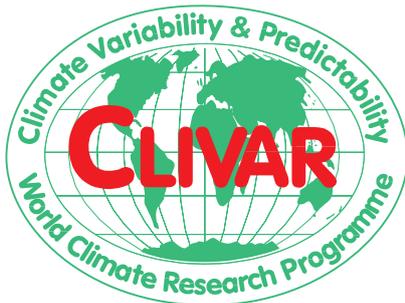


# WCRP REPORT

World Climate Research Programme



ICSU  
International Council for Science



## Project Report

### Report of 18<sup>th</sup> Session of the CLIVAR Scientific Steering Group - SSG18

02-05 May 2011 Intergovernmental Oceanographic  
Commission (IOC), Paris, France

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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.

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# Report of CLIVAR SSG-18

## 1. Introduction

### *1.1 Background*

The 18<sup>th</sup> session of the CLIVAR Scientific Steering Group (SSG-18) was held at the Intergovernmental Oceanographic Commission (IOC), Paris, France, from the 2nd to 6th May 2011. The SSG co-chairs (Dr Jim Hurrell and Professor Martin Visbeck) led the meeting of 37 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 Ms. Forest Collins and Dr Albert Fischer for acting as the local organizers of the meeting and for all their efforts to ensure that the meeting was an extremely successful and sociable event.

The agenda, list of participants and action items are provided in Annex A, Annex B and Annex C, respectively. Presentations are available on the CLIVAR website, therefore they will not all be detailed here. This report will focus on the discussions that led to action items.

### *Opening of the meeting*

Dr Jim Hurrell, SSG co-chair welcomed the meeting participants. He briefly reviewed the CLIVAR mission, objectives and structure and reminded attendees of the importance of the CLIVAR imperatives to serve as the priorities, metrics and deliverables for the programme for the next 5-years. He also noted that the imperatives map across all CLIVAR panels and working groups and provide issues that encompass various non-WCRP international programmes and the 3 other WCRP core projects.

Following Dr. Hurrell's presentation, attendees introduced themselves and their relationship to CLIVAR activities. In particular the meeting was pleased to welcome representatives from present and possible future collaborators with CLIVAR (e.g., IMBER and the European Space Agency).

### *1.3 Welcome from IOC and IOC/CLIVAR interactions*

Dr Luis Valdes, Chief of Section for Ocean Sciences, welcomed the group on behalf of IOC. He described IOC's mission "as a global knowledge broker involving gathering, transfer, dissemination and sharing of information, data, knowledge and best practices related to Oceanography". He stressed the importance of both past (i.e., TOGA and WOCE) and present WCRP-IOC joint activities (i.e., IOCCP, CLIVAR) in advancing our understanding of the role of the ocean in climate. He went on to provide the medium-term strategy (2008-2013) for WCRP to address IOC priorities. Activities included: (1) increasing regional modelling through downscaling of global climate models; (2) providing accurate regional estimations of sea level; (3) establishing or strengthening links between WCRP and IOC Regional Programmes; and National Oceanographic committees; and (4) increasing research aimed at adaptation and mitigation of climate change on the oceans. Finally, he noted IOC plans and expectations for WCRP beyond 2013. These include: (1) ensuring WCRP has both a solid scientific basis and firm governmental framework that encourage collaborations with other IOC programmes using pilot projects, working groups and outreach activities to ensure fruitful cooperation; (2) assisting WCRP to connect with end users (3) encouraging, while keeping WCRP autonomous, communications with GEC programmes; and (4) assisting WCRP to be proactive in the Global Framework for Climate Services. He ended with some suggested IOC scientific projects for CLIVAR, including strength of stratification in temperate seas and oceanic gyres, upwelling systems and changes in wind regimes, thermohaline circulation, sea level rise and outreach of scientific knowledge.

### *1.4 Introduction to SSG-18 Objectives*

Dr Hurrell reviewed the objectives of SSG-18, which included addressing the following:

- The strategy for the evolution of CLIVAR noting such questions as what research should be the focus of an ocean-atmosphere project?
- Is it time to “downsize” CLIVAR? If so, where do some current (broader) activities fit in the restructured WCRP?
- Should CLIVAR change its name?
- How to ensure needed interactions across other international research programs in a restructured WCRP?
- How to enable critical and effective interfaces for regional programs and
- How does one define “Grand Challenges” and what role should they play in a revised WCRP structure?

These questions will form the basis for the discussions during SSG-18.

## **2. WCRP strategy, outcomes of JSC-32 and other WCRP core project and wider programme inputs**

### ***2.1 Developments in WCRP***

Dr Ghassem Asrar, Director of WCRP, provided the names of the new members of the JSC, which are: Graciela L. Binimelis de Raga, UNAM, Mexico; Thomas Karl, NOAA, USA; David Karoly, Monash, Australia; Hong Liao, IAP, People Republic of China; and Pius Yanda, U. Of Dar es Salaam, Tanzania. He then reviewed the mission and objectives of WCRP based on the WCRP Implementation Plan, 2010-2015 which included broadening the mission of WCRP to include climate services as a key activity of the restructured program. The World Climate Conference-3 (WCC-3) identified five elements of a Global Framework of Climate Services (GFCS). The five include research observations, climate prediction, high-resolution products, climate information and training and development. WCC-3 encouraged WCRP to continue work on these elements of the GFCS. A high level task force has been established to develop the components of the GFCS, develop options for governance and outline a plan for implementation. A proposed governance option for GFCS includes executive committees that map directly onto WCRP and CLIVAR activities. This intersection of interests will provide WCRP/CLIVAR with a framework for developing climate services.

Dr Asrar then explained the ICSU visioning process and Grand Challenges. The goal of the process is to propose implementation steps for a holistic strategy on Earth System Research that will encourage both scientific innovation and address policy needs. ICSU Grand Challenges were given as Forecasting, Observing, Confining, Responding and Innovating. Success in one will require progress in addressing each of the others.

The expectations and outcomes from the 32<sup>nd</sup> meeting of the WCRP Joint Scientific Committee (JSC-32) were described. The two main objectives were to define the transition/evolution of the core projects over the next 12 months and to define the role of the OSC and its outcome in finalizing the future functions and structure of the WCRP. JSC-32 outcomes included approval of both Modelling Council and a Data Council, formation of a working group directed at regional climate science and information, and a crosscut team addressing communication joint with IOC. Additional outcomes included: designating WOAP as the lead to develop a surface flux action plan; unpacking the extremes activity to specific topics (e.g., drought); endorsing the recommendations of the drought workshop; and developing WCRP’s position and participation in Rio+20.

Action items from JSC-32 for CLIVAR included:

- develop future priorities for ocean-climate component of WCRP;

- re-examine present sub-structure of CLIVAR for future;
- evaluate a name change;
- develop links between WGSIP and CliC to address sea-ice;
- encourage WGCM and WGSIP to engage core Projects in analyses of modes of climate variability, especially non-stationary, using CMIP5 results;
- work with GEWEX to develop strategy to study African monsoons using CORDEX as a model; and
- develop a partnership plan for working with Space Agencies (e.g., ESA).

### **3. ICPO Report**

During the past year, there have been several personnel changes in the ICPO, Dr Howard Cattle retired and was replaced by Dr Bob Molinari on 1 September 2010. Dr Molinari's tenure is scheduled to end at the completion of the NERC contract, 31 March 2013. Dr Kate Stanfield retired as a Staff Scientist and was replaced by Ms. Catherine Beswick. Mrs. Sandy Grapes retired as P/A to the Director on 31 March. As it was decided that the Director did not require a full time P/A, the Office hired Mrs. Christina Thompson a 15-hour/week schedule. The remainder of the P/A position was filled by an IT specialist, Mr. Mathew Reynolds who will work on the CLIVAR website.

Support for the ICPO is provided through hosting of personnel, salary and travel support. The Director, Office Manager and one staff scientist continue to be hosted by the National Oceanography Centre at Southampton. Another staff member has visiting scientist status at NOCS. The Abdus Salam International Centre for Theoretical Physics, Trieste and the University of Buenos Aires each host Staff Scientists. NERC provides the full time salaries for the ICPO Director, Dr Bob Molinari, and Staff Scientist, Ms. Catherine Beswick. In addition, NERC provides the part time salaries for the Director's P/A and the IT Specialist. The total contribution from NERC to the ICPO is approximately \$300,000.

Funds provided by the US NSF, NASA and NOAA through a UCAR/NERC contract administered by the US CLIVAR Office provide the full time salaries of Drs Anna Pirani and Antonio 'Nico' Caltabiano, and half time salary of Dr Carlos Ereno. These Staff Scientists are employed as contractors with one-year contracts. The total amount provided by the US to the ICPO is approximately \$150,000. The total amount for this years US support is less than last years as the hours of Dr. Pirani are reduced for maternity leave.

The World Climate Research Program (WCRP) provides the support for ICPO Staff Scientists to attend the workshops and steering group meetings of the CLIVAR panels and working groups they support. In addition, WCRP supports the travel of the ICPO Director to other WCRP meetings.

The ICPO continues to publish CLIVAR Exchanges, although there has been a gap owing to the staff changes mentioned above. The most recent version of Exchanges was published in early 2011 and it will continue to be issued quarterly. The ICPO also maintains the CLIVAR website, where other publications and workshop summaries are distributed and CLIVAR activities are promoted. The ICPO Staff will support the WCRP funded CLIVAR meetings and workshops planned for 2011. The ICPO has generated a draft 2012 meetings list in an attempt to reduce last minute problems with late proposed sessions. This list is presently under review by the SSG and panel/working group chairs. ICPO Staff works between sessions to ensure action items resulting from CLIVAR meetings are completed and requests for information, support, etc. are met. Dr Xiaohui Tang serves as a communications facilitator for Chinese scientists involved in CLIVAR projects (e.g., NPOCE).

#### ***4. OSC Status***

The response to the call for abstracts for the OSC has been overwhelming surpassing the Scientific and Local Organizing Committees expectations. The number of expected attendees is between 1500 and 2000 promising a very exciting conference.

#### ***5. Report from other projects***

##### ***5.1 OOPC Report***

Dr Albert Fischer reminded the meeting participants of the calls for action from the OceanObs09 conference, which included:

- fully implement by 2015 the initial physical and carbon global ocean observing system refined at OceanObs09;
- implement and coordinate systematic global biogeochemical and biological observations taking into account regional variations in ecosystems;
- embrace a framework for planning and moving forward with an enhanced global sustained ocean system over the next decade - a post-conference working group will develop recommendations on this Framework; and
- Increase efforts to achieve the needed level of timely data access, sensor readiness and standards, best practices, data management, uncertainty estimates and integrated data set addressing these objectives.

Dr Fischer presented the Framework for Ocean Observing to CLIVAR. The overall goal of the framework is to better connect the observing systems to the information outcomes needed for science and society. It will provide guidance to the design and implementation of the growing Global Ocean Observing System (GOOS), which is coordinated by the IOC. The Framework was presented as a mechanism to facilitate improved connectivity between the (mandated) requirements for and the delivery of global to regional ocean information. Its fundamental 'currency' is essential ocean variables (EOVs), which are observable by a mix of networks that all contribute to appropriate data integration activities to produce information products. The system design approach also facilitates implementing best practices, enables better communication and transferring lessons learned.

Dr Fischer also indicated that a role for CLIVAR in the Framework for Ocean Observations is to exercise the framework in its work by: defining appropriate essential ocean variables; improving the readiness of ocean observing techniques and networks; developing ocean information products (e.g., ocean synthesis); and reviewing the applicability and requirements of ocean observation products. It is particularly important to work with OOPC to improve the existing set of ocean indices and develop additional ones. Discussion was also directed at the relative role of GSOP and OOPC relative to other groups addressing ocean observations.

##### ***5.2 IGBP IMBER – update on current status and activities***

Professor Ken Drinkwater briefed the SSG on IGBP's programme on Integrated Marine Biogeochemistry and Ecosystem Research (IMBER). IMBER is also co-sponsored by SCOR. 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

IMBER interests in ocean circulation, vertical stratification, upwelling, CO<sub>2</sub> fluxes, regional downscaling and matching of spatial and temporal scales of physical and biological processes intersect with CLIVAR interests. For example, on the regional scale, the Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER) project links strongly with the CLIVAR/GOOS Indian Ocean Panel.

### **5.3 Developments in CliC**

A presentation delivered by Dr Vladimir Ryabinin on behalf of WCRP's Climate and Cryosphere (CliC) project summarized the current status of CliC and, in particular, its lead in WCRP's crosscutting 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)

Other key issues for CLIVAR are Arctic climate and the role of sea ice. Thus, the Arctic Sea-Ice Working Group was formed to model sea-ice. In addition it was recommended that a dedicated group for cryosphere modeling be formed.

### **5.4 Developments in SPARC**

Dr Elisa Manzini noted that the 2-way dynamical connection between the stratosphere and troposphere provides a potential source of predictability. She described the goals of SPARC including: promoting coupled ocean, atmosphere and sea ice with global models including 'high top' stratospheres; assessing stratospheric dynamical variability; and studying of the 2-way dynamic coupling between the stratosphere and troposphere and the effect of this coupling on tropospheric and surface predictability. She noted the approval of a DynVar/CLIVAR-WGSIP Workshop in March 2012 and encouraged interactions between the CLIVAR basin panels and DynVar to study atmospheric teleconnection patterns.

### **5.5 Developments in GEWEX**

Dr Kevin Trenberth, GEWEX chair provided activities under the WCRP's Global Energy and Water Experiment (GEWEX). He summarized the GEWEX's new research imperatives and where the SSG saw the "frontiers" of GEWEX activity to lie. In contrast to the science-directed CLIVAR imperatives, GEWEX imperatives are pointed to actions such as developing data-sets, analyses, applications and modelling. At the most recent GEWEX SSG meeting, it was decided that GEWEX would adopt the land-atmosphere mission. However, it was also decided that GEWEX will continue to "*embrace the global energy and water cycles*" as well as monsoons and extremes. These mandates will require continued interaction with CLIVAR particularly on such issues as monsoons and extremes. Also of relevance to CLIVAR is the reorganization of GEWEX modelling, with an emphasis now on regional hydroclimate projects. Dr Trenberth expressed the need to coordinate these projects with the WCRP Modelling Council. With respect to extremes, Dr Trenberth noted that it is ineffective to separate droughts from floods, heat waves and fires and these events must be considered as ensembles. Finally, it was decided at the GEWEX SSG to change the name of the program to Global and Regional Water Energy Exchanges while keeping the acronym the same. An additional session on GEWEX-CLIVAR intersections is summarised below.

## **6. Discussion of Grand Challenges emerging from JSC-32, IOC, and ICSU**

Dr Visbeck led an initial discussion on Grand Challenges. Assuming that the JSC ‘box structure’ for the future WCRP is adopted, a CLIVAR Grand Challenge in one sense is an activity that extends beyond the ‘ocean-atmosphere’ box. For example, the CLIVAR imperatives could also be considered Grand Challenges. Other criteria that should define a Grand Challenge include: a highly specific and focused activity; the possibility for significant progress within a 5 to 10 year period; definable metrics, transformative research; and an activity that captures the public’s imagination. It was noted that JSC-32 did not define any Grand Challenges or specific criteria for establishing them but rather had an intense discussion about how Grand Challenges are different from the existing WCRP cross cuts. The topic of Grand Challenges emerged throughout the remainder of the meeting as will be noted accordingly. Three subgroups were formed and discussed the pros and cons of establishing CLIVAR-wide Grand Challenges. Some possible topics were presented by the break-out groups. More concrete actions are planned once the overall structure of the future WCRP becomes more apparent.

### **7.0 CLIVAR STRATEGY “beyond the imperatives”**

#### **7.3 Working arrangements with a restructured GEWEX**

A major issue raised by Dr Trenberth was the placement of atmospheric dynamics in the restructured WCRP. Specifically, do the JSC core projects Ocean-Atmosphere and Land-Atmosphere each have an atmospheric component or should there be an atmospheric crosscut? Similarly, do monsoons belong in the future Ocean and Land core projects or should there be a separate monsoon project? Monsoon modelling has not made significant advances possibly because of the present distributed nature of monsoon studies in the present WCRP; therefore, coordination is required. Dr Trenberth noted that CORDEX should serve as the near-term framework for monsoons in Africa. Finally, it was noted that the location of extremes, such as droughts, and surface fluxes in the new WCRP needs to be addressed.

#### **7.1/7.2 Meeting participants divided into 3 groups to discuss:**

- What are the priorities and new opportunities under “Ocean-Atmosphere” structure?
- What else does CLIVAR want to be to include extending beyond a strict ocean-atmosphere definition? (e.g. extending imperatives, tackling new frontiers, ideas for WCRP Grand Challenges, etc.)?
- What linkages to other programs need to be strengthened and/or developed?

A second round of breakout groups tackled the issue of the future structure of the Ocean-Atmosphere Project of WCRP. Most groups reaffirmed that some moderate changes of the subpanels would be desirable, but most importantly several of the existing panels and working groups already have significant connections to the other WCRP projects. In a new Ocean-Atmosphere Project with possibly a reduced scientific scope, it was not apparent that it would be best supported by a radically different sub-panel structure.

There was recognition of the significant advantage to collaborate across the WCRP ‘spheres’ (atmosphere, ocean, ice, land), in particular when predictive models and regional analyses are concerned. Consequently, a critical discussion ensued about the proposed new WCRP structure and what alternative (potentially more integrative) models might look like.

The ‘vertical’ structure put forth by the JSC has four vertically oriented cores - ocean-atmosphere, land-atmosphere, cryosphere, and stratosphere-troposphere -superimposed on 3 horizontally oriented structures; a model council, a global data council and WCRP regions activities. Several alternative ‘horizontal’ structures were considered at the SSG. These structures are characterized by horizontal

bands including as does the JSC format the councils and region bands. However, the core projects such as land and ocean are now placed horizontally as a possible mechanism to increase collaboration. Within each of these bands are placed the working groups and panels pertinent to that particular band. For instance, a possible restructured CLIVAR project is shown in Figure 1.

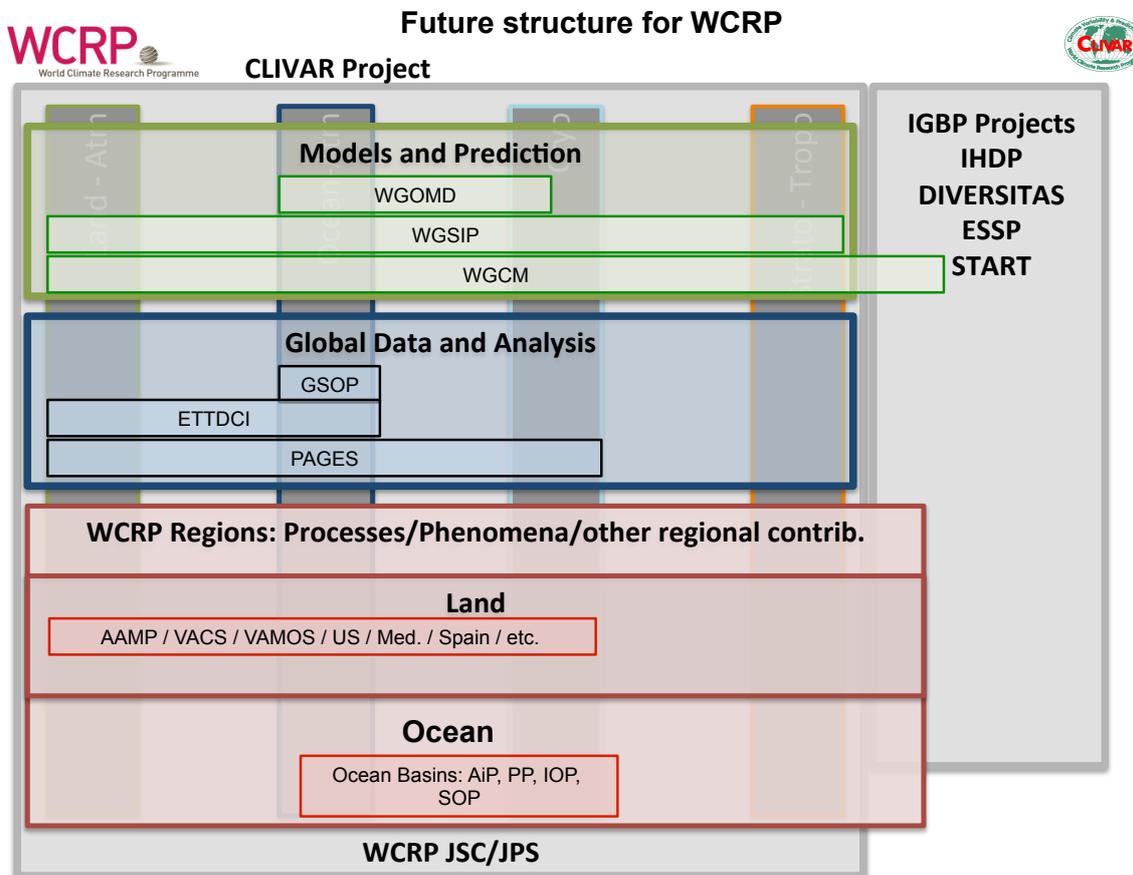


Figure 1: A potential future structure for CLIVAR.

The potential advantages of a horizontal organization are to be addressed by a small working group tasked with writing a prospectus for this alternate structure. The two-page document will be provided to the JSC for consideration in their deliberations of WCRP restructuring.

Given that the CLIVAR imperatives will provide challenges and guidance for international coordinated science plus the existing name recognition of the ‘label’ CLIVAR there was little enthusiasm for a name change.

In preparation for possible new Grand Challenges, plus potential slight shifts in the panel substructures a number of time limited task forces were formed to address the issues such as model improvements, regional ocean information, collaboration with biogeochemistry and ecology groups and a possible focus on upwelling systems. Appendix C includes the individuals assigned to each Task Force, the deadline for completion and the ICPO Staff support.

## ***8. Contributions from national and other international programs***

### ***8.1 US CLIVAR***

Dr Lisa Goddard reviewed the status of the US CLIVAR project, which uses working groups as the foundation for their activities. The groups have short terms (2 years) and are directed at such issues as salinity, the MJO, drought, and high latitude surface fluxes. US CLIVAR has formed 4 new Climate Process Teams to address ocean boundary mixing, sea ice/ocean mixing, stratocumulus to cumulus transition, and cloud macro physical parameterization. US CLIVAR also provides small grants to young scientists to work on CMIP5 data and supports 40 AMOC projects, working with international CLIVAR programs. US and International CLIVAR benefit from interactions fostering consistent goals, cross-fertilization of scientists in planning and cooperative projects (e.g., drought, Dynamo). In addition US CLIVAR benefits from global observations collected by CLIVAR and coordination between both modelling and regional panels.

### ***8.2 CLIVAR SPAIN***

Dr Ileana Bladé described the activities of CLIVAR Spain. Spain has over 100 scientists working on CLIVAR projects, demonstrating an example of a successful regional CLIVAR project. A focus of the group is to foster collaborative science, international participation of the Spanish climate research community and promote excellence in science. Their lobbying activities have led to release by the Spanish Meteorological Office of weather and climate data. A regional assessment report on the climate of the Iberian Peninsula has recently been generated (collaboratively written, externally reviewed and translated into English). CLIVAR Spain plans to make a large science contribution to the OSC.

### ***8.3 European Space Agency (ESA)***

Dr Pierre-Phillipe Mathieu described the missions and activities of the ESA. Their core mission is to design and launch satellites. Two types of activities are undertaken with the on-board sensors; a science mission includes observing salinity and ice thickness remotely, whereas an applications mission provides user driven services. ESA is also offering support to other WCRP core projects such as GEWEX through providing estimates of soil moisture. ESA also has begun a Climate Change Initiative, CCI, which delivers Essential Climate Variables such as clouds, sea level, SST, and land cover. CCI activities also include developing products (e.g., errors).

## ***9.0 Summary of key progress against imperatives and issues from chairs of CLIVAR Panels and Working Groups.***

The CLIVAR Panel and Working Group reports and presentations are given on the CLIVAR website under the heading SSG-18 and will not be repeated here.

## ***10. Climate Services***

### ***10.1 NOAA Climate Services***

Dr J. Todd of NOAA described his agency's activities in climate services. For example, NOAA has developed a Climate Services Portal to provide a one-step access for NOAA's Climate information. NOAA uses two approaches to develop climate services; NOAA science drives the services provided and the services required drives NOAA science.

### ***10.2 Discussion of CLIVAR's role in providing the science base for Climate Services***

The issue of how scientists engage with climate services was discussed. It was stressed that the information provided has to be reliable, accurate and timely and scientists providing the data need to have an ownership relationship with the resulting products. However, it is usually not very effective for climate scientists to work directly with the end users. Other communities exist to perform this function and CLIVAR should enable these communities by expert interactions and providing appropriate information. WCRP and CLIVAR's roles in performing and coordinating climate related research is critical in developing and providing the climate services required by society.

## ***11. CLIVAR's role in capacity building***

The growing demand for climate knowledge provides a challenge for both developed and developing countries. CLIVAR has not taken a well-organised approach to capacity building in the past. It was recognized that several panels and working groups, however, have engaged in a number of very successful efforts in both training scientist from developing countries and Early Career Scientists (ECS). It was suggested that the years 2012 and 2013 could be designated as the years of a focussed CLIVAR activity on the overall challenge of capacity building. Events such as summer schools and workshops could be planned and directed at specific topics. Funding opportunities, such as those from space agencies (ESA) should be explored. The importance of having follow-up activities rather than just one-time workshops was stressed. The need to obtain more activities of the scientific community in north-south capacity building and acquiring funding for these activities was noted. CLIVAR's ETCDDI was recognized as having successfully engaged in training projects in several regions with activities that include research, data compilation, product development and training. The interaction of CLIVAR scientist with Regional Climate Outlook Fora was also noted as an important activity in supporting both scientific capacity building and the support for Climate Services.

## ***13. Review of action items from SSG-17***

Action items from SSG-17 were reviewed and major actions have been completed.

## ***14. Additional items***

### ***14.1 Endorsed projects***

The procedures for obtaining CLIVAR endorsement for a project were reviewed. It was noted that CLIVAR does not have a process for tracking the progress of endorsed projects and the establishment of such a process was recommended.

### ***14.2 Time and location of CLIVAR SSG-19***

Advantages of convening SSG-19 close to the time of the Second International Symposium on the Effects of Climate Change on the World's Oceans possibly cooperatively with the IMBER conference were discussed. The Symposium is scheduled for the spring of 2012 in Yeosu, Korea. Additional discussion will determine if this venue and schedule is appropriate for SSG-19.

## **APPENDIX A AGENDA**

**CLIVAR SSG-18**

**IOC/UNESCO**

**PARIS FRANCE**

**2-5 MAY 2011**

### **MONDAY 2 MAY, start 1030**

#### **1. Introduction**

- 1.1 Welcome by IOC (Wendy Watson Wright / Luis Valdez)
- 1.2 Welcome by CLIVAR SSG co-chairs Visbeck/Hurrell (TIME ALLOTTED 30 mins)
- 1.3 Introductions (all), local arrangements, Molinari (10 mins)
- 1.4 Introduction to SSG-18, SSG co-chairs (15 mins)

**2. Outcome of JSC-32 (1125-1230) Including Future Structure of WCRP**, (G Asrar) (35 mins)

**3. ICPO Report (including funding)** Molinari (15 minutes)

**4. OSC Status:** Hurrell (15 mins)

#### **LUNCH (1230-1330) Venue: IOC Cafeteria**

#### **5. Report from other projects (20 minutes each)**

- 5.1 OOPC Report, Fischer
- 5.2 IMBER, Drinkwater
- 5.3 Developments in CliC, TBD
- 5.4 Developments in SPARC, Manzini
  
- 5.5 Developments in GEWEX, Trenberth

#### **Tea/Coffee 1510-1540**

**6.0 Discussion of Grand Challenges emerging from JSC-32, IOC and ICSU (e.g., Arctic, Ocean)** Visbeck/Hurrell (80 mins)

#### **1700 END OF DAY ONE**

**RECEPTION: Hosted by IOC**

### **TUESDAY 3 MAY, start 0900**

**7.0 CLIVAR STRATEGY “beyond the imperatives”**

7.1 Working group breakouts to discuss

- a. What are the priorities and new opportunities under “Ocean-Atmosphere” structure?
- b. What else does CLIVAR want to be to include extending beyond a strict ocean-atmosphere definition? (e.g., extending imperatives, tackling new frontiers, ideas for WCRP Grand Challenges, etc.)
- c. What linkages to other programs need to be strengthened and/or developed? Led by Visbeck/Hurrell (70 mins)

7.2 Breakout groups and discussion, Visbeck/Hurrell (50 mins)

**Tea/Coffee (1100-1130)**

7.3 Working arrangements with a restructured GEWEX, Trenberth leads Discussion; synergy and gaps with CLIVAR activities and plans (60 mins)

**LUNCH 1230-1400**

**8. Contributions from national and other international programs**

8.1 US CLIVAR science initiatives, future strategy, links to International CLIVAR. USGCRP Goddard, Patterson (45 mins)

8.2 Interactions with other groups

- a. ESA: potential for cooperative projects. Mathieu (15 mins)
- b. NERC: future climate plans TBD (15 mins)

**1515 END OF DAY TWO**

**Field trip to Musee Quai Branley- to start at 1530**

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**WEDNESDAY 4 MAY start 0900**

**9.0 Summary of key progress against imperatives and issues from chairs of CLIVAR Panels and Working Groups (10 mins presentation, 15 mins questions/discussions)**

We are looking for 1-2 highlights and the near term plans focusing on the challenges. The goal is to provide constructive actionable input to the panel chairs for their work.

- 9.1a Global modeling panels: WGCM (Bony), WGSIP (Scaife), WGOMD (Drange)
- 9.1b Discussion on coordination across modeling panels in context of strategy Hurrell

**TEA/COFFEE BREAK (1040-1110)**

9.2a GSOP (Haines) activities and OOPC coordination Haines

9.2b Climate change detection: ETCCDI (Zhang) and CLIVAR/PAGES Panel (Masson Delmotte) (25 mins each)

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

**LUNCH (1245-1345)(1345)**

9.4a Ocean basin panels: Atlantic (Laurent), Pacific (Cai), Indian (Yu), Southern Oceans (Speer) (25 mins each)

**TEA/COFFEE BREAK (1525-1600)**

9.4b Discussion on coordination across basin panels in context of strategy Visbeck (20 mins)

9.5a Africa/Monsoon Panels: AAMP (Sperber), VAMOS (Berbery), VACS (Washington) (25 mins each)

9.5b Discussion on coordination of monsoon activities across panels and WCRP more widely Visbeck (25mins)

**1800 END OF DAY 3**

**1830 NO HOST SSG-18 DINNER: VENUE TBD**

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**THURSDAY 5 MAY (0900-1500)**

**10. CLIMATE SERVICES (Intro Visbeck)**

10.1 NOAA Climate Service Initiative Jim Todd (20 mins)

10.2 Discussion of CLIVAR's role in providing the science base for Climate Service Visbeck (30 min)

**11. CLIVAR's role in capacity building** Visbeck (30 mins)

**TEA/COFFEE BREAK 1020-1050**

**12. New Structure Introduction** Visbeck

- Discussion on overall structure, panel, working group and task force coordination across the program as a whole (40 mins)

- CLIVAR procedure for endorsement and tracking of activities (10 mins)

**13. Review of action items from SSG-17** Molinari (10 mins)

**LUNCH 1150-1330**

**14. Additional items**

14.1 Summary and discussion of action items from SSG-18 Molinari (20 mins)

14.2 Date and place of next meeting Visbeck/Hurrell (10 mins)

**1400 END OF SSG-18**

**SSG Executive Session Visbeck/Hurrell (60 mins, 1500)**

**Appendix B: CLIVAR SSG-18 List of Attendees**

	<b>Name</b>	<b>Capacity in which attending</b>	<b>Affiliation</b>	<b>Email</b>
1.	Jim Hurrell	CLIVAR SSG co-chair	NCAR, Boulder, USA	jhurrell@ucar.edu
2.	Martin Visbeck	CLIVAR SSG co-chair	IFM-GEOMAR, Kiel, Germany	mvisbeck@ifm-geomar.de
3.	Lisa Goddard	CLIVAR SSG, Chair US CLIVAR SSC	International Research Institute for Climate and Society, Columbia University, Palisades, USA	goddard@iri.columbia.edu
4.	Ken Drinkwater	CLIVAR SSG	Institute of Marine Research, Bergen, Norway	ken.drinkwater@imr.no
5.	Sieg Schubert	CLIVAR SSG	NASA/GSFC, Greenbelt, USA	siegfried.d.schubert@nasa.gov
6.	Dongxiao Wang	CLIVAR SSG	South China Sea Institute of Oceanology, Chinese Academy of Sciences, China	dxwang@scsio.ac.cn
7.	Valerie Masson-Delmotte	CLIVAR SSG	Atomic Energy Commission and Energy Alternatives, CEA, Gif-sur-Yvette, France	Valerie.masson@cea.fr
8.	Steve Rintoul	CLIVAR SSG	CSIRO, Australia	Steve.rintoul@csiro.au
9.	Sandrine Bony	WGCM	Laboratoire de Meteorologie Dynamique, France	Sandrine.bony*@md.jussieu.fr
10.	Adam Scaife	WGSIP	UK Met Office, United Kingdom	Adam.scaife@metoffice.gov.uk
11.	Helge Drange	WGOMD	Department of Geophysics, University of Bergin, Bergin Norway	Helge.drange@gfi.uib.no
12.	Keith Haines	GSOP	ESSC, Reading University, Reading, UK	k.haines@reading.ac.uk
13.	Xuebin Zhang	ETCCDI	Environment Canada, Toronto, Canada	Xuebin.Zhang@ec.gc.ca
14.	Caspar Amman	CLIVAR/PAGES	NCAR, Boulder, USA	ammann@ucar.edu
15.	Laurent Terray	Atlantic Panel	CERFACS, Toulouse, France	terray@cerfacs.fr
16.	Wenju Cai	Pacific Panel	CSIRO, Aspendale, Victoria, Australia	Wenju.Cai@csiro.au
17.	Weidong Yu	Indian Ocean Panel	First Institute of Oceanography, Qingdao, China	wdyu@fio.org.cn
18.	Sabrina Speich	Southern Ocean Panel	Universite de Bretagne Occidentale-UFR Sciences, Brest France	speich@univ-brest.fr
19.	Hugo Berbery	VAMOS	Dept. of Meteorology, University of Maryland, College Park, USA	berbery@atmos.umd.edu
20.	Ken Sperber	AAMP	Lawrence Livermore National Laboratory PCMDI, USA	sperber1@llnl.gov
21.	Ghassem Asrar	D/WCRP	WCRP, Geneva, Switzerland	GAAsrar@wmo.int
22.	Valery Detemmerman	JPS for WCRP	WCRP, Geneva, Switzerland	VDetemmerman@wmo.int
23.	Kevin	GEWEX Rep	Climate Analysis Section, NCAR,	trenbert@ucar.edu

	Trenberth		Boulder USA	
24.	Elisa Manzini	SPARC Rep	Max-Planck Institut fur Meteorologie Hamburg Germany	Elisa.manzini@zmaw.de
25.	Vladimir Ryabinin	CLIC Rep	WCRP, Geneva	vryabinin@wmo.int
26.	Nico Caltabiano	ICPO	ICPO, National Oceanography Centre, Southampton, United Kingdom	caetano@noc.ac.uk
27.	Anna Pirani	ICPO	ICTP, Trieste, Italy	Anna.pirani@noc.ac.uk
28.	Carlos Ereno	ICPO	University of Buenos Aires, Buenos Aires, Argentina	Carlos_eren@yahoo.com
29.	Catherine Beswick	ICPO	ICPO, National Oceanography Centre, Southampton, United Kingdom	cb2r10@soton.ac.uk
30.	Bob Molinari	D/ICPO	ICPO, National Oceanography Centre, Southampton, United Kingdom	Robert.molinari@noc.ac.uk
31.	Michael Patterson	D/US CLIVAR Office	US CLIVAR Office, Washington DC, USA	mpatterson@usclivar.org
32.	Cathy Stephens	US CLIVAR Office	US CLIVAR Office, Washington DC, USA	cstephens@usclivar.org
33.	Jim Todd	US agency Rep	NOAA Climate Program Office, Silver Spring, USA	james.todd@noaa.gov
34.	Albert Fischer	OOPC	IOC/UNESCO Paris, France	a.fischer@unesco.org
35.	Ileana Blade	CLIVAR-SPAIN	Facultat de Fisica, Universitat de Barcelona	Ileana.blade@upc.es
36.	Pierre.Philippe Mathieu	ESA-Rep	European Space Agency Earth Observation Science and Applications Frascati, Italy	Pierre.Philippe.Mathieu@esa.int
37.	Michael McPhaden	DBCP	NOAA/PMEL, Seattle, Wash., USA	michael.j.mcphaden@noaa.gov

	<b>APPENDIX C ACTION ITEMS</b>	<b>Responsible</b>	<b>Deadline</b>	<b>ICPO Support</b>
	<b>SSG</b>			
1	Honour request from ETCCDI to renew 2 year-term of CLIVAR members		Done	
2	Develop a perspective vis-à-vis the JSC position on extremes	Schubert, Pirani with GEWEX	JSC 33	Beswick
3	Develop a 2-page prospectus on an alternate WCRP management structure	Goddard, Schubert, Visbeck	OSC	Pirani
4	Communicate CLIVAR's recommendation to the JSC discussion on Grand Challenges	Hurrell, Visbeck	OSC	Molinari
5	Clarify the WCRP monsoon structure with one paragraph input from GEWEX, WGSIP, VAMOS, AAMP	Scaife, Berbery, Sperber	OSC	Ereno
6	Develop Terms of Reference (TOR) and list of potential members for Task Force on how WCRP/CLIVAR can best improve components of earth systems models (perhaps modelling on US CLIVAR CPTs)	Terray, Bony, Drange, Scaife, Rintoul, Berbery, Schubert	OSC	Pirani
7	Develop TOR and list of potential members for Task Force on how best to communicate WCRP/CLIVAR research findings to IMBER and coastal research communities, and develop mechanisms for enhancing collaboration and exchange	Drinkwater, Cai, Yu, Speer, Wang, Haines	OSC	Caltabiano
8	Develop TOR and list of potential members for Task Force on how best to communicate CLIVAR research findings	Detemmerman, Boscolo, Drinkwater, Gulev, Rintoul, Masson-Delmotte, Blade, ICPO	OSC	Beswick
9	Develop TOR and list of potential members for Task Force on design of ocean climate indices on time scales from days to centuries	Harrison, Masson-Delmotte, GSOP, basin panels	OSC	Caltabiano
10	Develop TOR and list of potential members for Task Force to map out CLIVAR decadal variability and predictability activities across all panels,	Goddard, Boer, Scaife, WGSIP, WGCM, basin	OSC	Pirani

	linking with US CLIVAR Decadal WG and WGCM/WGSIP DCPD	panels		
	<b>MODELLING PANELS</b>			
11	Encourage the organizers of the WGCM CMIP5 Workshop to include a SPARC DynVar session	WGCM, DynVar	OSC	Pirani
12	Explore possibility of including decadal variability in WGSIP's scope as one of the activities of the Decadal predictability task force	WGSIP, WGCM	OSC	Pirani
	<b>INDIVIDUAL PANELS (ALL)</b>			
13	Report on on-going studies of regional sea level changes to ICPO	PP, IOP, AOP, SOP	OSC	Caltabiano/Beswick
14	Report on on-going work and future aspirations on upwelling systems to ICPO	AOP, VOCALS, IOP	OSC	Caltabiano
15	Encourage regional panels to explore links to SPARC/DynVar	PP, IOP, AOP, SOP, VAMOS, AAMP, VACS	OSC	Caltabiano/Beswick
16	Encourage the ocean basin panels to exploit the CORE-II WGOMD experiments	Basin panels, WGOMD	OSC	Caltabiano/Beswick
17	Explore linkages with PAGES and provide thoughts for opportunities in time for OSC	Panels report to SSG co-chairs	OSC	Beswick
	<b>IOP</b>			
18	Encourage the IOP to develop a science research plan for air-sea climate issues	IOP	OSC	Caltabiano
19	Reaffirm the importance of the ITF task force by highlighting its synergy with current and future panel activities	PP, IOP	OSC	Caltabiano
	<b>AIP</b>			
20	Contribute to the model improvement CPT and develop a strategy on how to best reduce tropical biases with a focus on the Atlantic in the context of a cross cutting CLIVAR 'challenge'	AIP, WGSIP, WGCM, WGOMD	OSC	Caltabiano
	<b>PP</b>			
21	Contribute to the model improvement CPT to explain how the regional process	PP, WGSIP, WGCM, WGOMD	OSC	Caltabiano

	studies can contribute			
	<b>SOP</b>			
22	Contribute to the model improvement CPT on issues of ocean eddy mixing and deep ocean overflows	SOP, WGSIP, WGCM, WGOMD	OSC	Beswick
	<b>GSOP</b>			
23	Revisit the GSOP terms of reference vis a vis those of WOAP/WCRP Data Council and OOPC and make recommendations to SSG prior to OSC	GSOP	September, 2011	Caltabiano
24	Encourage GSOP to use the Framework for Ocean Observations document to guide their activities	GSOP	September, 2011	Caltabiano
25	GSOP and basin panels work with task force on ocean indices	ETCCDI, GSOP	OSC	Caltabiano
26	Recommend that ocean data and indices consistently use a format that is compatible for model intercomparison and evaluation	Basin panels, ETCCDI	OSC	Caltabiano
27	Increase interactions between GSOP and WGOMD on the intercomparison, evaluation and development of ocean syntheses products and free running ocean models	GSOP, WGOMD	OSC	Pirani
28	Develop interactions with ESA and EUMETSAT, for example with summer schools and data homogenisation	ICPO	SSG19	Molinari
29	Encourage GSOP and basin panels to interact with WGSIP on the observational requirements to initialize and verify predictions	GSOP, WGSIP, basin panels	SSG19	Pirani
30	Explore linkages with Arctic Ocean community (i.e., AOSB) to provide guidance and advice to facilitate Arctic Ocean data synthesis	ClIC, WGOMD, GSOP	SSG19	Caltabiano
	<b>VAMOS</b>			
31	Provide a short summary of the linkages to other WCRP activities in South America for the SSG to evaluate if it is also de facto a WCRP regional panel	VAMOS, AOP, PP	SSG19	Ereno
	<b>AAMP</b>			

32	Work with Greg Flato from the JSC and WGSIP to develop a WCRP strategy on how best to interact with the RCOFs using the Asian region as an example.	JSC, WGSIP, AAMP	SSG19	Ereno
	<b>VACS</b>			
33	Evaluate future integration of GEWEX as a co-sponsor of VACS	VACS, GEWEX	OSC	Pirani
34	Generate 2-page VACS science plan for consideration at first meeting	VACS	OSC	Pirani
	<b>ICPO with CLIVAR Panels and Working Groups</b>			
35	Identify capacity building activities for CLIVAR with ICPO developing a template	Panels, Working groups, ICPO	SSG19	Molinari
36	Determine who is using CLIVAR information, how the transfer of knowledge is organized using an ICPO developed template	Panels, working groups, ICPO	SSG19	Molinari
37	Report on CLIVAR endorsed projects using an ICPO developed template	Panels, working groups, ICPO	SSG19	Molinari