consistent policy for the identification, flow and dissemination of relevant data and information for ACSYS and CliC.
4. Prepare data and information flow management plans for ACSYS and CliC; review and update them as and when required.
5. Design and improve a CliC data and information system. The data and information system will be developed in parallel to ADIS using the expertise gained in ACSYS.
6. Undertake activities to provide meta-data, documentation and sources for data sets of interest for ACSYS and CliC. Perform data rescue as appropriate and encourage the exchange of data and information via data information services specialized to meet project needs.
7. Promote the free and unrestricted dissemination of ACSYS/CliC data for non-commercial purposes.

ANNEX 7

DMIP-3 Task Plan

The action items below are derived from the recommendations and conclusions of DMIP-3. Where no deadline is given, the action should be taken before the next session of the DMIP.

1. Presentation of the DMIP-3 meeting report at the ACSYS/CliC SSG meeting in October, 2000; **(action by the chair of DMIP or representative)**.
2. Status and progress in the development of the ACSYS DMI plan will be presented to the SSG during the first ACSYS/CliC session in October, 2000; **(action by chair of DMIP or representative)**.
3. DMIP will present a preliminary concept and outline for the CliC DMI at the October 2000 meeting of the ACSYS/CliC SSG; **(action by chair of DMIP or representative)**.
4. DMIP will consult the ACSYS NEG for a list of data sets for the discipline "modelling", in addition to the disciplines on sea ice, oceanography, meteorology, hydrology, following the recommendations of the ACSYS SSG-VIII; **(action by chair of DMIP)**.
5. The Panel will send a questionnaire to NEG and OPP scientists with specific questions about their data in order to assist DMIP to improve the information in ADIS; **(action by DMIP by September 2000)**.
6. DMIP-3 suggests that the table of NEG data requirements should be reviewed by NEG and OPP to assess and more clearly justify data requirements presented in the present table; **(action by NEG and OPP; preferably by October, 2000)**.
7. The Panel suggests to the ACSYS/CliC SSG that the data management and information systems be customized for each project to satisfy the project needs; **(action by DMIP; for ACSYS by October 2000; for CliC during the course of development)**.
8. The panel suggests that articles be written on ADIS for publications such as EOS, Global Change Magazine, Arctic Info services; **(action by IACPO on a continuing basis)**.
9. Representation of DMIP at the first ACSYS NEG/Arctic Climate Model Intercomparison Project workshop planned for September 13-15 in Fairbanks, Alaska be arranged; **(action by chair of DMIP)**.
10. The Panel members agreed to develop a technical questionnaire for data management and service requirements of CliC participants. The concept of the questionnaire will be produced for the ACSYS/CliC SSG meeting in October 2000 and the advice of SSG will be requested prior to completion and circulation of the questionnaire to participants in ACSYS and CliC. The Panel will compare the data requirements of NEG and OPP with the available data sets in ADIS; **(action: IACPO with support of all panel members)**.
11. The Panel will also develop an assessment of data gaps based on available information in ADIS, the CliC plan and personal knowledge of panel members; **(action: IACPO with support of all panel members)**.

ANNEX 7

12. The DMIP will provide guidelines on data management activities to the SSG for transmission to all project scientists developing proposals; **(action: chair of DMIP with support from panel members)**.
13. The Panel recognized the need for more active co-ordination with GEWEX and CLIVAR and will make the necessary contacts; **(action: chair of DMIP and panel members)**.
