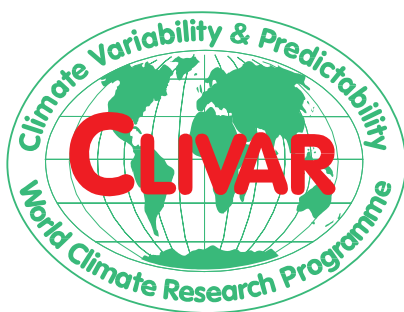


# WCRP REPORT

World Climate Research Programme



Project Report

Report of the 12<sup>th</sup> Session of the Atlantic  
Implementation Panel

Kiel, Germany 13-14<sup>th</sup> September 2012

May 2013

WCRP Informal/Series Report No. 12/2013  
ICPO Informal Report 188/13

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, 2013:  
Atlantic Implementation Panel. International CLIVAR  
Publication Series No 188. (not peer reviewed).

## **ACTION ITEMS**

ACTION: AIP and PIRATA to discuss with IMBER/SOLAS good ways to collaborate with the implementation of BGC observations in the PIRATA array, particularly in the Southeastern Extension (AIP co-chairs)

ACTION: Provide a letter of endorsement from US CLIVAR ETOS WG with recommendations to PIRATA SSC (P. Chang, P. Brandt)

ACTION: Propose Thomas Toniazzo as a member of the US CLIVAR ETOS WG (AIP co-chairs)

ACTION: AIP to request US CLIVAR ETOS WG their plans for fieldwork (P. Chang, P. Brandt)

ACTION: Request GoAmazon more details of their plans and involve GEWEX in the discussion (P. Chang, ICPO)

ACTION: contact both Pacific and Indian Ocean Panels to develop a framework in the area of oxygen minimum zones (P. Brandt)

ACTION: Explore links with African countries on regional coastal zones for upwelling studies (M. Rouault)

ACTION: suggest to WGOMD for renewed request PCMDI to serve CORE-II dataset (Treguier)

ACTION: Provide details and data of model 14-cycle run (P. Chang)

ACTION: AIP members to contribute to white paper on upwelling systems (All)

RECOMMENDATION: SSG to revisit and broaden the scope of the Intraseasonal, seasonal and interannual variability research challenge

ACTION: AIP to interact with ETCCDI on ocean indices. (M. Baringer, P. Chang, co-chairs)

ACTION: Map out potential capacity building activities where AIP can contribute (All)

ACTION: Suggest ideas for sustained capacity building activities (All)

ACTION: Contact WASCAL/SASCAL regarding their knowledge transfer activities (co-chairs)

ACTION: Find replacements for Laurent Terray, Ruth Curry, Bogi Hansen and Yochanan Kushnir (co-chairs)

ACTION: Place open call for new members in CLIVAR Exchanges, with some information about panel activities/objectives in order to canvas interest (co-chairs, ICPO)

ACTION: Identify new panel members with expertise in sea level (co-chairs)

# **CLIVAR Atlantic Implementation Panel – 12<sup>th</sup> meeting**

## **Sep 13-14, 2012**

### **Kiel, Germany**

#### **1. Atlantic Panel overview and Terms of reference**

Peter Brandt and Laurent Terray, AIP co-chairs, welcomed all panel members and invitees. Apologies were sent by Mauricio Mata, Tom Farrar and Susana Camargo.

The CLIVAR Atlantic Implementation Panel (AIP) is a part of the CLIVAR organization. The panel is in charge of implementing the CLIVAR science plan in the Atlantic sector. More specifically its Terms of Reference are:

1.1 To recommend and oversee the implementation of observations in the Atlantic Ocean sector and of research on Atlantic climate variability and predictability, in order to meet the objectives outlined in CLIVARs Science and Initial Implementation Plans, particularly with respect to the Principal Research Areas D1 (NAO), D2 (TAV), D3 (THC), and anthropogenic climate change.

1.2 To collaborate with JSC/CLIVAR WGCM, WGOMD, and WGSIP in order to contribute to the design of appropriate numerical experiments and to jointly define and implement the requirements for data sets needed to validate and initialize models.

1.3 To liaise with relevant CLIVARs panels, in particular the Arctic Climate Panel, the Southern Ocean Panel, and the VAMOS and VACS panels to ensure that best use is made of resources from regional research programs.

1.4 To liaise with GSOP, OOPC, PIRATA, ARGO, and the IOC-CO<sub>2</sub> panel to ensure that CLIVAR benefits from and contributes to GEOSS.

1.5 To liaise with relevant interdisciplinary SCOR-IGBP groups such as PAGES, GLOBEC, IMBER, and SOLAS and with regional Atlantic marine ecosystem research programs such as BCLME and GCLME to ensure that CLIVAR benefits from and provides input to these programs.

1.6 To respond to needs from stakeholders and facilitate the transfer of knowledge from science to operations and applications with respect to Atlantic climate variability and predictability issues.

1.7 To report to the CLIVAR SSG.

#### **2. Session: The tropical and South Atlantic observational network**

Members of the PIRATA SSC joined the participants of the 6<sup>th</sup> Session of the Atlantic Implementation Panel for an overview and discussion of the PIRATA array. Bernard Bourles gave a presentation where he summarised the status of the network. PIRATA data sets are increasingly valuable for more weather and climate forecasting, and also became a major Atlantic contribution to the global ocean observation system in support of climate (GODAE, ARGO, GOOS, GOSUD, OceanSITES, AMMA, TACE, VAMOS...). The PIRATA array and its extensions constitute the main backbone of the Tropical Atlantic Observing System, which also include ADCP moorings, tide gauges. PIRATA yearly scientific cruises are sources of a large number of measurements along repeat sections, and they are used as a platform for “piggy-back” measurements (eg CO<sub>2</sub>), process studies and for deployment of glider, Argo floats and surface drifter. In this sense, PIRATA constitutes an important tool & context for international cooperation and contribution to other programs (eg AMMA, EU-PREFACE...), and also for capacity building in developing countries (eg in Africa).

The group discussed some scientific issues that are of interest to both CLIVAR and PIRATA. The first topic was the issue of tropical biases in models. Although some models have improved with regard to those biases, it is still a big problem. Regional models have shown a linkage between the Atlantic Equatorial

region and the Southeastern part but this needs to be further explored. Do models simulate the stratus deck well? Some model do but there are several biases still observed. There is more and more indication that the ocean plays a big role in the biases, with propagation of the signal from the Equator to the southeast upwelling regions. Observations are critical if one wants to assess model performance. There are a good number in the equatorial region particularly established during TACE, but not so much in the Benguela upwelling region. The PIRATA community can play a larger role here too. This topic can provide a good opportunity for collaboration between modelling and observations communities (as shown by the partnership within the PREFACE project, submitted to FP7).

The group also discussed what new measurements should be part of the array, including the use of the array as a platform for biogeochemistry (BGC) data. There has been discussion between CLIVAR and IMBER regarding the need for more integrative studies between the two groups. The Eastern Atlantic is a very good location because of the strong upwelling which can have a large impact on fisheries. There are some groups in Germany and France, with studies of Ecology and BGC in this region.

**ACTION:** AIP and PIRATA to discuss with IMBER/SOLAS good ways to collaborate with the implementation of BGC observations in the PIRATA array, particularly in the Southeastern Extension (AIP co-chairs)

One issue that is common to both CLIVAR and PIRATA is Capacity Building and Knowledge Transfer. South Africa and Brazil have developed a larger community, particularly around PIRATA. In Africa, it is still in development, and geo-politics have a big role in the region. However, there is good opportunity for closer interaction between the CLIVAR Africa Climate Panel, AIP and PIRATA. It is necessary to identify key scientific questions to be addressed in the regions and then develop capacity around them, with specific tasks to be identified. Capacity Building and Knowledge Transfer will be further discussed at this meeting.

Y. Kushnir gave an update on the US CLIVAR Hurricanes working group. The objectives of the WG are to provide an improved understanding of interannual variability, and trends, in tropical cyclone activity from the beginning of the 20th century to the present, and to quantify changes in the characteristics of tropical cyclones under a warming climate. Their main tasks will be to: (i) define common experiments for model simulations by participating modeling group; (ii) supply common data sets and tropical cyclone metrics for those experiments; (iii) coordinate the evaluation and reporting of common experiments and the storage of model output; and, (iv) organize workshops to present and discuss the results. There are a few papers in preparation after the 1<sup>st</sup> Workshop, which happened in January 2012 in New Orleans. The 2<sup>nd</sup> workshop is planned for the Spring 2013.

The Atlantic Tropical Biases Workshop (Miami spring 2011) identified multiple potential hypotheses reflecting coupled processes among ocean, land, and atmosphere, all associated with the sea surface temperature bias observed in model outputs. The US CLIVAR has then setup a new Eastern Tropical Oceans Synthesis (ETOS) Working Group (WG), and several AIP members are part of it. Ping Chang reported on their plans and initial activities. Their main goals are (i) to organize datasets within a WG website with value added products/cultivated plots; (ii) to coordinate model performance assessments; and (ii) to identify further observations/model experiments needed.

The upwelling region in the Eastern Atlantic is an area of interest from different communities: fisheries, biogeochemistry, ecology, ocean and atmosphere physics. The ETOS WG has provided several good scientific questions but there is a lack of observations in the region. It is a good opportunity for a fieldwork initiative. There is an EU project being proposed so the WG should contact PIs of that project. The PIRATA SSC would welcome recommendations made by the US CLIVAR ETOS WG on the necessary observations in the region, including definition of sites for observations. If the planned SE extension of the PIRATA array is seen as an important component to help the understanding of those issues, the PIRATA SSC would welcome a letter of endorsement from the ETOS WG. AIP would also like to propose that Thomas Toniazzo is invited to be part of the ETOS WG.

**ACTION:** Provide a letter of endorsement from US CLIVAR ETOS WG with recommendations to PIRATA SSC (P. Chang, P. Brandt)

ACTION: Propose Thomas Toniazzo as a member of the US CLIVAR ETOS WG (AIP co-chairs)

Also in relation to the location of the PIRATA buoy and their Southeastern Extension, it is important to take into account the role of aerosol and the evaluation of heat budget.

There is a planned fieldwork focused on the smoke above stratocumulus. There is interest from AIP to develop a collaborative work, with an ocean campaign together with the atmospheric study. It would also be important for both AIP and the PIRATA SSC to know with more details the plans for fieldwork prepared by the ETOS WG, and at the same time involve the group in proposing joint ocean observations.

ACTION: AIP to request US CLIVAR ETOS WG their plans for fieldwork (P. Chang, P. Brandt)

Ping Chang also reported briefly on the US Department of Energy (DOE) Atmospheric Radiation Measurement (ARM) GOAmazon Project in 2014, with their main interests in the radiation and aerosol effect. A proposal has also been submitted to the US National Science Foundation to use NSF/NCAR facilities to study Amazon convective processes (Convective life cycle, Convective transport, Wet season onset, Atlantic SST bias,...). The NSF proposal was not funded in 2012, but DOE's GOAmazon project is still going forward. The plan is to try in 2013 again for possible NSF radar and sounding network deployment in fall 2014/spring 2015. The group discussed the interest of this project for CLIVAR. In this area, atmospheric reanalysis are not consistent, and there is a clear impact on the trade winds. By understanding this better, it would certainly help to improve the bias problem. AIP would need more information from GOAmazon's PIs and involvement with GEWEX in future discussions would be important.

ACTION: Request GoAmazon more details of their plans and involve GEWEX in the discussion (P. Chang, ICPO)

Peter Brandt gave an overview of the Tropical Atlantic Climate Experiment (TACE) further activities. A EU FP7 proposal (PREFACE) is in preparation, with the objective of enhancing prediction of tropical Atlantic climate and its impacts. Within this proposal, there is funding request for PIRATA Southeast extension at 6°S, 8°E, which would be beneficial to studies related to model SST biases. Another activity is the BMBF Joint Project: Southwest African Coastal Upwelling System and Benguela Niños (SACUS), planned for 2013-2015, which will focus on the connectivity of the southeast Atlantic coastal upwelling system to the equatorial current system, and Tropical Atlantic climate and predictability. The BMBF RACE has a subproject that will look into the Western boundary circulation off Brazil, with strong cooperation with the South Atlantic Meridional Overturning Circulation (SAMOC) Project and PIRATA Brazil. Another project funded by the German government under the DFG Collaborative Research Center 754 will focus on the oxygen minimum zones of the tropical North Atlantic and South Pacific. This project is at its phase 2 (2012-2015) at the moment. This subject is of a close relation with the BGC community and interaction with them needs to be further developed. There is some emphasis on the modelling component on BGC, with interaction with coupled climate models, coupled BGC and regional models. This is an interesting topic and the group agreed that other CLIVAR basin panels should be contacted in order to develop a common strategy for all basins.

ACTION: contact both Pacific and Indian Ocean Panels to develop a framework in the area of oxygen minimum zones (P. Brandt)

Mathieu Rouault reported to the group on activities being developed in South Africa. Some projects had been well developed in the region with funding from World Bank, with participation of several countries, but funding has now stopped. Research activities rely heavily on international partners. Capacity building in the region is extremely necessary, particularly regarding global climate issues, since local problems (red tide, drought, floods) are the focus of the scientific community. There is strong interest in the region for coastal areas and upwelling and this should be further developed with the help of AIP.

ACTION: Explore links with African countries on regional coastal zones for upwelling studies (M. Rouault)

The Nansen-Tutu Centre has been working with operational oceanography with interests in the Agulhas region, using both in situ and remote sensing data. ACCESS SATREPS project has a good interaction with Japanese colleagues and is developing good interaction with and within South Africa. The project has several components, including climate variability, climate change and marine studies. For the SAMOC project, South Africa is funding ocean and coastal moorings. Moorings will be serviced by a monitoring line which is focused on fisheries studies. The SOCCO project, led by Pedro Monteiro, is using gliders to study currents in the southern region of South Africa. PIs of this project should make sure links are made with the CLIVAR/CliC/SCAR Southern Ocean Panel. South Africa has now purchased a new research vessel which will be used to annually service the SAMBA line, starting June 2013. In relation to modeling activities, there are projects related to seasonal forecast and ocean modeling using regional models. CORDEX has been very active, data is available for use but not much collaboration with ocean analysis.

Shenfu Dong presented to the group the latest activities of the South Atlantic Meridional Overturning Circulation (SAMOC) Project. The overarching goal of the SAMOC initiative is to observe and understand the mechanisms that control the mean and time-varying MOC in the South Atlantic and the inter-ocean exchanges. Advance our knowledge of the South Atlantic MOC is crucial to improving our understanding of climate system variability. There have been four international SAMOC workshops held to date, bringing together the international scientific community to share results on the South Atlantic MOC and to design an integrated observational system. In May 2012, the CLIVAR SSG endorsed the project. The first turn-around for the NOAA pilot array at 34.5°S will be done in December 2012 as part of a joint Brazilian, Argentine, and US cruise. In addition to the NOAA turn-arounds, this cruise represents a crucial expansion of the MOC observing system in the region, as Brazil will be deploying additional instruments to improve the existing western boundary array and to expand it up onto the continental shelf. High-resolution hydrographic/biogeochemical data will be collected during the cruise. One of the new instruments to be deployed as part of the SAMOC project is the Adaptable Bottom Instrument Information Shuttle System (ABISS). A deep ocean data retrieval system, once fully operational will allow scientific instruments anchored on the ocean bottom to send their data back via expendable data pods that will release from the ocean floor on a programmable schedule. ABISS has been tested in shallow water, the first deep water test is scheduled in October 2012. Several projects are being developed or proposed as part of SAMOC. Gustavo Goni (NOAA/AOML) is developing a project to measure the MOC using satellite altimetry. The objective of this work is to make use of the high correlation that exist between SH and depth of isotherms between 20S and 35S in the SA Ocean to monitor the variability of the MHT in this regions. In the modelling side, Ricardo Matano is submitting a proposal to use the high-resolution model from GFDL for SAMOC region, with the objective to identify water mass pathways. The group discussed North Atlantic MOC and SAMOC links. The US AMOC programme will setup an internal working group to look at the interaction between the two basins.

### **3. Session: The North Atlantic observational network**

Anne-Marie Treguier reported on the OVIDE project and future plans in the subpolar North Atlantic. The three main research themes of the OVIDE project are (i) Water mass variability with a focus on the variability of the subpolar mode waters; (ii) Variability of the transport of the main currents across the OVIDE section and of the thermohaline circulation (meridional overturning circulation, MOC); and, (iii) Tracer budgets with a focus on the anthropogenic carbon budget. See [www.ifremer.fr/lpo/ovide](http://www.ifremer.fr/lpo/ovide) for more information on the project and for publication list. The project contributes to field work in the subpolar North Atlantic: a hydrography/geochemistry section between Greenland and Portugal was realized every two other years since 2002; a current meter array was deployed in the East Greenland Current to measure its transport and variability in 2004 and recovered in 2006; Argo floats were deployed during each of the 5 cruises. Funding for the project come from Ifremer, CNRS, CNES, Météo-France, CARBOCHANGE (FP7). Some of the future plans for OVIDE include the repeat of the OVIDE line, which is one of the few high-frequency hydrography and geochemistry repeat lines. It is planned to continue to re-occupy it every 2 years and as long as possible. Also, in terms of process studies, the Reykjanes Ridge experiment's main objectives is to investigate the role of the Reykjanes Ridge on currents, water masses and mixing and ultimately on the Atlantic Meridional Overturning Cell. The project is also willing to increase collaboration with other experiments.

Anne-Marie Treguier also updated the group on the modeling activities of the DRAKKAR project. Several high-resolution models have been used. There are some plans to compare TACE data with these high-resolution models. Another modeling activity focused on the North Atlantic is an intercomparison of CMIP5 pre-industrial control-run simulations, using the Physical Analysis for a Gridded Ocean (PAGO) tools. Some initial analysis show that differences in hydrography and circulation strength imply substantial differences in freshwater budget in the North Atlantic.

As a member of WGOMD, Anne-Marie Treguier also reported on their activities. WGOMD is developing a CORE 2 intercomparison, with 13 participating models, some of them with many experiments. There are six cycles of CORE 2 (300 years) with global ice-ocean models. There is a paper in preparation regarding the AMOC, but also strong interest in developing further papers on the Southern ocean, regional sea level, and South Atlantic. The next WGOMD meeting will be in Hobart, Australia, in February 2013. One issue that the groups discussed was the availability of the CORE data and it was felt that it would be useful for PCMDI to serve the CORE-II dataset again. A possible way forward would be a letter of support from CLIVAR requesting this.

ACTION: suggest to WGOMD for renewed request PCMDI to serve CORE-II dataset (Treguier)

Ping Chang mentioned that he found interesting results using a model with a 14-cycle run. The group has requested access to the data and Ping Chang has agreed to make the data available.

ACTION: Provide details and data of model 14-cycle run (P. Chang)

Molly Baringer gave a presentation with updates and recent developments on the US AMOC programme. The Department of Energy (DOE) has been added as a sponsoring agency in 2012 with eleven new projects approved. Over 50 funded projects have now been linked to the programme, and the 4th Annual Progress Report was published in March 2012. An external programme review is planned for autumn 2012. Issues related to AMOC predictions are being well coordinated, although there are no results yet. Several groups, in addition to those directly linked with the AMOC programme, are working on this (WGOMD, GSOP, US CLIVAR Decadal Predictability Working Group). CORE models do not capture well the vertical structure of the MOC when compared with observations, although they are closer than ocean synthesis products. However, none of them show the trend measured by observations. Molly Baringer also gave a brief overview on the RAPID-MOCHA array. Several papers are being prepared with results of the array. In terms of funding, the US part of RAPID will have to be re-submitted, and 2014 can be a joint review (US and UK). The NERC review will now happen in 2014. However, there is no guarantee that the UK Natural Environment Research Council will renew the fund for RAPID.

Bogi Hansen reported on some European projects in the North Atlantic area. Some of the Core Themes of the ThermoHaline Overtuning at Risk? (THOR) project still have on-going work, particularly Core Theme 3 (Observations of the North Atlantic THC). Interesting results have been achieved by some of the observations: Denmark Strait overflow is stable and warming is starting in the Deep Western Boundary Current at the Labrador Sea. Another project that has just been funded by FP7 is NACLIM. Its main objective is to investigate and quantify the predictability on interannual to decadal time scales of the climate in the North Atlantic/European sector related to North Atlantic/Arctic Ocean surface state (SST and sea ice) variability and change. Rather than running climate forecasts within the project, the aim is to analyze CMIP5 predictions and critically assess their quality for the near-future stage of atmospheric and oceanic quantities. NACLIM has a large component on impacts and will demonstrate the use of the physical North Atlantic/European climate predictions by evaluating their impact on two different but highly relevant sectors: oceanic ecosystems and urban climate.

A new German research programme was established (2012-2015) called RACE (Regional Atlantic Circulation and Global Change). Goal is an improved understanding of the regional response of the Atlantic circulation and climate modes to global warming and of expected impacts. This is a coordinate effort including high-resolution ocean and coupled modeling as well as contributions to the Atlantic observing system. The latter includes western boundary current arrays off Brazil at 11°S and in the subpolar gyre at 53°N, an observation network of the NAC and measurements of the Denmark Strait Overflow.



Bill Johns presented a summary of the recent activities of OSNAP. The observational strategy of OSNAP has been developed through OSSE and using the 1/12° FLAME model. The US components have not been funded and parts of European components should be ready to be deployed soon. The modelling component of the project will be initially delivered by the UK and German proposals. In the US there are also plans for the modeling component but funding agencies have requested that some observational data should be provided first.

The group has discussed how AIP can help in the coordination of an integrated observing system in the Atlantic basin. At the moment, there is more reporting from groups with some discussion. But some of the communities, e.g., AMOC, are well coordinated and have developed ways for better discussion of issues related to that subject. Historically AIP has helped in the development of several ideas/projects. One area that, although with a large community, AIP can serve as a platform for discussions about the Tropical Atlantic, particularly now that TACE has ended. Review or white papers commissioned by AIP can help at fostering new ideas and AIP's webpage should be seen as an important tool in order to draw in the wider community.

#### **4. Session: Modelling activities**

Laurent Terray led the discussion on AIP's involvement with CMIP5. There are still some key questions regarding natural forcing and natural variability in the North Atlantic. Air-sea coupling, particularly the impact of small scale events on a global scale, is a particular issue that needs to be better understood. High-resolution atmospheric models can certainly help in understanding links, and fully coupled models can be tested if small scale coupling can be reproduced. Teleconnections is a topic that also needs to be further investigated. AIP should play a lead role in this. Regarding Sea level regional trends, a good agreement can be seen between Levitus dataset and models for the steric part. Some regions do not show a good agreement (e.g., sub polar gyre). It is necessary to use models to understand more sea level trends. Extending the sea level trends period back in time will require a multireconstruction approach as different methodologies and model datasets exist and can be used.

Doug Smith gave a presentation on decadal prediction current status. There are initial suggestions of skilful predictions of extremes (simply defined by values above the 90% percentile), mainly from climate change signal. Also, skilful predictions of tropical Atlantic storms are seen, with initialisation improving via North Atlantic and tropical Pacific. It is noted the emerging importance of external factors, especially aerosols, which reduced storms since 1860, important for near future. Full field approach and anomaly are both skilful. The full field is slightly better, especially seasonal ENSO teleconnections. Many groups are now developing decadal predictions, and key experiments are being done for CMIP5. So the 15th session of the WMO Commission for Climatology recommended action to start the coordination and exchange of decadal predictions and a proposal went out to various groups in 2010 to exchange decadal prediction information. For the 2012 exercise, initialised predictions are cooler on average, but warmer in Atlantic sub-polar gyre.

#### **5. Session: CLIVAR new structure and AIP business**

Martin Visbeck, co-chair of the CLIVAR Scientific Steering Group (SSG), briefed the group on the discussions of the last SSG's meeting in La Paz, Mexico, in May 2012 and of the last WCRP Joint Scientific Committee (JSC), in Beijing, China, in July 2012. After 2013, links between WCRP projects will be focused and based on fundamental interactions of the Earth system. More details about the discussions on the evolution of WCRP can be found on the report of the JSC meeting ([http://www.wcrp-climate.org/documents/JSC33\\_Report\\_Final.pdf](http://www.wcrp-climate.org/documents/JSC33_Report_Final.pdf)). Regarding the organisational structure of CLIVAR, some panels will now report directly to the JSC. VAMOS, AAMP and ACP have been asked to interact more with a view of joint sponsorship with GEWEX. The SSG has also proposed topics which will guide CLIVAR science in the next 10 years. These Research Challenges - (a) Intraseasonal, seasonal and interannual variability and predictability of monsoon systems, (b) Decadal variability and predictability of ocean and climate variability, (c) Trends, nonlinearities and extreme events, (d) Marine biophysical interactions and dynamics of upwelling systems, and (e) Dynamics of regional sea level variability - will be further developed by white papers, which will then be open for public comment.

Panel members discussed the role of AIP within those research challenges and within the proposed CLIVAR and WCRP structure. A particular challenge now will be AIP interaction with WGCM and WGSIP as they will no longer report to the SSG. One way to overcome this would be perhaps through cross membership. Links with WGOMD should also continue, particularly because of the decadal variability research challenge. As it is proposed that the CLIVAR research challenges will be addressed by new formed panels, one problem may be the focus of those panels' activities, mainly because some of the topics are very broad. Regional aspects will be ensured by the regional panels and cross-membership to research challenges should be ensured. The panel also noted the continued lack of an Arctic Ocean Panel in the CLIVAR structured. Although progression in polar predictability science is important, this will have to be further discussed with CliC.

In relation to the research challenge on upwelling systems, a clear stronger interaction between CLIVAR and IMBER is needed. This should also be seen as an important issue for AMOC, perhaps to be discussed by the US AMOC Science Team. This particular research challenge has also clear links with what is being proposed by the US CLIVAR ETOS WG. AIP should contribute to the white paper on Upwelling Systems being written by the tiger team.

**ACTION:** AIP members to contribute to white paper on upwelling systems (All)

Regional Sea Level change has not been discussed much by AIP, this is an issue that could be revisited when discussing membership. At the last AMOC meeting, a good discussion about this topic has happened. Regarding Intraseasonal, seasonal and interannual variability, the group's recommendation is that it should not be only about monsoon, but broader.

**RECOMMENDATION:** SSG to revisit and broaden the scope of the Intraseasonal, seasonal and interannual variability research challenge.

As for the Extremes Research Challenge, there is a lot related to the ocean and CLIVAR needs will be involved. AIP should also interact more with the CLIVAR/CCI/JCOMM ETCCDI in order to support their work in developing more ocean indices.

**ACTION:** AIP to interact with ETCCDI on ocean indices. (M. Baringer, P. Chang, co-chairs)

In addition to the research challenges, the SSG has also proposed some capabilities – (a) Improving Ocean system models, (b) Implementing ocean observations, (c) Support of global assessments, (d) Access to ocean data, synthesis and information, (e) Knowledge transfer and stakeholder feedback, and (f) Education, capacity building and outreach - that will support the research challenges. One of the discussions that AIP members had was how CLIVAR plan to provide information to mitigation and adaptation processes. Perhaps the best way will be through the work done by knowledge exchange capability.

Regarding capacity building, panel members have discussed the issue at length. A few years ago, AIP co-organised jointly with IMBER the CLIMECO-2 international summer school. It was a combination of both training and scientific discussion, which proved to be very a successful model, with invitation to students and early career scientists from developing countries. The panel felt that any training activities should be focused on a particular issue. At ICTP, in Trieste, training activities ran with a 3-day conference type event at the end, which helps scientific discussions. The PIRATA community has been very successful in running a MSc course in Benin and perhaps AIP should contribute more to that. On a more strategic level, there are two ways to move ahead: either defining a region (e.g. Africa) where several CLIVAR panels could contribute, or defining a specific topic (e.g., regional sea level) and have a regional workshop on that subject. The panel should map out known capacity building activities for the next 2 years and see how AIP can collaborate with them. Once this is done, gaps in topics could be identified and ideas should be suggested for activities, particularly if they can be somehow sustained.

**ACTION:** Map out potential capacity building activities where AIP can contribute (All)

**ACTION:** Suggest ideas for sustained capacity building activities (All)

Another topic that CLIVAR wants to develop more is in relation to knowledge transfer. CLIVAR endorsed projects have already been contacted with a request to provide their plans and activities related to knowledge transfer. The WASCAL/SASCAL project should also be contacted and asked to provide their activities. The European Space Agency (ESA) also is interested in scoping workshops related to some of the CLIVAR Research Challenges and the panel should engage with any activities they may develop.

**ACTION:** Contact WASCAL/SASCAL regarding their knowledge transfer activities (co-chairs)

The panel has discussed its membership. Laurent Terray, Ruth Curry, Bogi Hansen and Yochanan Kushnir are rotating off and several others have their membership expiring at the end of 2012. Although it is necessary to ensure some continuity, there is a need to identify new roles for the panel to perhaps cover the new CLIVAR research challenges, particularly sea level, as there is a gap in this topic within AIP. Also, it needs to develop better interaction with other panels (e.g., VAMOS) through cross-membership

**ACTION:** Find replacements for Laurent Terray, Ruth Curry, Bogi Hansen and Yochanan Kushnir (co-chairs)

**ACTION:** Place open call for new members in CLIVAR Exchanges, with some information about panel activities/objectives in order to canvas interest (co-chairs, ICPO)

**ACTION:** Identify new panel members with expertise in sea level (co-chairs)

## Meeting participants

Laurent Terray	CERFACS, Toulouse, France
Peter Brandt	GEOMAR, University of Kiel, Germany
Molly Baringer	NOAA/AOML/PHOD Miami, USA
Ping Chang	Texas A&M University College Station, USA
Bogi Hansen	Faroe Marine Research Institute, Faroe Islands
Yochanan Kushnir	LDEO, Columbia University USA
Mathieu Rouault	University of Cape Town, South Africa
Doug Smith	Hadley Centre, MetOffice, UK
Anne-Marie Treguier	LPO IFREMER, France
Shenfu Dong	NOAA/AOML, USA
Bill Johns	RSMAS, University of Miami, USA
Martin Visbeck	GEOMAR, Germany
Roger Barry	ICPO, UK
Nico Caltabiano	ICPO, UK

**CLIVAR Atlantic Implementation Panel – 12<sup>th</sup> meeting**  
**Sep 13-14, 2012**  
**Kiel, Germany**

**Meeting Agenda**

**Thursday, Sep 13<sup>th</sup> 2012**

09:00 - Welcome and charge to the meeting (L.Terray, P. Brandt)

09:15 - ICPO (R. Barry)

**Session1: The tropical and South Atlantic observational network**

09.20 - Common AIP/PIRATA SSG meeting (B. Bourles / R. Lumpkin, only possible on Thursday morning)

- Discussion about future needs, improvements, collaborations, capacity building and knowledge transfer

10.40 – **Coffee break**

11:00 - Update on the Hurricanes working group (Y. Kushnir)

11:20 - Eastern Tropical Ocean SST biases working group (P. Chang, L. Terray)

11:40 - TACE, further activities (P. Brandt)

12.00 - South African initiatives (M. Rouault)

12.20 - SAMOC (S. Dong)

**13:00 Lunch**

**Session 2: The North Atlantic observational network**

14:00 French/European projects in the North Atlantic – OVIDE and DRAKKAR (A. M. Treguier)

14:30 US-AMOC (Molly Baringer / B. Johns)

15:00 RAPID-WATCH (Molly Baringer / B. Johns)

15.30 – **Coffee break**

16:00 EU-THOR / NACLIM (B. Hansen)

16:20 German RACE (P. Brandt)

16:30 OSNAP (B. Johns)

17:00 Discussion: how can AIP help in the coordination of an integrated AMOC observing system

17:30 End of day

**Friday, Sep 14<sup>th</sup> 2012**

**Session 3: AIP and CLIVAR new structure**

09:00 WCRP / CLIVAR Grand Challenges (M. Visbeck)

09:20 Proposed CLIVAR new structure (P. Brandt)

09:40 Discussion how AIP fits into the new structure (including future membership and new research challenges)

10.40 – **Coffee break**

11:00 Continue - Discussion how AIP fits into the new structure (including future membership and new research challenges)

12:00 Discussion on Capacity Building and Knowledge Transfer

**12:30 Lunch**

13:30 CMIP5: what is expected from the AIP? How much can we be involved? (L. Terray)

14:00 Decadal prediction (D. Smith)

14:30 Discussion on modelling issues

15:00 Review of action items

End of meeting

