WCRP REPORT
World Climate Research Programme

Project Report

Report of the 17th Meeting of the CLIVAR Scientific Steering Group (SSG)

17 - 20 May 2010
NCAR, Boulder, Colorado, USA

March 2011

WCRP Informal Report no: 5/2011
ICPO Publication No. 153

CLIVAR is a component of the World Climate Research Programme (WCRP). WCRP is sponsored by the World Meteorological Organisation, the International Council for Science and the Intergovernmental Oceanographic Commission of UNESCO. The scientific planning and development of CLIVAR is under the guidance of the JSC Scientific Steering Group for CLIVAR assisted by the CLIVAR International Project Office. The Joint Scientific Committee (JSC) is the main body of WMO-ICSU-IOC formulating overall WCRP scientific concepts.

Bibliographic Citation

INTERNATIONAL CLIVAR PROJECT OFFICE, 2011. March. Report of the 17th Meeting of the CLIVAR Scientific Steering Group. International CLIVAR Project Office, CLIVAR Publication Series No. 153. (not peer reviewed).

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Report of CLIVAR SSG-17

Introduction

1.1 Background

The 17th session of the CLIVAR Scientific Steering Group (SSG-17) was held at the National Center for Atmospheric Research (NCAR), Boulder, Colorado, USA from 17-20 May 2010. The SSG co-chairs (Dr Jim Hurrell and Prof Martin Visbeck) led the meeting of 33 participants comprised of SSG members, chairs or representatives of CLIVAR Panels and Working Groups, representatives of other core WCRP projects and other invitees. The SSG is most grateful to Lisa Butler (NCAR) for acting as the local organizer of the meeting and for all her efforts to ensure that the meeting was an extremely successful and sociable event.

The agenda for the meeting is at Annex A and a list of participants is at Annex B.

1.2 Opening of the meeting

Following welcome by the SSG co-chairs, the delegates were warmly welcomed to Boulder in an opening address by Dr. Greg Holland, Director, NCAR Earth System Laboratory (NESL). Dr. Holland identified and discussed a number of scientific challenges being tackled by NESL, including regional climate prediction, closer ties between the weather and climate modelling communities, and the promotion of science and its communication to society.

Following Dr Holland's presentation, the attendees at the meeting introduced themselves and their relationship to CLIVAR activities. In particular the meeting was pleased to welcome Dr Bob Molinari as the prospective new Director of the ICPO.

1.3 Introduction to SSG-17

Martin Visbeck gave a general introduction to the goals for and background to the meeting, reminding the SSG of the CLIVAR's mission and overall structure and the SSG's Terms of Reference. He introduced the concept of a "Global Framework for Climate Services (GFCS) that had been the major focus for World Climate Conference-3 and the WCC-3 statement calling for major strengthening of the essential elements of a GFCS, namely the Global Climate Observing System (GCOS), the WCRP, climate services information systems, climate user interface mechanisms and efficient and enduring capacity building. As an introduction to WCRP's own visioning process currently being carried out by the Joint Scientific Committee for WCRP to recommend a future structure for the programme (see below), he pointed out that ICSU's Earth System Visioning Process has led to a number of (currently draft) "grand challenges" consistent with the drivers for WCRP. Finally he summarized the main foci for the meeting, namely the anticipated future structure for WCRP and its implications for CLIVAR; review of the "imperatives" for CLIVAR research (developed at CLIVAR SSG-16); review of progress and plans by CLIVAR Panels and Working Groups and consideration of number of specific regional issues (in particular Arctic climate, CLIVAR's Africa programme, and the Indonesian Seas).

2. WCRP strategy, outcomes of JSC-31 and other WCRP core project and wider programme inputs

2.1a Developments in WCRP

To help set the context of the meeting, Dr. Ghassem Asrar, Director of WCRP, reviewed the major events of the past year since CLIVAR SSG-16. This included publication of the WCRP Achievements and Implementation Plan documents, the outcomes of World Climate Conference-3 (Geneva, Switzerland, September 2009) and the resulting concept of a Global Framework for Climate Services now being developed by a high level segment task team, the OceanObs'09 Symposium

(Venice, Italy, September 2009) and its follow-on limited lifetime working group to recommend a framework for moving sustained ocean observations ahead over the next decade and the ongoing ICSU visioning process. The last has developed a number of Grand Challenges which also reflect the challenges for WCRP. The ICSU General Assembly will take a view on these next year, following the close of the ICSU Grand Challenge exercise in Autumn 2010. Emerging issues for WCRP include the clear call for emphasis on regional scales and the WCRP's own visioning process being undertaken by the Joint Scientific Committee (JSC) for WCRP and aimed at developing a new longer-term structure for the programme (see below). New structure elements emerging include an "Observations and Analysis Council" and a "Modelling Council", the SSG's views on which are very welcome. A major future event will be the WCRP Open Science Conference (Denver, USA, October 2011), plans for which were the subject of a separate presentation by Jim Hurrell as chair of the International Scientific Organizing Committee) later in the meeting.

Dr Asrar also reminded the SSG of the modelling survey that had been led by WGCM and WGNE with assistance from the ICPO (Dr Anna Pirani) over the year the outcomes of which are currently being analysed. One issue arising was the importance of process research for model improvement and reduction of uncertainties, a topic which the SSG had some discussion on following the presentation. Other issues raised were the status of the Earth System Science partnership (ESSP) and European Space Agency activity with respect to the Global Climate Observing System (GCOS) Essential Climate Variables (ECVs), in response to which Dr Trenberth informed the SSG that the WCRP Observations and Assimilation Panel (WOAP) are promoting workshops relating to the assessment of reprocessed ECV products.

2.1b Interactions across WCRP and other programmes

In a follow-on presentation, Valery Detemmerman (Joint Planning Staff for WCRP) identified a number of challenges and opportunities for coordinated research among both the WCRP projects and with other programmes, including IGBP. These included interactions across the WCRP's cross cutting topics (seasonal prediction, decadal prediction, extremes, monsoons, sea level, anthropogenic climate change and atmospheric chemistry and climate) and across the functions of WCRP in terms of observations and analysis, model development, evaluation and experiments, processes and understanding, applications and services and capacity building.

2.2.a Developments in GEWEX

Activities under the WCRP's Global Energy and Water Experiment (GEWEX) were provided by its new chair, Dr. Kevin Trenberth, who summarized the GEWEX SSG's research imperatives and where it saw the "frontiers" of GEWEX activity to lie. GEWEX achieves its goals through a combination of data set development and analysis, process studies and model improvement organized through the GEWEX Radiation Panel, its Modelling and Prediction Panel and its Coordinated Energy and Water Cycle Observations Experiment, each of which has identified its short term priorities though buy-in to these has still to be established amongst the doxen or more groups in each area. Following GEWEX SSG-22 (New Delhi, India, January 2010), the mission statement for GEWEX post 2013 has been defined to be: "*To develop improved observational, diagnostic and modeling capabilities focusing on land-atmosphere interactions to measure and predict global and regional energy and water variations, trends, and extremes such as heat waves, floods and droughts; and provide the science underpinning climate services*" and a number of imperatives have been defined against the areas of data, analysis, modelling, and applications. In addition a number of "frontiers" of GEWEX research have also been identified. These will be further discussed at a pan-GEWEX meeting in Seattle, Washington USA (August 2010), to develop the list and seek buy-in by the various GEWEX groups.

Dr Trenberth then outlined recent progress in the area of climate extremes and the current focus on issues of drought being pursued through the joint CLIVAR/GEWEX Drought Interest Group which has proposed an international drought workshop to be held in the 2010/11 timeframe. He also raised the issue of coordination of monsoon research across WCRP expressing concern at the number of

groups involved and making suggestions as to how this could be talked including a central WCRP inventory of groups and activities and a wiki page to help communication in this area, recognising that resources to do this would need to be identified.

In discussion, Martin Visbeck noted the difference in approach between GEWEX and CLIVAR on imperatives/activities, in acknowledgment of which, Dr Trenberth extended an invitation to CLIVAR to attend the pan-GEWEX meeting to help the process of developing these. (Subsequently it was agreed that Jim Hurrell, Richard Washington and Bob Molinari represent CLIVAR at this meeting).

2.2b Developments in CliC

A presentation on behalf of the WCRP's Climate and Cryosphere (CliC) project by Dr. David Bromwich summarized the current status of CliC and, in particular, its lead in the WCRP's cross-cutting activity on sea level rise. The principal GOAL of CliC is to assess and quantify the impacts that climatic variability and change have on components of the cryosphere and the consequences of these impacts for the climate system. In addressing this goal, CliC also seeks to determine the stability of the global cryosphere. Co-sponsored by WCRP, the Scientific Committee on Antarctic Research and the International Arctic Science Committee, CliC focuses its activities through the following themes:

1. Terrestrial Cryosphere and Hydrometeorology of Cold Regions (TCHM)
2. Ice Masses and Sea Level (IMSL)
3. Marine Cryosphere and Climate (MarC)
4. Global Prediction of the Cryosphere (GPC)

CliC SSG-6 (Valdivia, Chile, February 2010) sought to prioritize cryospheric issues for the themes and define theme goals with deliverables to CliC SSG-7 in 2011. CliC is seeking involvement with the modelling community for all four of its themes. They have also defined a number of focus groups providing cross cuts between themes as follows:

1. Cryospheric inputs to the Arctic and Southern Ocean freshwater budgets
2. The role of carbon and permafrost in the climate system
3. Hemispheric differences in sea ice extent and seasonal predictability
4. Regional climate modelling and improved parameterisation of cryospheric processes
5. Ice sheet dynamics and the role of the major ice sheets in sea level rise.

Cryospheric issues defined by CliC include carbon and permafrost (CAPER) and prediction of sea level rise (SLR). Sea level variability and rise issues are being developed under a joint IOC/WCRP Sea Level Group that is currently developing its workplan. Konrad Steffen (CliC SSG Chair) and John Church co-chair the group. CAPER is a new joint initiative between CliC and IGBP AIMES that will promote complementary approaches for understanding and quantifying carbon cycle and permafrost dynamics across scales of observations, measurements and models for regional to global analyses. It will also develop a coordinated modelling framework including parameterization sets and sub-models for soil carbon and energy dynamics that are applicable for cold region processes that can be inserted or incorporated into current and future generation land surface or ecosystem models.

A key issue for CLIVAR is the issue of Arctic climate and the CliC lead in the development of a working group to address this across WCRP, addressed later in the meeting (see below). In consideration of the issue of sea level rise, the SSG also felt that this was an area in which CLIVAR could make important contributions and should be more involved.

2.3 OOPC Report

Professor Detlef Stammer provided the report from the Ocean Observing Panel for Climate on behalf of its Chair Dr Eric Lindstrom. He summarized the goals of OOPC to be to:

- Provide data and information products for
    - Climate monitoring and forecasting
    - Climate assessment
    - Climate research
    - Outreach
- Support decision-making in adaptation to climate change
- Serve as a foundation for global oceanography – research and operations.

He emphasized the role of OOPC as a component of the integrated framework for sustained ocean observations post OceanObs'09, including biogeochemical and ecosystem observing. OOPC is also looking to improve the societal relevance of its activity on ocean climate indices. A particular call to research programmes, including CLIVAR, is to articulate the need for sustained legacy observations in a systematic way. OOPC is encouraging data sharing, by promoting regular tracking of adherence to data sharing policies. Overall, OOPC is committed to provide updated information on the state of the ocean, its relevance to climate and society, and liaison with other programs to advocate for sustained ocean observations. It will examine the ocean observing system for needed periodic review of component elements, compliance to climate observing requirements, integration of space and in situ components, and addition of new elements. In particular it will, in 2011, revisit the previous review of ocean thermal observation requirements

In terms of CLIVAR and OOPC the Panel had reiterated the relevance of having the basin panel representatives attend its meetings as well as GSOP to:

- Articulate CLIVAR's need for sustained legacy observations in a systematic way and so help OOPC understand regional *in situ* and *satellite* observing needs
- Help OOPC develop its story on *societal relevance* of observations

Whilst it had been recognised that a single CLIVAR point of contact with OOPC had been established, the Panel hoped that basin panel attendance at OPPC would continue to be supported.

- **Ocean basin panels and GSOP are asked to respond to the needs of OOPC for representation as appropriate. (Action: Basin Panel & GSOP co-chairs)**

Prof. Stammer also briefly outlined the current status of the remotely-sensed and in situ observing system. The latter was assessed as being 62% complete in 2009 resulting in a call from OceanObs'09 for nations to strive to complete the initial system by 2015. A task force is currently working on a set of recommendations for a new framework for integrated sustained observations and will report back to its sponsors later in 2010.

In commenting on the OOPC presentation Martin Visbeck expressed the view that SSG-18 should devote time on its agenda for in-depth discussion of the ocean observing system. Detlef Stammer reiterated the need for CLIVAR to communicate its needs to OOPC for ocean observations, something which had been satisfactorily achieved through both GSOP and basin panel attendance.

- **Include discussion of CLIVAR's needs for ocean observations in next years' SSG meeting agenda (Action: SSG co-chairs and ICPO).**

Bob Molinari commented that many of the papers at OceanObs'09 had focused on individual systems. He wondered about system integration. In response, Detlef Stammer pointed to the reanalysis efforts which took in the various observational types to produce integrated analyses and efforts for example to analyses ocean heat content. He agreed with Dr Molinari's subsequent comment that much depended on models but there is a need to pull from all directions to maximize the benefits.

2.4 IGBP IMBER – update on current status and activities

The SSG were also briefed by Prof. Ken Drinkwater on the IGBP's programme on Integrated Marine Biogeochemistry and Ecosystem Research (IMBER). IMBER is also co-sponsored by SCOR. Itseeks to provide a comprehensive understanding of, and accurate predictive capacity for, ocean responses to accelerating global change and the consequent effects on the Earth System and human society" Its research focus is to *investigate the sensitivity of marine biogeochemical cycles and ecosystems to global change, on time scales ranging from years to decades*. To achieve its goal, IMBER will identify key interactions between marine biogeochemical cycles and ecosystems, and assess how these interactions respond to complex natural and anthropogenic forcings. Understanding biogeochemistry and ecosystems are at the heart of IMBER's goal with climate, CO_2, nutrients and harvesting considered to be the main drivers of global change.
IMBER research is structured around four themes:

- Interactions between biogeochemical cycles and marine food webs
- Sensitivity to global change
- Feedbacks to the Earth System
- Responses of society

The project is directed by a Scientific Steering Committee (SSC) with its International Project Office (IPO), providing administrative support to IMBER and its activities. National contacts help to promote IMBER, seek funding for research and coordinate IMBER-related science in their respective countries, thereby broadening IMBER's international scope.
IMBER has four working groups or task teams. These groups are responsible for developing implementation plans for specific research topics. Often the group will be formed to tackle scientific issues that need special attention. A working group on human dimensions has been proposed and is under discussion.

IMBER also collaborates with other projects both regionally and globally to implement its objectives. On the regional scale, the Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER) project links strongly with the CLIVAR/GOOS Indian Ocean Panel whilst there are further potential areas for collaboration, for example in synthesis and modelling and in IMBER's activity on "Integrating Climate and Ecosystem Dynamics in the Southern Ocean".

3. Contributions from National Programmes

3.1 US CLIVAR presentation

An update on US CLIVAR science initiatives was provided by Dr. Marty Hoerling, the outgoing US CLIVAR SSC chair. In particular, US CLIVAR is moving ahead on the themes of decadal variability and climate extremes. The climate of polar regions is an emerging third core theme, further explored at the recent (July 2010) US CLIVAR Summit. In addition carbon cycle and ecosystem opportunities are being assessed within US CLIVAR. US CLIVAR has pioneered the concept of Climate Process Teams (CPTs) and four new teams covering ocean boundary mixing, cloud parameterizations and sea ice/ocean mixing will begin in 2010. A programme for CMIP-5 model analyses is also under development, including those addressing decadal diagnostics. In addition, the Atlantic Meridional Circulation activity has now grown significantly to 38 projects. Finally, the US CLIVAR post-doc programme, aimed at increasing the pool of scientists qualified to transfer climate knowledge to decision frameworks and tools, has announced three new Fellowships for 2010.

3.2 Monitoring climate extremes in Europe

Albert Klein-Tank provided the SSG with a briefing on the European Climate Assessment & Dataset project (ECA&D). This is a joint activity of ~40 Met. Services and ~10 Universities in Europe with the status of a WMO Regional Climate Centre (RCC) for RA VI. Based on a centralised data archive

of station records, it covers a mixture of science and services and its goal is to describe the past evolution of land-atmosphere climate extremes. Deliverables encompass scientific papers and interactive web interface at http://eca.knmi.nl for browsing time series plots, trend maps, climatology/anomaly maps, and return value maps for selected stations, time periods, etc. that provides:

- Daily data records for temp, precip, humidity, cloud cover, snow depth, slp, sunshine, plus metadata (roughly 60% of ~3300 stations from ~60 countries downloadable)
- Indices for moderate extremes (27 ETCCDI indices plus many more for snow, drought, etc.)
- Return values for more rare extremes (based on GEV analysis for consecutive 20yr periods)
- Factsheets for significant weather events from the past(GEO themes energy, health, disasters, water, etc.)
- Complete documentation on data processing steps

Data are also available from the Climate Explorer http://climexp.knmi.nl. ECA&D forms the European contribution to the worldwide set of indices for the CCl/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI). There is a gridded version called E-OBS developed as part of EU ENSEMBLES to match the common RCM grids in Europe though the gridding technique has also been used in Mexico and South America. The website, database and processing software is openly available for use in other regions of the world and the system is now being implemented for the region Indonesia, Malaysia, Thailand, Philippines,

In terms of future perspectives, a newew EU-funded project EURO4M (2010-2014) will synthesize: station based results of ECA&D; satellite climate data records of CM-SAF (EUMETSAT) and new regional reanalyses by UKMO, SMHI, Meteo-France (see http://www.euro4m.eu)

4. ICPO Report

Howard Cattle updated the SSG on the structure, funding and activities of the ICPO. The National Oceanography Centre, Southampton, UK (NOCS) hosts three of its staff (Howard Cattle, Kate Stansfield and Sandy Grapes under funding from the UK Natural Environment Research Council (NERC). Other staff members (Anna Pirani, Nico Caltabiano and Carlos Ereno), funded through US CLIVAR, are currently hosted by the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy (Anna Pirani) and the University of Buenos Aires, Argentina (Carlos Ereno) with Nico Caltabiano having visiting scientist status at NOCS. In the area of staffing, Roberta Boscolo had left the ICPO for a post with the JPS for WCRP in June 2009, her place being taken with the move back to the ICPO by Dr Caltabiano. The ICPO were also very recently pleased to welcome a new member of staff, Dr Xiaohui Tang seconded by China and who would work from the Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China. Whilst Dr Cattle had formally retired at the end of March 2010, he had continued to act as ICPO Director under contract to UK NERC on a 3-day a week basis, pending the recruitment of his successor. Two recruitment campaigns had been run during the year with the second resulting in the offer of the post to Dr Bob Molinari.

A bid for further funding of the ICPO for 5 years from 1 April 2010 was made to UK NERC during the year. The bid was successful in NERC agreeing to support for a further 3 years at this stage. US CLIVAR funding is provided partly through a contract with CLIVAR and partly through NOAA. The UCAR contract, previously with the University of Southampton, was renegotiated to be between UCAR and NERC during the year to meet an internal NOCS requirement.

Dr Cattle then briefly outlined aspects of the work of the ICPO during the year in support of the wide range of CLIVAR activities reflected in the agenda for the meeting. In closing he expressed thanks to those who have supported the office both through direct funding and through “in kind” support through acting as hosts to IPO staff and their activities.

5. Future CLIVAR strategy

By way of leading into the discussion on this topic, Jim Hurrell first outlined the mechanism by which the CLIVAR Research Imperatives had been developed by CLIVAR SSG-17 and summarized the list of Imperatives overall. These had been presented to JSC-31 which itself had been concerned with developing the future new structure for WCRP. The charge to CLIVAR and its activities is to:

- Examine what this new structure implies for the sub-structure within CLIVAR:
    - How should crosscutting (observations, modeling) and regional panels change to reflect this new structure?
    - Do we modify what we have or start with a clean slate?

- Develop a strawman for "ocean-atmosphere" for further discussion at next JSC

Some issues and initial thoughts included:

- Much of the science of CLIVAR falls under "ocean-atmosphere":
    - Ocean basin panels, GSOP, WGOMD
    - Ocean observing system (partnership with IOC, JCOMM, etc.)

- But some activities are broader and do not:
    - Monsoon panels, work on extremes, annular modes, etc.
    - WGCM, WGSIP, …
    - IGBP and other interactions …

- More generally
    - How would we organize activities spanning Earth system domains and other integrating themes?
    - What should be the scope/structure of "ocean-atmosphere" project?
    - How do we develop effective partnerships (across WCRP, IGBP, …)?
    - How do we ensure effective interfaces (e.g., regional programs)?
    - What would be the deliverables and links to applications?

- Will an IPO based around "ocean-atmosphere" be attractive to funders? What would be its remit and name?

5.1 Restructuring of WCRP and implications for CLIVAR activities

During its meeting the SSG extensively discussed, via breakout groups and plenary discussion, the proposals for a new structure for WCRP and their implications for CLIVAR. By way of introduction, Martin Visbeck had earlier provided a summary (repeated in Jim Hurrel's presentation above) of present thinking on this by the JSC for WCRP which is to make a transition in the 2013-15 timeframe from the present projects to four core areas covering:

- ocean-atmosphere interactions,
- land-atmosphere interactions,
- cryosphere-climate interactions
- troposphere-stratosphere interactions.

They would have particular responsibilities to facilitate climate research at the interface of the physical Earth system components. CLIVAR would basically transition to a single focus on ocean-atmosphere interactions.

Each core project should address a common set of basic "themes":

- Observations and analysis
- Model development, evaluation and experiments
- Processes and understanding
- Climate information, applications and capacity building

In addition Observation & Analysis and Modelling Councils will provide overall coordination in their respective areas. Some attention was given at the last JSC meeting to the prospect of identifying overall "grand challenges" across WCRP though without clear conclusion. The JSC is requesting feedback from its projects on these ideas which are set out in more detail in the JSC-31 Report at www.wcrp-climate.org/documents/JSC_31_report.pdf.

Subsequent discussion and a round table poll of views led to a wide variety of views on the proposed new structure. These included:

- The focus on interactions with the atmosphere rather than on atmospheric dynamics and physics per se
- Whether the four project structure would be limiting for improving predictions and the need for model improvement to be clearly addressed within it (this would clearly need to be addressed by the Modelling Council).
- Whether this decomposition moves us in the right direction to meet societal needs and whether this form follows desired function in terms of exciting groups to address scientific challenges
- The view that the structure as proposed might strengthen barriers and keep observationalists and modellers apart.
- Favour for the four project structure but not for the councils
- A preference for a re-organization along a set of prioritized "grand challenges" and a view that this would better facilitate getting people together.
- A view that "grand challenges" would not necessarily be inclusive
- How the regional approach would be incorporated, given its importance for observations, issues of extremes, linking to IGBP, and developing country involvement. The need for a plan for applications and regions
- How the structure incorporated predictability and prediction in a changing climate.
- How the whole would be coordinated
- How the proposed structure would interface with wider climate system elements including biogeochemistry and ecology
- Where data management lies

In further discussion, Martin Visbeck reminded the meeting that the challenge we are presented with is to scope whether we could make things work within the proposed new structure. With this in mind, the meeting split into three breakout groups to consider this, co-chaired by Drs Lisa Goddard, Ben Kirtman and Wenju Cai.

5.1.1 Breakout Group 1 (Chair, Lisa Goddard)

This group started from the perspective that CLIVAR can indeed fit to the proposed new organization but asked where might the failure points be. A CLIVAR focus on ocean-atmosphere interactions would eneble attention to problems not currently tackled – e.g. in collaboration with IGBP, ocean acidification and upwelling and impacts on ecosystems. The real question was how the new organization would fit to issues such as the monsoons which were the product of a combined ocean-atmosphere and land-atmosphere interactions? These would clearly have to be tackled as a cross cut or "grand challenge" though such a pan-WCRP approach has not worked well to date. There is also

the potential for the structure to become unwieldy because of the potential need for an increasing number of interactions amongst groups. The matrix management would not be easy.

Further discussion of the "grand Challenge concept recognized that these come in "waves of opportunity" providing "low hanging fruit" which establish communities (a key WCRP function). In terms of timescale, it was felt that the duration of such activities should be of order 6 years or so but that the "grand challenge" approach may not be what is needed for the developing world in particular. Regional issues also received attention. Both CLIVAR and GEWEX have well established regional activities, some in tandem (e.g. VAMOS) and there was a need to scope how regional activities would interface with the new structure – some countries/regions may prefer a more merged approach than that implied by he present set of proposed 4 core projects.

Overall the feeling was that the ocean aspects of CLIVAR could be fitted to the new structure. However there would be a need to negotiate continuity for some parts of CLIVAR of necessity moving outside of this area (e.g. Africa) and there would be a need to give careful attention to regional issues, cross cuts and grand challenges

5.1.2 Breakout Group 2 (Chair Ben Kirtman)

This group sought to take a holistic view of the proposed new WCRP structure which seeks to facilitate and enable science that requires interactions amongst the "disciplinary projects". This is distinct from the current structure. In themselves the disciplinary projects provide necessary underpinning which must be supported. As yet however it is unclear how the projects organize themselves, whilst the overarching scientific challenges need to be identified and prioritized. In doing so and in developing science and implementation plans there is a delicate balance between "top-down" and "bottom up" that needs to be recognized.

5.1.3 Breakout Group 3 (Chair,Wenju Cai)

The overall conclusion of this group was that the new structure can be made to work. The new structure preserves functions similar to those of the existing structure as well as much of the support structure and infrastructure already in place. Each of the four new programmes has a comparable equivalent to the existing structure. It is also felt that after the decade-long evolution, CLIVAR has grown to include too many panels and working groups to the effect that its main focus might be seen as somewhat lost. The restructuring process offers an opportunity to restore and enhance functions of several panels and working groups by placing them in a more appropriate programme. Nevertheless, the need to recognise the continuing need for substantive cross-cuts was highlighted by the group.

The group recommended in particular that:

- The Asian-Australian Monsoon Panel (AAMP), Variability of the American Monsoon Systems, and Variability of the African Monsoon Systems Panel (VAMOS) reside outside the new Ocean-Atmosphere programme.
- An Arctic Panel be added to the Ocean–Atmosphere programme (but see below).
- GSOP and WGOMD continue to reside in the Ocean-Atmosphere program, but WGCM and WGSIP be placed outside, given their broad cross-cuts.

It was also suggested that the function and the goal of the two councils in the new structure needs to be clarified, recognizing that these councils are not the home for model working groups, and data synthesis panels etc., but a mechanism for integrating across all four projects.

The overall view which emerged was that CLIVAR could indeed adapt to the new structure (recognising that this is still in an early form) with attention to issues such as scope (in particular of the ocean-atmosphere interactions component), structure (including the SSG), partnerships, interfaces,

especially to the regions and applications and the nature of the deliverables (data, models, information services etc). A summary of the discussion at SSG-17 and feedback to the JSC will be provided.

- **Provide feedback to JSC on SSG discussions on future WCRP structure (Action: SSG co-chairs with ICPO)**

In concluding the discussion, Dr Asrar reminded the attendees that the JSC would indeed value feedback and inputs to the discussions from all of the community over the next 15 months or so. The timeline was to set out the big picture at the WCRP Open Science Conference in October 2011. Until then, nothing as yet was set in stone.

5.2 CLIVAR's role in climate services

The meeting then turned its attention to CLIVAR's role in climate services. CLIVAR has a clear role to provide feed in to IPCC and the mechanisms by which this is done are well established. CLIVAR also has an important role to provide science underpinning in the area of prediction and information more widely and to do this over a range of timescales. However in order to get a better idea of where CLIVAR activities feed into the Climate Service elements, panel and working group chairs or their representatives were asked to identify panel word working group contributions to these in percent. The outcome was the table at Annex C where it can be seen that, whilst a high percentage of CLIVAR effort goes into observations and core climate research, a significant amount of effort goes into wider areas also. With regard to observations, a particularly important issue for climate services is the development and maintenance of the sustained observing system and the SSG discussed this. GCOS is clearly the lead here though as identified in relation to the Ocean Observing System and OOPC, the CLIVAR role is to feed in the science requirements for sustained observations.

5.3 Imperatives for CLIVAR research

At its last meeting, the SSG developed the basic structure for its imperatives for research over the coming 5 years and set up tiger teams to develop this further. The outcomes of this activity were reviewed through 3 off-line groups with conclusions/input as follows:

Anthropogenic Climate Change and Earth System Models (Jerry Meehl, lead)
Key points:

- Focus on what is happening now and in the near future in terms of CMIP-5
- Identify the need for better coordination of CMIP-5 decadal model experimentation and observationalists
- Identify the need to provide evidence for decadal variability

Intraseasonal, Seasonal to Interannual and Decadal Predictability and Prediction (Sieg Schubert, lead)
Key points:

- On subseasonal to seasonal timescales, we need to in particular emphasize collaboration with THORPEX/TIGGE.
- There is a need to emphasize also promotion of the use of YOTC data.
- Emphasize good connections to GEWEX and SPARC (few with CliC as yet).
- Need to emphasize the seamless approach linking across to decadal.

Data Synthesis and Analysis, the Ocean Observing System (Detlef Stammer, lead).
Key points:

- Noted sea level is not included in CLIVAR Imperatives – there is a need to clarify CLIVAR's involvement in the WCRP cross cut on this is not clear.
- Include the need for uncertainty measures for ocean synthesis
- Need to highlight the surface flux elements of synthesis products

- Include mention of connection to IGBP for carbon fluxes and the need to develop links to SOLAS and IMBER
- Need to identify relevance of synthesis to decadal as well as seasonal prediction
- The observing system section of imperatives document needs revision and further development to identify what CLIVAR is doing and its particular focus on research requirements and assessment of what is being observed
- Data stewardship also needs a home and needs to be included in the ocean observing system imperative.

In addition all were asked to consider the issue of capacity building in CLIVAR. A particular aspect identified was the need for workshops to train both our own community and developing countries on how to use climate products.

Following the brief reports on these deliberations, a mechanism to publish the Imperatives in a common format was agreed. In particular there is a need to:

1. Complete the imperatives document through the autorship teams, making the text more uniform in terms of style, length and format.
2. Add a few exciting figures (ask authorship teams for these). Write an introduction
3. After soliciting final comments/edits from the SSG and panels, publish and distribute the final document
4. Produce a short, glossy brochure that is eye-catching to funding agencies, other research programs, etc.

The end of 2010 was targeted for completion of these tasks.

As a check on the relevance of the Impoeratives to the work of the CLIVAR Panels and Working Groups, a table providng percentage fit to each was developed. The outcome can be seen at Annex 4. The imperatives will provide the basic platform to guide the programme over the timescale of the next 5 years or so and will provide a basis for future reporting on progress with CLIVAR activities.

- **Further develop document on imperatives together with an associated glossy (Action: B Molinari, with ICPO staff and V Detemmerman)**

- **In particular further develop observing system imperative description (Action: GSOP co-chairs)**

5.4 Strategy for the Arctic

David Bromwich introduced this topic on behalf of CliC. He began by noting that, following the finish of the WCRP Arctic Climate System Study (ACSYS), WCRP activities in the Arctic have not been visible enough. Systematic underestimation of the rate of the decline of the Arctic sea-ice cover by the IPCC AR4 models and the need to resolve multiple climate system feedbacks in order to more comprehensively predict Arctic climate in global climate predictions call for a *systematic* approach to prediction of Arctic Climate as part of the global climate prediction. The IPY was a quantum leap of the polar science, especially in the area of observations. Yet, its contribution to the prediction of the Arctic climate as a system could have been larger.

The 6th Session of the CliC SSG (Valdivia, Chile, 4-9 February 2010) discussed the situation and adopted four *long-term CliC objectives.* They are:

- Enabling prediction of the Arctic climate system;
- Enabling prediction of the Antarctic climate system;

- Enabling prediction of terrestrial cryosphere; and
- Enabling improved assessment of the past, current and future sea-level variability and change.

CliC understands that achieving these objectives is hard and requires work with partners within and outside WCRP. CliC SSG Chair Koni Steffen presented these long-term objectives to JSC-31 and they were approved by JSC. JSC requested CliC to take the lead in defining the scope of the "Arctic" dimension of pan-WCRP activities, in cooperation with relevant partners. CLIVAR is one of the key partners for Arctic climate system prediction.

At present, the primary issue is the need for a broad consensus between all interested parties on the systematic way forward for Arctic Climate system prediction. The decadal scale is key because decadal variability is prominent in the Arctic. The seasonal scale is key because of its practical importance and greater feasibility. The JPS for WCRP has started inquiries with several key partners and this work has to be continued and expanded.

The CliC request to the CLIVAR SSG was therefore for the SSG to ask relevant CLIVAR groups and panels to work with CliC towards preparing a roadmap towards prediction of the Arctic climate on time scales from seasonal to decades. A white paper on this had already been considered by CLIVAR's Atlantic Panel. Moving forward will require identification of experts for a working group that would be composed of leading experts in various aspects of Arctic climate prediction from within and outside of the WCRP circles.
Finally Dr Bromwich appraised the SSG of the development of proposals for a CMIP-5 project for an **AR**ctic **C**limate **HI**ndcasting, **M**odelling and Pr**ED**iction **E**xcersi**S**e (ARCHIMEDES) for which a roadmap needs to be developed and of the recent outcomes of a meeting of the Arctic Ocean Sciences Board (AOSB) which had agreed a joint undertaking with WCRP on Arctic climate system prediction and on a data synthesis for the Arctic and Subarctic Seas. He also outlined a planned SPARC/CliC workshop on "Polar climate predictability" (Bergen, Norway, 25-29 October 2010), the development of a WWRP THORPEX polar prediction activity and the current status of Arctic System Reanalysis efforts.

In discussion, the SSG agreed the approach. CLIVAR would nominate and submit names of individuals to serve on a Working Group on the Arctic with CliC taking the lead and undertaking the negotiation with the various groups involved (AOSB etc). The issue of the need to strengthen CliC involvement in WGSIP activity on CHFP was also raised as an important near term opportunity for CliC.

- **The SSG encourages development of Working Group on Arctic Climate (CliC lead in consultation with external groups). CLIVAR to submit nominations for membership to CliC (Action: SSG-co-chairs with ICPO).**

- **Follow up on the near term opportunity for CliC to link up with prediction area via CHFP (Action: CliC/WGSIP)**

5.5. Strategy for surface fluxes

Dr Kevin Trenberth outlined the recent discussions on the issue of surface fluxes at the recent WOAP meeting. The WCRP Working Group on Surface Fluxes has been functioning since 2004, and it has promoted work on improving the measurement and modelling of surface fluxes. The terms of all the members of the Group have expired, and so it is appropriate to consider the best organisational arrangement for the coordination of surface flux activities, bearing in mind the work in other WCRP programs. Current activities of WCRP-related programs on surface fluxes include:

- WGSF has developed, *inter alia,* the Flux Handbook on observational best practice and the OceanObs09 paper on data requirements for fluxes.
- GEWEX has prepared a range of flux data sets, including SeaFlux, BSRN, LandFlux and

SRB.

- CliC has a continuing program on fluxes in the cryosphere.
- US CLIVAR has a working group on high latitude surface fluxes.
- WGNE has the joint SURFA project with WGSF comparing collocated fluxes and related variables with NWP output.
- SOLAS aims to improve understanding of biogeochemical interactions and feedbacks between the ocean and the atmosphere.
- TOPC-AOPC Task Group is considering algorithms used in the preparation of ECVs at the land-atmosphere interface.
- TOPC has continuing work on carbon and related fluxes through the FluxNet program, and it is also establishing new activities on the estimation of global carbon fluxes.
- Real-time carbon fluxes are a component of the GEMS program.

Possible overlaps in current activities include work on air-sea fluxes in WGRF, GEWEX, SOLAS and CliC. Current activities of WGSF that should be continued include improvement in radiative flux and precipitation measurements at sea, flux process studies and their impact on parameterization, improved management of flux and flux-related data, and guidance on flux products. Consideration of these issues had led WOAP to recommend two actions as follows:

- The CLIVAR SSG is requested to develop a strategy for coordinating current activities on surface fluxes across GCOS and WCRP projects and for ensuring that significant gaps are addressed.
- WOAP should consider focusing one proposed dataset assessment workshop on global surface fluxes, including physical and biogeochemical properties.

Dr Trenberth's presentation was followed by a summary presentation of the work of the Working Group on Surface Fluxes by Dr Sergey Gulev. Despite the fact that it is now time expired, the recent activities of the Working Group have included participation in OceanObs'09 and contribution of a Community White Paper to that conference; participation in the Joint SEAFLUX/US CLIVAR Working Group on High Latitude Surface Fluxes Meeting in March 2010; involvement in the SURFA Project; work on solar flux calibration/intercomparison measurement meeting BSRN standards; and the imminent submission to the *Rev. Geophys.* of a review article on surface production of sea spray aerosols.

- **In response to WOAP request, the CLIVAR SSG agreed to take on WCRP lead in air-sea fluxes through GSOP, ensuring link with GEWEX SeaFlux activity in particular (Action: GSOP co-chairs)**

5.6 WCRP Open Science Conference

The present status of planning for the WCRP Open Science Conference (OSC), to be held in Denver, Colorado, USA from 24-28 October 2011, was summarized by Jim Hurrell. The theme of the conference is "*Promoting, facilitating and coordinating climate research in service to society*". It will be an assembly of entire WCRP research community and wiill also engage other key international programs. In particular it will be an exclusive opportunity for exchange and collaboration across diverse research communities (e.g., WCRP, WWRP, IGBP, IHDP, …) working to advance understanding and prediction of climate variability and change across scales. Some 1500 or more participants are anticipated. The conference will:

- Appraise current state of climate science (→ AR5)
- Identify most urgent scientific issues and research challenges
- Ascertain how WCRP can best facilitate research and develop partnerships critical for progress
- Facilitate growth of future, diverse workforce

Scientific and Local Organizing Committees are in place chaired by Jim Hurrell and David Leger respectively. The programme will comprise daily conference themes, plenary and poster sessions to follow themes and parallel science sessions. Strong supprt and the engagement of CLIVAR and other WCRP projects is needed to stimulate, suggest and lead exciting symposia and additional programme features, encourage participation and financial support and to contribute to the OSC organization and to help with publicity, actions on which are already well in hand.

Action: Develop strong CLIVAR contributions to the OSC (All)

6. Reports from CLIVAR Panels and Working Groups

The third day of the meeting was primarily taken up with presentations on progress by CLIVAR's panels and working groups and discussions of these. Each was encouraged to bring to the table any issues that they had for the SSG. The discussions were stimulated by short presentations from the CLIVAR Panel and Working Group co-chairs or their representatives and informed by the summary reports of progress provided as written documents prior to the meeting. Edited version of these reports were published in CLIVAR Exchanges No. 54 (July 2010) available via:

http://eprints.soton.ac.uk/162355/1/Exch54.pdf

A detailed account of these presentations is not included here, therefore. A number of recommendations and actions emerged as a result o the panel and working group reports as follows:

6.1 Global modelling working groups

6.1.1 WGCM

- **SSG endorses call for full documentation of CMIP models and of how experiments were run.**

- **With GSOP and the GEWEX dataset panels, continue to explore the optimal use of observational datasets for model validation (Action: WGCM with GSOP & GEWEX dataset panels).**

- **SSG supports continued CLIVAR dialogue with SPARC on ESM model evaluation (Action: WGCM)**

6.1.2 WGSIP

- **WGSIP to develop a position on the optimal communities to interact with, providing feedback on these to global modelling centers (Action: WGSIP).**

- **Increase visibility of CHFP via, e.g., a future WCRP CHFP workshop and at the next WGNE meeting (Action: WGSIP).**

6.1.3 WGOMD

- **Basin panels are encouraged to make use of of available CORE-II runs providing feedback to WGOMD (Action: Basin Panel co-chairs)**

- **SSG agrees to extend membership of WGOMD to cover biogeochemistry, the coastal (regional) modelling community and land-ice connection in relation to sea level. (Action: WGOMD co-chairs with ICPO)**

- **Consider WGOMD membership overall (Action: WGOMD co-chairs with ICPO)**

- **Consider the relevance of links to the operational ocean modelling community taking advantage of existing member contacts in this area (Action: WGOMD co-chairs)**

- **WGOMD is encouraged to continue to provide recommendations for evaluating ocean simulations, especially eddy resolving models (Action: WGOMD).**

6.2 Synthesis & Observation panels

6.2.1 CLIVAR/PAGES

- **Review way in which CLIVAR selects membership with aim of choosing scientists already active in CLIVAR structure (Action: SSG co-chairs with ICPO)**

6.1.2 ETCCDI

- **ETCCDI to develop future strategy to grow capability in its area of work and mechanisms by which this may be achieved, so as to meet growing demand for information on extremes. (Action: ETCCDI co-chairs)**

- **CLIVAR membership agreed in principle, to be reviewed immediately post meeting and re-evaluated after 2 years in light of new strategy (Action: SSG co-chairs with ICPO).**

6.1.3 GSOP

- **GSOP is requested to urgently review its membership for submission to the SSG (Action GSOP co-chairs).**

- **GSOP to scope the holding of a workshop to evaluate ECV ocean products, possibly in conjunction with planned data workshop (Action: GSOP co-chairs)**

6.3: Ocean Basin Panels

- **All: Review carbon representation for all panels (Action: Basin Panel co-chairs with ICPO)**

6.3.1 SO Panel

- **Discuss SO Panel membership issues before/at June meeting. The SSG suggests the panel considers including membership from the ecosystem community (Action: SO co-chairs with ICPO).**

6.3.2 Pacific Panel

- **The SSG encourages increased involvement of South American scientists in Pacific Panel activities and suggests discussion with VAMOS on this (Action: Pacific Panel co-chairs).**

- **The SSG requests the Pacific Panel establish greater interactions with VOCALS (Action: Pacific Panel co-chairs)**

6.3.3 Indian Ocean Panel

- **Discuss IOP membership prior to July meeting (Action: IOP co-chairs with ICPO).**

- **Charles Magori's membership of IOP is approved (Action ICPO).**

- **Consider IOD as a science topic for a possible IOP workshop (Action: IOP co-chairs)**

6.4 Monsoon & Africa Panels

6.4.1 AAMP

- **AAMP is encouraged to develop its links with GEWEX AAM activities, particularly those under CEOP, and also encouraged to seek to meet more frequently than 18 month intervals (Action: AAMP).**

6.5 Proposed Working Group on the Indonesian Through Flow (ITF) and Indonesian Sea Variability

During the period since SSG-16, a proposal had arisen for this short-term Working Group to:

- Review the current understanding and uncertainty in ITF and Indonesian Sea variability and their influence on climate variations.
- Facilitate collaboration between existing and planned observational and modeling studies to minimize the gaps in the research and maximize the scientific outcome.
- Develop strategy to monitor ITF for long term.

Yukio Masumoto (co-chair of the Indian ocean panel (IOP)) had agreed to lead this and provided the meeting with a short presentation on current progress with this. He reminded the SSG that:

- TheITF connects the western Pacific and eastern Indian Oceans
- The ITF affects the mean condition and variability in the warm pool regions, the basin-scale circulation systems, and global thermohaline circulation
- Strong tidal mixing in the Indonesian Seas affects the water mass properties, SST distribution, and hence the air-sea interactions in the region.
-

Despite its importance, the ITF had received little attention within CLIVAR thought there are a number of previous current and planned activities in the region. What is needed is to:

- Have a better estimate of ITF magnitude and its variability and the 3-D structures in the Indonesian Sea, and utilize them for validation of model results
- Have better understanding of ITF's role in climate system/variations
- Promote collaborations between existing and planned observational and modeling studies
- Develop a strategy to monitor ITF for long term.

With SSG agreement it was now proposed to develop the membership of the working group keeping the number of members to around 10, incorporating internationally recognized researchers who are studying ITF and Indonesian Sea variability together with iaison members fromIOP, PP, and possibly AAMP and at least one member from Indonesia, possibly as co-chair. Propsals would be discussed at the IOP and pacific Panel meetings in July and October respectively with the final propsal being submitted to the SSG in November 2010.

In consideration of this report, the SSG agreed its support for the development of 2 year **Task Force (TF)** to provide a mechanism and plan for ITF activity. In consequence:

- **SSG members were requested to contribute suggestions for members of the ITF TF, to include at least one member from Indonesia (Action: SSG members to send to Yukio Masumoto, copy to ICPO)**
- **The need to specify deliverables for ITF TF activity as part of review of ToRs was identified (Action: Pacific Panel/IOP co-chairs, SSG, IPCO)**

7. Discussion on Africa

This item was intended to identify the future strategy for CLIVAR's Variability of the African Climate System (VACS) panel. The discussion was led by Dr Richard Washington, the VACS co-

chair. In his view VACS has been most successful in the past as a springboard for activity, intervening and facilitating major programmes. It has been less successful in sourcing its own funds for activities and facilitating its own regional research programmes. An important point in developing any programme for Africa is that most climate programmes and initiatives are now 'applications' oriented. Dr Washington reminded the SSG that Africa is not on track to meet the Millennium Development Goals given that:

- It has a dependence on rain fed, subsistence agriculture
- Sub-Saharan Africa is the only region of the world that has become poorer in the last generation
- The continent makes up just 13% of the world's population but 28% of world poverty
- It is home to 32 of the 38 Heavily Indebted Poor Countries
- Its share of world trade more than halved between 1980 and 2002
- It is subject to conflict and unrest

There is however a correlation between rainfall and GDP indicating that climate matters to Africa and it is clear that the CLIVAR Imperatives map directly onto African climate needs, especially for prediction and capacity building. Regional aspects are particularly important and in developing the VACS programme it is assumed that CLIVAR and WCRP will maintain a focus on the regional approach. Dr Washington proposed that VACS pursue the following set of climate science activities:

a) Mechanisms in models with a focus on CMIP5 and CORDEX Africa-wide analysis.
   - VACS to set up, promote and maintain analyses of model mechanisms for key regions
   - Framework for analysing observed and model mechanisms, including extremes, variability and change
   - Links to ETCCDI (VACS looks at process) and Ocean basin panels

b) Coordination of climate programmes (Fennec, AMMA2, ClimDev)
   - VACS provides outline of major activities and programmes, where they are run from, timelines etc.
   - Links to Ocean basin panels, climate services, NGOs etc

c) An African-wide 4 degree project
   - Evaluate climate change in Africa associated with 2, 3, 4, and>4 degrees of global temperature change.

d) Mineral Aerosols
   - Coordinating framework on mineral aerosol research in Africa

e) Congo (via Forest Fund)
   - Shape beginnings of an understanding of Africa's key climate region.

In terms of outreach and capacity building, the VACS African Climate Atlas provides one mechanism for the former whilst Dr Washington proposed to follow up again on the previous propsal for a "Rainfall Onset Workshop". He also proposed to develop an overview of capacity building efforts for the continent to track national capacities to provide scientific inputs and advice. He noted that programme endorsement is powerfully important in securing funding when science resources are projected to decline in many countries. With regard to applications, Dr Washington identified a number of avenues from which to explore this, as follows:

• The Rainfall Onset Workshop

• Climate science – humanitarian futures partnership: demonstration studies in Africa (DFID, Oxfam, Christian Aid etc) key output with close links to WGSIP

• EU FP7 project QWeCI Quantifying Weather and Climate Impacts on Health in Developing Countries (2010-2014). The country focus is on Senegal, Ghana and Malawi.

• Agriculture and climate uncertainties

In terms of issues and practicalities, given the climate change focus in Africa, he suggested a chage of name for VACS to African Climate System Panel. With an eye to the future directions of WCRP and CLIVAR he wondered if an African panel belongs in an "Ocean-Atmosphere box" at the same time noting that VACS loads heavily onto the CLIVAR Imperatives. He also made some proposals for membership, resources needed and a prospective timeline for the next 6 months leading to the first meeting of the reconstituted VACS Panel.

Dr Washington's presentation led to considerable discussion. Particular points included:

- Support for work on understanding mechanisms and assessing the basic credibility of models as AR5 develops and as a focus for Africa
- Opportunities for cooperation with GEWEX
- Potential for wide collaboration with CORDEX
- Potential for coordination with basin panels.
- Whether there should be focus on short timescale predictability
- Chinese interest in Africa and the potential for follow up on this.
- Potential for paleo links
- The need for collaboration with WGSIP identifying sources of predictability and quantifying uncertainty in model predictions over the continent.
- The wider importance of hurricane genesis (NCEP has an Africa desk) and wider US interests including aerosols.
- The potential of the VACS Climate Atlas for bridging the gap between observations and models

Ghassem Asrar noted that the timeline was an ambitious on and wondered what the thoughts were for the period beyond that and what support would be needed from both the JPS and the ICPO. As yet these had to be scoped.

- **The SSG was supportive of way forward with VACS. GEWEX connections need to be explored and Richard Washington was invited to attend the upcoming pan GEWEX meeting to explore connections. There is also a need to identify levels of support needed longer term and to begin to move the proposals forward (Action: Richard Washington to initiate).**

8. Summing up session on strategy

Outcomes of this discussion and agreed ways forward have been incorporated into the appropriate sections below.

9. CLIVAR procedure for endorsement of activities

This item was introduced by Howard Cattle. He reminded the SSG that CLIVAR is, from time to time asked to endorse activities which have not grown up under its umbrella but which contribute to the programme in terms of meeting its overall aims. CLIVAR endorsement can have advantages to those requesting it in, for example:

- Helping a project/activity to obtain national recognition and funding,
- Establishing a formal mechanism to enable the representatives of a project/activity to engage discussions with a CLIVAR panel or WG, or the ICPO to assist co-ordination.

They can also provide the potential for a broadening of CLIVAR's scientific remit into include a new but related emerging research area.

Present guidelines for endorsement are on the CLIVAR web page. These had been reviewed by Dr Cattle and some changes to these were suggested in the accompanying meeting document. In particular to make the procedure less onerous and without the sometimes implied need to work though detailed and long planning documents.

In discussion it was stressed that these procedures were intended for SSG endorsement of international, not national programmes and activities SSG agreement. However Richard Washington stressed that letters of support are sometimes very important for the success of proposals. UK NERC for example have a special place for letters of support. It was agreed that such letters could be sent on he understanding that CLIVAR would send letters commenting on the relevance of work, but not commenting on the quality of any proposal and that the process be managed through the ICPO. Dr Visbeck noted that endorsement of international conferences was usually done at SSG Executive level. In commenting on the wording of the proposed changes, Prof. Drinkwater noted the need to add a requirement to report back on progress with activities to the relevant CLIVAR Panel and Worksing Group or the SSG. The need to strengthen the section on data policy (asking what was to be done about this, rather than simple adherence to policy, was needed.

Finally, Dr Trenberth asked why these procedures are not WCRP-wide. Dr Asrar confirmed that this could be desirable if the procedures could be made generic and were managed by the projects. He requested CLIVAR, through the ICPO, to make a proposal on this to JSC-32.

- **Finalize the changes to the procedure and post on web (Action: ICPO)**

- **Establish mechanisms for report-back on CLIVAR-endorsed projects and tracking data management and data access aspects (Action: ICPO)**

- **Make procedure for endorsement of activities generic and suggest to the JSC to make this WCRP-wide (Action: ICPO with JPS for WCRP).**

10. Review of action items and revisit of issues as needed

Actions were discussed and reviewed with a final version drawn up after the meeting and agreed.

11. SSG and Panel/Working Group membership issues

Identified SSG decisions and recommendations on these, where they have arisen, have been incorporated into earlier sections of this report

12 Date and place of next meeting

The next SSG will be hosted by the International Oceanographic Commission at the UNESCO building in Paris during the week of 2-6 May 2011.

13. Close

The meeting was closed with thanks to all those who have taken part and in particular to Lisa Butler (NCAR) for all her friendly and timely help during the meeting.

The full set of meeting papers is at: www.clivar.org/organization/ssg/ssg17/ssg17.php

Presentations are at: www.clivar.org/organization/ssg/ssg17/SSG17-presentations.php

Annex A

CLIVAR SSG-17
National Center for Atmospheric Research
Boulder Colorado USA

17-20 May 2010

AGENDA (v13 May 2010)

SUNDAY 16 MAY 2010
18:00: CLIVAR SSG Exec discussion, including working dinner
Thyme on the Creek Restaurant, Millennium Harvest House Hotel

MONDAY 17 MAY, start 0900

1. Introduction (0900-1030)

1.1 Welcome by Dr Greg Holland, Director NCAR Earth System Laboratory
Welcome by the CLIVAR SSG co-chairs

1.2 Introductions (all), local arrangements (Lisa Butler, Howard Cattle) (10mins)

1.3 Introduction to SSG-17 (SSG co-chair(s), 10 mins + 5 mins discussion)

2. Outcomes of JSC-31 and sponsor and other project/programme inputs (1000-1330)

2.1a Outcomes of JSC-31 and other sponsor issues, e.g WMO/WCP, ICSU, IOC, WCC-3, WWRP, THORPEX, WGNE (G Asrar)

2.1b CLIVAR interactions across WCRP and other programmes (V Detemmerman)

(30 mins + 15 mins discussion for 2.1a & b in total)

Tea/coffee (1015-1045)

2.2a Developments in GEWEX (K Trenberth) (15 mins + 5 mins discussion)

2.3 OOPC Report (D Stammer, 15 mins + 5 mins discussion)

2.4 IMBER – update on current status and activities (Ken Drinkwater, 15 mins + 5 mins discussion.

3. Contributions from national programmes

3.1 US CLIVAR science initiatives, future strategy and links to international CLIVAR (M Hoerling/D Legler, 15 mins + 5 mins discussion)

4. ICPO Report (H Cattle, 15 mins + 5 mins discussion)

LUNCH (1225-1325) "on your own" in the NCAR cafeteria, cash only

2.2b Developments in CliC (D Bromwich) (15 mins + 5 mins discussion)

5. Future CLIVAR Strategy 1345-1730 (Tea/coffee (1530-1600)

5.1 Presentation of the WCRP "evolution" (CLIVAR co-chairs)

5.2 WCC-3 outcomes and CLIVAR's role in Climate Services (M Visbeck?)

5.3 Discussion, with consideration to the context of long-term frontiers and other programmes etc.

Reception (1730 – 19:30) NCAR Damon Room (with food and beer/wine)
[Introducer tbd]

2200 END OF DAY 1

TUESDAY 18 MAY, start 0900

5. Strategy continued (0900-1230)

5.3 CLIVAR imperatives and their implementation

Base around:

- Imperatives Documents
- 'Review'
- "Implementation Plan"

Tea/coffee (1030-1100)

5.4 Strategy for the Arctic, including modelling, (D Bromwich to introduce on behalf of CliC; 10 mins + 20 mins discussion)

5.5. Strategy for surface fluxes (30 mins total including discussion).
Introduction - WOAP request to CLIVAR (K Trenberth).
Work of JSC Working Group on Surface Fluxes (S Gulev).

5.6 Review of the organisation of the CLIVAR SSG

5.7 WCRP Science Conference 2011, IPCC-5 Input

LUNCH (1230-1330) "on your own" in the NCAR cafeteria, cash only

3. Contributions from national programmes continued (1330-1400)

3.2 Monitoring climate extremes in Europe (10 min) A Klein Tank

3.3 Other contributions tbc (10 min each including discussion)

Field trip to "Science on a Sphere", NOAA/ESRL Boulder (1400-1700) – shared cost, followed by catered picnic at the summit of Flagstaff Mountain

END OF DAY 2

WEDNESDAY 19 MAY, start 0900

6. Summary of key progress and issues from chairs of CLIVAR Panels and Working Groups (25 mins each – 10 mins presentation, 15 mins questions/discussion)
We are looking for 1-2 highlights, and the near term plans focussing on the challenges.
The goal is to provide constructive actionable input to the panel chairs for their work.

6.1a Global Modelling Panels: WGCM, WGSIP, WGOMD,

6.1b Discussion on coordination across modelling panels in context of strategy (15 mins)

Tea/coffee (1030-1100)

6.2a Global Synthesis and Observations (GSOP activities)

6.2b Climate change detection (ETCCDI activities) and paleoclimate (CLIVAR/PAGES)

6.2c Overall discussion of GSOP, ETCCDI, CLIVAR/PAGES in context of strategy (15 mins)

LUNCH (1230-1330) "on your own" in the NCAR cafeteria, cash only

6.3a Ocean basin panels: Atlantic, Pacific, Indian, Southern Ocean

6.3b ITF working group (Y Masumoto10 mins)

6.3c Discussion on coordination across basin panels in context of strategy (20 mins)

1540-1610 Tea/coffee

6.4a Africa/Monsoon Panels: AAMP, VAMOS, VACS

6.4b MJO Working Group (K Sperber, 10 mins)

6.4c Discussion on coordination of monsoon activities across panels and WCRP more widely, (30 mins)

6.5 Discussion on overall panel and working group coordination across the programme as a whole in context of strategy (30 mins)

1835 END OF DAY 3

1900 NO HOST SSG-17 DINNER at Laudisio Italian Restaurant (within walking distance of the Millennium Hotel)

THURSDAY 20 MAY (0900-1230)

7. Africa Discussion
What are the panels and working group connection with Africa?
Future strategy for VACS (45 mins)

8. Summing up session on strategy (max 30 min)

9. CLIVAR procedure for endorsement of activities (H Cattle to introduce)

10. Review of action items; revisit of issues as needed

1030-1100 Tea/coffee

11. Review of action items; revisit of issues as needed (continued)

12. SSG and Panel/Working Group membership issues

13. Date and place of next meeting

14. Close

1230 END OF SSG-17

Annex B

CLIVAR SSG-17 Attendees

Name		Capacity in which attending	Affiliation	email
Jim	Hurrell	CLIVAR SSG co-chair	NCAR, Boulder, USA	jhurrell@ucar.edu
Martin	Visbeck	CLIVAR SSG co-chair	IFM-GEOMAR, Kiel, Germany	mvisbeck@ifm-geomar.de
Dong	Wenjie	CLIVAR SSG	National Climate Centre, China Meteorological Administration	dongwj@bnu.edu.cn
Lisa	Goddard	CLIVAR SSG	International Research Institute for Climate and Society, Columbia University, Palisades, USA	goddard@iri.columbia.edu
Sergey	Gulev	CLIVAR SSG	P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russian Federation	gul@sail.msk.ru
Ken	Drinkwater	CLIVAR SSG	Institute of Marine Research, Bergen, Norway	ken.drinkwater@imr.no
Sieg	Schubert	CLIVAR SSG	NASA/GSFC, Greenbelt, USA	siegfried.d.schubert@nasa.gov
Dongxiao	Wang	CLIVAR SSG	South China Sea Institute of Oceanology, Chinese Academy of Sciences,China	dxwang@scsio.ac.cn
Jerry	Meehl	WGCM	NCAR, Boulder, USA	meehl@ncar.ucar.edu
Ben	Kirtman	WGSIP	Rosentiel School for Marine and Atmospheric Science, University of Miami, Florida, USA	bkirtman@rsmas.miami.edu
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Annex C: Contribution of CLIVAR Panels & Working Groups to the Climate Service Elements (%)

	WGCM	WGSIP	WGOMD	GSOP	ETCCDI	PAGES	AIP	PP	IOP	SO	AAMP	VAMOS	VACS
Global Climate Observing System				40	20		70	503	50		5	10	20
Core Climate Research including modelling	70	50		15	40		30	30	20		80	40	30
Climate services information systems				20	10			10	10		5	20	10
Climate user interface mechanisms	30	20		10	10			10	10		5	10	10
Capacity Building		30		5	20			10	10		5	20	30

Annex D: Panel and Working Groups percentage contributions to the CLIVAR imperatives in %

	WGCM	WGSIP	WGOMD	GSOP	ETCCDI	PAGES	AIP	PP	IOP	SO	AAMP	VAMOS	VACS
Anthropogenic Climate Change	50				60			30		20	10	20	15
Decadal Variability, Predictability and Prediction	30	30	40	20			20	10	10			15	15
Intraseasonal and Seasonal Predictability and Prediction		40		10			10	10	10		70	20	15
Improved Atmosphere and Ocean Components of Earth System Models	20	10	40	10			20	10		30	10	15	15
Data Synthesis and Analysis and Uncertainty		10		30	20			10	20	10		10	15
Ocean Observing System				30			50	30	60	30	5	5	10
Capacity Building		10	20		20					10	5	15	15
Other (%)													

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