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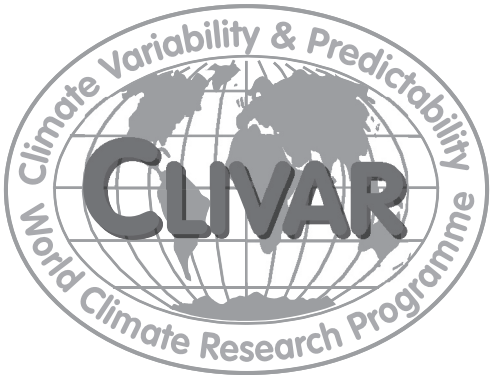

Report of the 9th Meeting of the Working Group on Seasonal to Interannual Prediction

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Summary of actions

Note: Numbers in Brackets (i.e. (1) ... (4) refer to the summary of CLIVAR SSG-13 requests to WGSIP described in Section 2.2 of the report. These are:

1. Develop WGSIP's programme contributing to model improvement.
2. Contribute to design of OSSEs and data assimilation activities relevant to seasonal to interannual prediction.
3. Improve interactions with the various regional panels, WGNE, GSOP and WGCM
4. Consider the utility of seasonal forecasts for applications, with interactions with regional panels.

Actions:

Action 1: Standards Project: Niño Pilot Project (Stockdale, DeWitt) (1)

- Stockdale to contact potential contributors
- Stockdale to set up DODS server
- WGSIP members to contribute data
- Stockdale to perform preliminary analysis

Action 2: Pacific Panel interactions – coordinate experiments to improve OGCMs for ENSO prediction (DeWitt (WGSIP), Richards (Pacific Panel), Balmaseda (Pacific Panel), Alves (BMRC, Australia)) (1.3)

- South Pacific Workshop: Kirtman, Saulo, Power to comment on plan.
- VOWELS:
  - Establish experimental protocol using two different forcing datasets; provisional experiments.
  - Collate existing results
  - Explore possibility of workshop
  - Establish links to the Pacific Upwelling and Mixing Physics (PUMP) experiment

Action 3: VAMOS interactions – Regional evaluation of global model outputs (Kirtman, Saulo (VAMOS)) (1,3,4): Saulo-Kirtman to interact to get global forecast data to VAMOS.

Action 4: VACS interactions – Regional evaluation of global model outputs (Landman, Reason (VACS)) (1,3,4): Landman to contact VACS regarding what data are needed.

Action 5: Clouds in AGCMs (and CGCMs) with WGNE and GEWEX (leads DeWitt and Jakob (GCSS/WGNE)) (1.3)

- Stockdale to inform Jakob of WGSIP's interest
- DeWitt to contact WGSIP members pointing them to the web site with experimental protocol
- WGSIP members to comment on experimental protocol to expand to 4 coupled experiments and perform experiment (i.e provide data)
- WGSIP to carry out diagnostic project on relationship between surface fluxes and SST (DeWitt).

Action 6: Develop potential list of coupled diagnostics for interaction with WGNE (Déque, Stockdale) (1, 3)

- Déque and Stockdale to develop list of diagnostics for circulation to WGSIP.
- WGSIP to comment.

Action 7: SMIP-2, SMIP/HFP (Boer, Sugi) (1,4)

- Boer to determine data size requirements.
- Boer to contact IRI, APCN and ADPRC/IPRC regarding hosting data server.
- Boer and Sugi to continue to promote international participation in SMIP.

Action 8: Sub-committee to explore potential WGSIP-OSSE-data assimilation contribution (Sugi (Chair), Koster and Kirtman) (2)

- Sub-committee to meet electronically

Action 9: Soil moisture initialization for seasonal prediction (Koster interaction with GEWEX) (2)

- WGSIP endorses the experiment.
- Koster/GEWEX to provide experimental protocol.

Action 10: WGSIP-TFSP Seasonal Forecast catalogue primarily for research use (Kirtman)

- Kirtman to email WGSIP and TFSP seeking input to the catalogue

- Kirtman to prepare catalogue as web site and circulate to WGSIP, TFSP for comment
- ICPO to put catalogue on CLIVAR web site.

Action 11: WGSIP-C20C interactions (Kirtman, Nobre, Kang, Folland (C20C))

- Kirtman and Folland to iterate on possible July meeting in Prague
- Nobre, Kang, Kirtman to develop potential pace-maker experimental design

Action 12: Interact with regional panels regarding applications (VAMOS, VACS) from the perspective of using WGSIP model data and experiment design. In sharing data, need to clearly identify that this needs additional resources and involves interactions with regional panels (2)

- See actions 3 and 4

Action 13: Refer back to the SSG on the question of what is CLIVAR doing to link to the applications community, START and CLIPS. Are the regional panels adequately equipped? Should there be a CLIVAR Applications Panel (2)

Action 14: Need to re-establish links with CLIPS and START (Harrison) (2)

- Harrison to identify appropriate contacts in START and CLIPS.

Action 15: WGSIP to comment on TACE (All) (2)

- All WGSIP members to comment by email regarding proposed observing system.

Action 16: Determine status of El Nino definition within WMO

- Cattle and Harrison to update.

Action 17: WGSIP to examine seasonal to interannual variability in IPCC simulations

- Power to coordinate.

Action 18: WGSIP letter to WCRP Modelling Panel regarding data management (Kirtman and Stockdale)

- Serious obstacle to WGSIP-TFSP activities
- Serious obstacle to collaboration with regional panels

Action 19: Circulate WGSIP on current status of AAMP activities (Cattle)

Action 20: Presentations to go on web (password protected) or CD (Cattle)

Action 21: Meetings with other groups – explore possibilities (Kirtman, Stockdale, Cattle)

Action 22: date of next meeting early 2006, location tbd (Kirtman, Stockdale)

1. Welcome and opening remarks

The 9th session of the CLIVAR Working Group on Seasonal to Interannual Prediction (WGSIP, previously known as CLIVAR NEG-1) was held at the Met Office, Exeter, United Kingdom from the 14-16 October 2004. Dr Mike Davey of the Met Office acted as local host for the meeting. Drs Ben Kirtman and Tim Stockdale (co-chairs of WGSIP) opened the session and welcomed the Panel members, invited experts, and local participants. A list of participants can be found at Annex A and the agenda at Annex B. Dr Howard Cattle, Director of the International CLIVAR Project Office (ICPO), also extended his welcome on behalf of CLIVAR and the ICPO.

2. Review of relevant developments and activities

2.1 Report from the International CLIVAR Project Office

Dr Cattle provided an overview of CLIVAR, the World Climate Research Programme's (WCRP's) project on Climate Variability and Predictability. CLIVAR is one of the four current projects of WCRP. The others are the Global Energy and Water Experiment (GEWEX), Climate and Cryosphere (CliC) and Stratospheric Processes and Climate (SPARC). Other WCRP activity takes place through the Earth System Science Partnership (ESSP) projects on the Carbon Cycle, Water, and Food and Fibre. The overall objectives of WCRP are "to determine to what extent climate can be predicted" and "the extent of human influence on climate", aiming at the goal of greatly improved understanding of the role of climate in the total Earth system. WCRP acts, through its projects to coordinate international research effort on physical aspects of climate. It links in particular to the International Geosphere Biosphere Programme (IGBP), the International Human Dimensions Programme (IHDP) and Diversitas, an international programme of biodiversity science. These programmes, with WCRP, form the partners of the ESSP.

Within WCRP, CLIVAR's mission is "to observe, simulate and predict the Earth's climate system, with focus on ocean-atmosphere interactions enabling better understanding of climate variability, predictability and change, to the benefit of society and the environment in which we live". CLIVAR science and implementation plans developed through the mid 1990s, with CLIVAR implementation starting in earnest in 1999, following the International CLIVAR Conference held in Paris from 2-4 December 1998. CLIVAR's goals and objectives include the need to extend the range and accuracy of seasonal to interannual climate prediction, in which WGSIP has the lead role. CLIVAR is being implemented through its panels and working groups, more detail on which can be obtained from the CLIVAR website at www.clivar.org.

CLIVAR implementation on a day to day basis is facilitated by the activities of the ICPO. Since the previous WGSIP meeting in Honolulu, USA (5-7 November 2003), Andreas Villwock, previously the staff member responsible for WGSIP, had left the project office at the end of 2003 on cessation of his funding from Germany. Staff responsibilities had therefore been reallocated, Current responsibilities were now as follows (panel/working group responsibilities in brackets)

- Dr Howard Cattle (SSG, WGSIP, links to WGCM; WGCM is managed by V Satyan, Geneva)
- Dr Roberta Boscolo, working from Vigo, Spain, (Atlantic, VACS, WGOMD)
- Dr Carlos Ereno, working from Buenos Aires, Argentina (VAMOS)
- Ms Katy Hill (Pacific, GSOP)
- Dr Mike Sparrow (Southern Ocean)
- Dr Zhongwei Yan (AAMP (including the Indian Ocean Panel), ETCCD, PAGES/CLIVAR)

One of the activities of the ICPO is publication of the CLIVAR Exchanges Newsletter. Printing of Exchanges is currently sponsored by the China Meteorological Administration through the Chinese Academy of Meteorological Sciences. Exchanges appears 4 times annually. Editions are frequently themed and the January 2005 edition would carry the theme of "Seasonal Predictability".

A major event of 2004 had been the 1st International CLIVAR Science Conference which was held in Baltimore, USA from 21-25 June. The theme of the conference had been around "understanding and predicting our climate system". WGSIP members had played a key role, in particular in the session on "short term climate prediction", in both the plenary lectures and through submitted posters. The conference, which had 640 registered attendees from 56 countries was the largest WCRP conference ever. There were 14 major sponsors with the conference organisation being led by Dr David Legler of the US CLIVAR Office. The purposes of the conference were to review the highlights of the first 5 years of CLIVAR implementation and more importantly to determine future priorities and new directions for understanding and predicting climate. In particular it provided input into the CLIVAR self assessment which was the focus of CLIVAR SSG-13 (Baltimore, 27-29 June 2004), held immediately following the conference. Dr Ed Sarachick had acted as reviewer for CLIVAR's seasonal to interannual activities and Dr David Anderson (ECMWF) for modelling.

2.2 Report from the 13th session of the CLIVAR SSG

Dr Kirtman provided an overview of the outcomes of CLIVAR SSG-13 and the CLIVAR assessment from the perspective of WGSIP. The SSG had commended WGSIP's work in promoting multi-model seasonal datasets in particular and had recognised the key role of WGSIP in leading the COPES Task Force on Seasonal Prediction activity. The SSG had also welcomed WGSIP efforts to improve access to and exchange of model data using agreed metadata and exchange mechanisms. The SSG considered that links between WGSIP and the Pacific Panel in the study of ENSO to be crucial to progress and urged them to consider joint plans (from this perspective, Dr Kelvin Richards attended the WGSIP meeting as chair of the CLIVAR Pacific Panel). The SSG also:

- Urged WGSIP to work closely other CLIVAR panels, in particular to help enable them to organise assessments of WGSIP global prediction products, promoting diagnostic analysis of these at regional level.
- Asked WGSIP and GSOP to develop requirements for initialising seasonal to interannual forecasts (and possibly decadal also).
- Requested WGSIP/GSOP interaction on observing system simulation experiments (OSSEs) to provide feedback on observing system requirements for seasonal forecasting in both the tropics and extratropics.
- Asked WGSIP to become more involved in the analysis of seasonal to interannual aspects of Coupled Model Intercomparison Project (CMIP-3) and IPCC runs under WGCM.
- Requested WGSIP to consider the utility of forecasts for specific applications working actively with applications experts on regional panels.
- Suggested WGSIP work more closely with WGNE to study the role of model error on seasonal forecast skill.

With regard to the last bullet, cross membership between WGNE and WGSIP had been put in place through the membership of both groups by Dr Michel Déque (Météo-France). In addition Dr Christian Jakob (BMRC, Australia) would brief WGSIP on the GEWEX Cloud System Study (GCSS)/WGNE Pacific Cross Section Intercomparison with a view to WGSIP involvement.

More generally, it was noted that as an outcome of its assessment, CLIVAR will work to focus more on the 4 major themes of ENSO, monsoons, decadal modes of variability and the thermohaline circulation, and anthropogenic climate change. Workshops would be run on one of the four themes annually. SSG meetings would also be restructured with each panel and working group asked to report, in particular, against i) its contributions to the themes and annual workshops; ii) activities related to regional assessment of predictability and variability in global model outputs; iii) cross panel and working group links and iv) terms of reference (ToRs). TORs for each panel and working group were under review by the SSG and being revised to include in particular explicit reference to data management and panel and working group cross links.

Overall, Dr Kirtman summarised the assessors and SSG's requests to WGSIP to be to:

5. Develop WGSIP's programme contributing to model improvement.
6. Contribute to design of OSSEs and data assimilation activities relevant to seasonal to interannual prediction.
7. Improve interactions with the various regional panels, WGNE, GSOP and WGCM
8. Consider the utility of seasonal forecasts for applications, with interactions with regional panels.

The relevance of the actions arising from WGSIP-9 to these four items is noted in the overall action list and in the individual actions below.

Overall the WGSIP felt it could respond positively to the requests that had come out of the assessment and SSG-13, though there was a danger that the coordination between groups could become an end in itself. A primary role for WGSIP was to improve models for seasonal to interannual prediction but it also needed to address the observation system question. Following discussion, the group decided on the following action:

Action 8: Sub-committee to explore potential WGSIP-OSSE-data assimilation contribution (Sugi (Chair), Koster and Kirtman) (2)

- Sub-committee to meet electronically

A need to do more for applications was recognised. The request from the SSG had been for this to be through the regional panels, but Dr Mike Harrison pointed out that in the past, WGSIP had started to engage with the WMO Climate Information and Prediction Services (CLIPS). There had been no CLIPS representation at WGSIP for 2 years now. The System for Analysis Analysis, Research and Training which is cosponsored by ESSP partners is also applications focussed. WGSIP has no proper START links. Dr Davey noted WGSIP's role in making data available, something those working in seasonal forecasting were used to doing. Indeed various institutional arrangements were in place. However WGSIP must not lose its focus of improving seasonal predictions. Indeed, improved prediction is the key WGSIP task.

On the other hand links to applications users are important, especially if this were a 2-way process providing feedback on performance. In this context, WGSIP had good links with the International Research Institute for Climate Prediction (IRI). WGSIP could clearly raise the profile of what seasonal to interannual prediction data there are available for use in applications and for analysis by CLIVAR's regional panels. Indeed, the group were supportive of the SSG strategy in this regard and agreed to take steps to ensure the availability of the appropriate datasets. Overall, though, the group questioned how well placed CLIVAR actually is to build links to applications and whether the present strategy of doing this through identified representatives on regional panels was the best approach. A more focussed attack through an explicit Applications Working Group could provide a better way forward. There was a need to obtain more clarification on this issue from the SSG (see also section 2.9, in particular Action 13). Even so it was clearly incumbent on WGSIP to work through CLIVAR mechanisms as well as to seek broader links to applications.

Action 12: Interact with regional panels regarding applications (VAMOS, VACS) from the perspective of using WGSIP model data and experiment design. In sharing data, need to clearly identify that this needs additional resources and involves interactions with regional panels (2)

- See also actions 3 and 4

Anticipating the outcomes of the discussion under agenda item 2.9, it was suggested that WGSIP could explore the potential for further development of applications links with CLIPS, START and others. The first step should be through an information gathering exercise. One aim would be to make clearer how CLIVAR and WGSIP should deliver to these (see Section 2.9 for related actions).

2.3 Overview and report on WCRP-COPES structures

Dr Cattle provided an overview of the WCRP's Coordinated Observation and Prediction of the Earth System (COPES) strategy which is in process of being established by the Joint Scientific Committee (JSC) for WCRP. The aim of COPES is "to facilitate prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit and value to society". As a strategy it aims to integrate the efforts of the core projects of WCRP (GEWEX, CLIVAR, CliC and START) and the major modelling activities under WGCM and WGNE. It will do this in particular through the establishment of pan-WCRP Task Forces. In that regard, COPES is setting specific objectives in consultation with the WCRP community. A start had been made with the WCRP COPES Task Force on Seasonal Prediction (TFSP) in which WGSIP, and in particular Dr Kirtman, has the lead (see section 3.7).

COPES seeks to synthesise the ongoing observational and modelling activities of all relevant WCRP components against the key concept of "seamless prediction" of the total physical climate systems from weeks to decades. To facilitate this a WCRP Modelling Panel (WMP) and a Working Group on Observations and Assimilation (now WCRP Observations and Assimilation Panel, WOAP) are being established in order to (a) provide overall coordination of WCRP modelling observational and assimilation activities, (b) facilitate the interactions of WCRP with external groups and organisations and (c) provide oversight of data management in WCRP. A Task Force is also being formed to define and initiate a process to plan and fully implement COPES. It will report to the JSC in March 2005.

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2.4 Report from the CLIVAR VAMOS Panel

VAMOS (Variability of the American Monsoon System) modelling activities were summarised in a presentation by Dr Celeste Saulo. VAMOS itself (see www.clivar.org/organization/vamos/index.htm#ACTIV) is focussed on three primary programmes: the North American Monsoon Experiment (NAME), Monsoon Experiment South America (MESA) and the VAMOS Ocean Cloud Atmosphere Land Study (VOCALS). The VAMOS modelling approach recognises key deficiencies in climate models, requiring improved process understanding. Its activities include data assimilation, use of global and regional atmospheric models and coupled GCMs used for investigations on timescales ranging from diurnal to interannual. An ad hoc VAMOS modelling group has been established to (a) review the status of modelling relevant to VAMOS research and (b) organise a modelling session at the 8th meeting of the VAMOS Panel (Mexico City, 7-11 March 2005) and (c) develop recommendations for a long-term VAMOS modelling strategy.

Dr Saulo noted that common issues for NAME and MESA include:

- The influence of ENSO on Americas monsoon rainfall.
- The relative roles of sea surface temperatures (SSTs), both tropical and extratropical, and soil moisture on monsoon rainfall.
- Why the rainfall patterns favour a dipole structure.
- The link between climate and weather for intraseasonal variability.
- The limits of predictability
- The diurnal cycle associated with monsoon rainfall.

Dr Saulo briefly described the NAME 04 field experiment which ran for four summer months (JJAS, 2004) (see www.joss.ucar.edu/name/). Overall, NAME is aimed at delivering:

- Observing system design for monitoring and predicting the North American monsoon.
- More comprehensive understanding of North American summer climate variability and predictability.
- Strengthened scientific collaboration across Pan-America
- Measurably improved climate models that predict North American summer precipitation months to seasons in advance

Dr Saulo noted that NAME had compiled a white paper that summarises the strategy for accelerating progress on the fundamental modeling issues pertaining to NAME science objectives. This can be found at: www.joss.ucar.edu/name/documentation/NAME_model.html). Dr Saulo also outlined results from the North American Monsoon Assessment Project (NAMAP, see www.joss.ucar.edu/name/) and wider global modeling studies, in particular in respect of the problems models have in representing the diurnal cycle of precipitation, the benefits of improved resolution and modeled monsoon anticyclone sensitivity to initialized soil moisture.

The modeling goal of MESA is to understand the sources and limits of seasonal predictability over South America in order to improve climate and hydrological predictions. The strategy focuses on detecting deficiencies in the models, and on the development of new parameterizations and model components. One challenge to seasonal prediction is the low predictability found in the southeastern region of Brazil. The South American Low Level Jet Experiment (SALLJEX) which ran from 15 November 2002 to 15 February 2003 had provided key datasets with which to test models of the South American monsoon system. Dr Saulo illustrated several SALLJEX-related modeling activities centred around:

- Model intercomparison.
- Data assimilation
- Model development
- Predictability studies

In conclusion, Dr Saulo summarized the possible contributions of VAMOS modeling to WGSIP activities to be:

- Use of results from SALLJEX and NAME 04 in numerical experimentation on seasonal to interannual variability and predictability.
- The unique contributions that VAMOS can make to model development, including the areas of land surface processes, boundary layer clouds, representation of orography, cloud-radiation interactions, the diurnal cycle (particularly for convection over land) and atmosphere-ocean interactions.

In thanking Dr Saulo for her presentation, Dr Kirtman noted interest in the community in global model representations of American monsoon processes, pointing to the potential in the Seasonal Model Intercomparison Project (SMIP – see section 3.4) and DEMETER outputs for regional studies in this regard. This was also echoed by Dr Stockdale who noted the value of the VAMOS outputs for model development. This is a clear task also for GEWEX, which is a co-sponsor of VAMOS activities, with CLIVAR. Following discussion, it was agreed that WGSIP interactions with VAMOS should be developed through the regional evaluation of global models.

Action 3 VAMOS interactions – Regional evaluation of global model outputs (Kirtman, Saulo (VAMOS)) (1,3,4): Saulo-Kirtman to interact to get global forecast data to VAMOS.

2.5 Reports from other CLIVAR regional monsoon panels (AAMP, VACS) and on pan-WCRP monsoon activities

2.5.1 Asian Australian Monsoon Panel (AAMP)

Dr Cattle reported on the status of the Asian Australian Monsoon Panel. As an outcome of the CLIVAR Assessment, the CLIVAR SSG-13 formed a Task Force, led by Professor Bin Wang, to develop a strategy for collaboration with GEWEX on the Asian-Australian monsoon. The Task Force examined the Indian Monsoon focus of AAMP to date, recognising the considerable success that AAMP has had in this area. It also looked however to the needs for:

- Enhanced East-Asian-Western North Pacific monsoon activity
- Integrated regional modelling activity between GEWEX and CLIVAR
- Coordinated GCM and CGCM studies
- Diagnostic regional analysis of global datasets
- ISO prediction
- Climate change and the A-A monsoons.
- The linkage between AAMP and the START Monsoon-Asia Integrated Regional Study (MAIRS).

In order to facilitate improved CLIVAR/GEWEX links in work on the A-A-monsoon region, the Task Force recommended implementing an expansion of AAMP activities and a revised membership for the AAMP to allow improved interaction between CLIVAR and GEWEX and a strengthening of the linkage to MAIRS. These recommendations are currently being implemented.

Action 19: Circulate WGSIP on current status of AAMP activities (Cattle)

2.5.2 Variability of the African Climate System (VACS)

The group discussed potential links with VACS, and agreed, given the SSG's direction, to pursue the same path as for VAMOS, namely that WGSIP interactions with VACS should be developed through the regional evaluation of global models. In particular, WGSIP would welcome feedback from VACS on global model performance. It was noted that Dr Willem Landman has links with VACS through Dr Chris Reason (VACS co-chair). Dr Landman was requested to open lines of communication and explore with VACS just what they might need against the current availability of SMIP, DEMETER and other runs.

Action 4 VACS interactions – Regional evaluation of global model outputs (Landman, Reason (VACS)) (1,3,4): Landman to contact VACS regarding what data are needed.

2.5.3 Pan WCRP Monsoon activities

This item was also reported on by Dr Cattle and covered a number of coordination activities that had taken place between GEWEX and CLIVAR since JSC XXV (Moscow, Russian Federation, 1-6 March 2004) at which concern had been expressed that that the CEOP Integrated Monsoon Study (CIMS) as yet did not include the full and proper input and participation of CLIVAR's AAMP. In response, JSC XXV reiterated a request that CLIVAR and GEWEX review their monsoon-related activities with a view to achieving better coordination, reducing the number of monsoon-related panels and developing a pan-WCRP monsoon modelling strategy. The JSC further requested that particular attention be given to the requirements and actions needed in connection with the A-A monsoon.

In response to these requests, Professor Tetsuzo Yasunari convened a meeting of CLIVAR and GEWEX experts involved in WCRP monsoon activities in Baltimore in association with, and just prior to, the CLIVAR Conference. The outcomes of the meeting were discussed a few days later at a follow-up meeting with the CLIVAR and GEWEX Chairs and IPO Directors. The meeting, aimed at examining the cross-cutting issues between CLIVAR and GEWEX, reviewed:

(i) Past interactions and communication problems.

(ii) The need for an overarching activity for studies of the southeast or east Asian monsoon (as carried out in GAME under GEWEX) and the Indian (or south Asian) monsoon.

(iii) The range of overall scientific issues relating to monsoons, the need for greater coordination and the previously-proposed pan WCRP Workshop on monsoons as an aid to development of a pan-WCRP monsoon modelling strategy.

Three particular outcomes have emerged in response to these discussions:

Firstly, to aid communication in the future, the need for a monsoon calendar as a means of sharing information was identified. Such a facility has been subsequently developed on the web by the International Pacific Research Center, Hawaii, USA, under the guidance of Professor Bin Wang (now the CLIVAR AAMP co-chair) and at the request of the CLIVAR SSG. It can be found at: http://iprc.soest.Hawaii.edu/meetings/monsooncal.html.

Secondly the review of AAMP activities (section 2.5.1 above)

Thirdly, arrangements were being put in place between CLIVAR and GEWEX for a proposed pan-WCRP "Workshop on the Monsoon Climate Systems – towards better prediction of the monsoons", to take place in Irvine, California in June 2005. An initial outline for the meeting has been drafted by Prof Yasunari and Dr Ken Sperber and a scientific organising committee is being put in place. Further information will be available when plans for the workshop are further developed.

2.6 Other WCRP modelling activities:GEWEX Cloud System Study (GCSS)/WGNE Pacific Cross Section Intercomparison

Dr Kirtman welcomed Dr Jakob to the meeting at this point and invited him to brief the WGSIP on the GEWEX Cloud System Study (GCSS)/WGNE Pacific Cross Section Intercomparison which is also linked to WGNE. The intercomparison is aimed at seeing to what extent models can reproduce the main properties of the diurnal cycle over the (sub)tropical oceans and to see how models and observations (in particular from a new generation of satellites) can help in characterizing the humidity structure of the (sub)tropical upper troposphere. The project is centred on intercomparison of model outputs along a Pacific cross section from the stratocumulus region to

the region of deep cumulus in the ITCZ. Information on the model data requested can be seen at: www.bom.gov.au/bmrc/wefor/staff/cnj/GCSS_pacific_case_final_files/frame.htm. The model outputs will be compared with various observational datasets.

WGSIP debated how it might participate in the project. At the conclusion of the discussion, the following was agreed:

Action 5: Clouds in AGCMs (and CGCMs) with WGNE and GEWEX (leads DeWitt and Jakob (GCSS/WGNE)) (1.3)

- Stockdale to inform Jakob of WGSIP's interest
- DeWitt to contact WGSIP members pointing them to the web site with experimental protocol
- WGSIP members to comment on experimental protocol to expand to 4 coupled experiments and perform experiment (i.e provide data)
- WGSIP to carry out diagnostic project on relationship between surface fluxes and SST (DeWitt).

2.7 Reports from regional or national CLIVAR Committees

2.7.1 Japan

Dr Sugi pointed participants to the March 2004 Japanese National Report "Japanese Contributions to CLIVAR: Update" which had been available at the 1st International CLIVAR Science Conference. This can be viewed on the CLIVAR web pages at:

www.clivar.org/organization/pacific/implementation/national/Japan/JapanCLIVAR

Dr Sugi also informed participants the Japanese Earth Simulator Project "Japanese Model Mission for Climate Change" involving high resolution coupled modelling (CCSR/NIES/FRCGC), an integrated earth system model (FRCGC) and high resolution AGCM and RCM studies (MRI/JMA). A Japanese reanalysis project (JRA25) is underway as a 5 year joint collaboration between JMA and CREPPI over the period 2001-2005. It will produce a comprehensive analysis data set from the JMA assimilation system for 1979-2004. The analysis cycles will be continued by JMA after JRA25 completion.

2.7.2 US CLIVAR

Dr Kirtman reported on three main items:

1. US CLIVAR is undergoing a reorganisation though details are not known yet.
2. The NOAA-OGP-NCEP-EMC-CPC climate test bed, transitioning R&D into operations (see www.cpc.noaa.gov/products/ctb/)
3. The Pacific Upwelling and Mixing Physics (PUMP) initiative, which could be a major player in US CLIVAR (see www.pmel.noaa.gov/~kessler/clivar/pump.html)

2.8 Update on related studies

2.8.1 EU ENACT Project

Dr Davey provided an update on the EU "ENhAnced ocean data assimilation and ClimaTe prediction" (ENACT) project, funded from 2002-2004. ENACT is primarily a project to intercompare ocean analysis systems over the ERA40 period. CGCM forecasts are being made to assess the analyses, some out to 5 years. The project has 10 European partners. ENACT is aimed at delivering:

- High quality processed observational datasets for ocean analysis (in situ temperature & salinity, altimeter-derived sea level; surface fluxes from ERA-40)
- State of the art global ocean data assimilation systems
- Sets of ocean analyses extending over a 40 year period
- Individual and collective assessment of ocean analyses
- Sets of hindcasts (Met Office & ECMWF CGCMs)

A particular Met Office activity had been the production of quality controlled T & S observational datasets. This activity was outlined to WGSIP in presentation by Mr Bruce Ingleby. Further information on ENACT, including information on data access can be obtained from: www.ecmwf.int/research/EU_projects/ENACT/index.html

2.8.2 EC DEMETER and ENSEMBLES projects

Tim Stockdale outlined these projects. DEMETER was an EU-funded project which ran over the 2000-2003 period. It has generated an extensive set of 6-monthly hindcast ensemble integrations. Details, including information on data access can be found at: www.ecmwf.int/research/demeter/general/index.html.

ENSEMBLES is a recently funded EU-funded Integrated Project to develop an ensemble prediction system for climate change based on the principal state-of-the-art, high resolution, global and regional Earth System models developed in Europe. These will be validated against quality controlled, high resolution gridded datasets for Europe, to produce for the first time, an objective probabilistic estimate of uncertainty in future climate at the seasonal to decadal and longer timescales. This ensemble prediction system will be used to quantify and reduce the uncertainty in the representation of physical, chemical, biological and human-related feedbacks in the Earth System (including water resource, land use, and air quality issues, and carbon cycle feedbacks). In addition, the project will maximise the exploitation of the results by linking the outputs of the ensemble prediction system to a range of applications, including agriculture, health, food security, energy, water resources, insurance and weather risk management. See: www.ecmwf.int/research/EU_projects/ENSEMBLES/index.html.

2.8.3 International Research Institute for Climate Prediction (IRI)

The mission of IRI is to enhance society's capability to understand, anticipate and manage the impacts of seasonal climate variations in order to improve human welfare and the environment, especially in developing counties. Dr David DeWitt outlined a number of the research activities in which IRI is involved, including the work of IRI in a number of regions across the globe. Further information on IRI activities can be found at: http://iri.columbia.edu/.

2.8.4 APEC Climate Network (APCN)

Dr In-Sik Kang provided an outline of the APCN including its history and origins out of the 3rd APEC (Asia-Pacific Economic Cooperation) Ministers Conference on Regional Science and Technology Cooperation (Mexico City, 1998), its structure and its visiting scientist programme. Much of the activity is built around the a multi-model ensemble and forecast assessment process with outputs to the APCN web site (www.apcn21.net). Outputs of models from China, Chinese Taipei, Japan, Korea, Russia and the USA are utilised. Limitations in the present system have lead to a pilot project aimed at the development of an APCN multi-model ensemble forecast system (see: http://ces.snu.ac.kr/apcn/main.htm).

2.9 Applications programmes (CLIPS, START etc)

Dr Harrison covered this item through access to relevant application programme web pages. In particular he pointed to:

(A) The START activities at www.start.org. START is a non-governmental, non-profit organization that seeks to establish and foster regional networks of collaborating scientists and institutions in developing countries. These networks conduct research on regional aspects of environmental change, assess impacts and vulnerabilities to such changes, and provide information to policy-makers. START acts to enhance the scientific capacity of developing countries to address the complex processes of environmental change and degradation through a wide variety of training and career development programs. START also mobilizes resources to support infrastructure and research programs on environmental change within developing regions. Two particular START activities relevant to WGSIP are:

1. Regional climate variability and change under which there are a number of projects, demonstrating a range of potential links, including CLIMAG (Climate Prediction and Agriculture) which is joint with WCRP.
2. Adaptation and vulnerability, in particular AIACC (Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors) which is IPCC Working Group 2's headline project for capacity building across the world.

(B) the WMO web site in the context of Open Programme Area Groups (OPAGs - see www.wmo.int/web/wcp/clips2001/html/index.html) under the World Climate Applications and Services Programme and CLIPS. These demonstrate the many links WGSIP could be working towards.

Noting the large number of links, Dr Davey proposed that a list of these be put on the WGSIP web site. Other relevant links into applications included e.g. The Tyndall Centre at the University of East Anglia, UK. Overall, as discussed previously, Dr Harrison emphasized that START & CLIPS may be a better way into applications research than through the CLIVAR regional panels. Referring to the discussion outlined in Section 2.2 above, the following actions were agreed:

Action 13: Refer back to the SSG on the question of what is CLIVAR doing to link to the applications community, START and CLIPS. Are the regional panels adequately equipped? Should there be a CLIVAR Applications Panel (2)

Action 14: Need to re-establish links with CLIPS and START (Harrison) (2)

- Harrison to identify appropriate contacts in START and CLIPS.

2.10 Proposed WMO CBS infrastructure for long-range forecasting (ILRF) products

Dr Davey introduced this item, considering the activities of the WMO CBS Global Producers of Long Range Forecasts Expert Team on Infrastructure for Long Range Forecasting (ET_ILRF). The WMO definition of LRF covers periods from 30 days to 2 years. Overall there is a bewildering range of non-standard seasonal-interannual forecasts available from diverse sources which are difficult to use, combine, compare and understand. WMO are facilitating a LRF infrastructure, principally for National Meteorological Services (NMSs) and forecast producers. The ET_ILRF has compiled a list of products, adopted by WMO, and which Dr Davey included in his presentation. Overall the list of recommended LRF products hasn't changed since WGSIP-8. The next meeting of the ET_ILRF will take place in November 2004 (it previously met in November 2001).

Dr Davey also outlined the work of the WMO CCl Expert Team convened in 2003 to develop guidance for NMSs on producing and issuing "Climate Watch" advisories. A guidance document was completed in October 2004 under the editorship of Vern Kousky. Dr Stockdale noted that a comprehensive document is also available from the LRF verification team. Dr Power felt it would be useful to circulate this amongst the WGSIP members.

3. WGSIP activities

3.1 New NCEP coupled model predictions

Dr Stephen Lord described the new NCEP coupled model prediction scheme which became operational in August 2004 (see http://cfs.ncep.noaa.gov/). It operates with an assimilation system running with a weeks delay. He noted the favourable tropical bias and that in individual simulated events, the SST distribution is well represented compared to observations. Increased skill of the hindcast system has been demonstrated with the coupled model skill at least as good as statistical outputs. Calibration data are publicly available. A 3-4 year update cycle is anticipated since calibrations are expensive.

3.2 Seasonal Forecasting at the UK Met Office: coupled and uncoupled models

Dr Richard Graham outlined the products available from the Met Office seasonal prediction system. These can be seen at www.metoffice.com/weather/seasonal/index.html and www.metoffice.com/research/seasonal/regional/index.html.

Dr Graham also outlined a comparison of performance of the Met Office coupled atmosphere-ocean (GloSea) and atmosphere-only (HadAM3 – atmosphere component of GloSea) models. GloSea had replaced the forced HadAM3 model in the real time Met Office seasonal forecasting system in May 2003. DEMETER experiments formed the basis of the comparison. Skill comparison, focused on 2m temperature prediction, had been examined from two points of view: remote responses to ENSO (tropical Atlantic, Indian Ocean) and evidence of (beneficial) coupled ocean-atmosphere responses in the North Atlantic. More detailed intercomparsion between the two modeling systems had revealed:

- That the coupled (GloSea model is better than the uncoupled system for most seasons/regions/lead times for temperature and precipitation.
- Best improvements were in the tropics, at a 3 month lead.
- Improved skill for ENSO, and response to ENSO in the tropical North Atlantic and Indian Ocean.
- That the GloSea model shows notable benefit for prediction of warm European spring events
  - o Case study evidence suggests benefit derives from GloSea ability to generate the 'tripole N Atlantic SST pattern', associated weith NAO, encouraging for prospects for improving predictions for Europe.

3.3 Model experimentation and outputs standards project

Dr Stockdale introduced two items under this heading – the Niño comparison project and the Standards project. An appropriate model comparison framework which allows easy collaboration across groups demands (a) open, ongoing protocols (not one-off restricted member studies); (b) a data access mechanism. In the latter context, Dr Stockdale noted that centralized collection of data can have drawbacks and so was advocating a distributed data access system for WGSIP activities, probably DODS based initially but then FWIS (Future WMO Information System - see www.wmo.ch/web/www/WDM/Documentation/FWIS-vision-2002.html).

The Niño SST project was a prototype of this approach. It (a) specified index regions (Niño 3, 3.4, 4) for which absolute values (raw model output) were required from individual ensemble members. (b) a data access mechanism: NetCDF format with specified metadata, DODS-based initially but eventually linked with FWIS. Dr Stockdale set out a timetable for action as follows:

- Subgroup to finalize definitions of metadata, lead-time etc
- Produce and exchange prototype datasets — End March 05
- Announce to WGSIP — April 05
- Announce to community — Next meeting

In discussion of how best to proceed with the Niño project, the group decided on having two data streams, one for raw model data and the other for calibrated values. It was also agreed that whilst DODS is the best option for data exchange at this point, there will be a need to consider the issue of how to handle larger datasets beyond the pilot project. One issue was whether the WGSIP web page could be used as a pointer. It was agreed that the project should go ahead on the following basis:

Action 1: Standards Project: Niño Pilot Project (Stockdale, DeWitt) (1)

- Stockdale to contact potential contributors
- Stockdale to set up DODS server
- WGSIP members to contribute data
- Stockdale to perform preliminary analysis

3.4 Dynamical seasonal prediction projects: Progress of "SMIP-2" as follow on to phase 1 (SMIP)

Dr George Boer outlined the approaches taken in SMIP2 and SMIP/HFP (see http://www-pcmdi.llnl.gov/projects/smip/smip2.php).

SMIP-2 is looking at 1st and 2nd season potential predictability based on initial conditions from reanalyses and AGCM response to specified observed SST and sea ice.

SMIP-2/HFP is examining 1st season actual predictability in an operational context (with no information from the future). It is based around a 2-tier forecast with objective prediction of boundary conditions (SST and sea ice) or a one-tier forecast using a coupled atmosphere-ocean forecast system. Initialisation is again from reanalyses in both cases.

Key principles of SMIP are as follows:

- Forecasts must be based on procedures that can be clearly described, explained, justified and reproduced; that is objective methods.
- Forecasts must provide clearly defined and quantitiative results that may be objectively verified
- Forecasts must be accompanied by measures of skill.
- Changes in forecast procedures require objective evidence of improvement.

SMIP-2 has been organized to provide new knowledge on seasonal to interannual prediction, to allow intercomparison of models in the seasonal to interannual context, to provide measures of potential and/or actual predictability in current models and to provide a collection of results for research into multi-model approaches to seasonal to interannual prediction. Diagnostic subprojects provide the opportunity to entrain "outside expertise" to help analyse results.

A number of datasets now reside at PCMDI. Data have been received from IAP, KMA, MRI, MGO and Scripps. Data available on the server were those from COLA, DEMETER (x6) and NCEP. Data will be available soon from CCCma, RPN and CPTEC. A number of contacts had also been made to encourage other centres to participate. However data archiving and access were at present problematic because of lack of resources at PCMDI. A choice needs to be made about the future for SMIP data management. There are three potential approaches:

1. The MIP approach. This has some history, including SMIP-1. It requires a defined experiment and variable list with data in a common format held at PCMDI (or another centre). Data handling is dependent on the resources available at the centre. Contributors must "push" the data (or the centre must "pull"). Analysis will be potentially guided by the organsing group.
2. Distributed approach. Here the data are made available on producers websites and users must "pull" the data from sites. There is however a danger that outputs, formats and experiments will differ and analysis may be a "free enterprise".
3. Mixed approach. In this case the data may be at PCMDI and another centre, or at PCMDI and on websites, or both.

Next steps for SMIP involved decisions on data management, the question of data availability (whether to make it available for all, or limited distribution through diagnostic subprojects and how best to draw attention to opportunities for analysis (by soliciting diagnostic subprojects and/or simply calling attention to data).

Much of the subsequent discussion ranged around the data management issue. There was some preference for the distributed approach but with agreed data standards and formats, recognizing that the user may need to reformat for their own use anyway. There may also be an access issue since some centres were reluctant to provide data for open use.

Several offers to act as potential hosts of the SMIP datasets came from various quarters, in particular from IRI, APCN, ADPRC/IPRC and COLA though it was noted that the COLA human resource will soon disappear. In order to move forward, it would be necessary to assess the size of the data volume before approaching centres. The need for password protection would be a requirement as would the ability to provide follow-up

support.

Action 7: SMIP-2, SMIP/HFP (Boer, Sugi) (1,4)

- Boer to determine data size requirements.
- Boer to contact IRI, APCN and ADPRC/IPRC regarding hosting data server.
- Boer and Sugi to continue to promote international participation in SMIP.

3.5 Asian-Australian Monsoon update

Further to the discussion under 2.5.1, Dr Kang provided a description of work on the AA Monsoon from the perspective of local and remote responses in AGCM studies and predictability studies using both the Seoul National University (SNU)/HFP AGCM and DEMETER CGCM studies. Having demonstrated the inability of AGCMs to hindcast the summer climate anomalies over the western North Pacific summer monsoon region, he demonstrated the dual benefits brought by both coupling with the ocean and statistical correction in terms of monsoon prediction.

3.6 Interactions with GEWEX - GLACE

Dr Randel Koster provided the group with an update on GLACE (the Global Land-Atmosphere Coupling Experiment), a project of the GEWEX Global Land-Atmosphere Study (GLASS). GLACE is a multi-model intercomparison experiment focusing on the ability of land-surface state to affect rainfall generation and other atmospheric processes. GLACE is co-sponsored by WGSIP. The experiment aims to quantify the strength of land-atmosphere coupling in the different global atmospheric models used for weather and climate studies. The hope is that the development of a "table" of coupling strengths would aid in the interpretation of the many land-atmosphere interaction studies now appearing in the literature. Analysis of the different multi-model ensembles is aimed at isolating the impact of soil moisture anomalies on precipitation within each participating AGCM. Dr Koster described the overall experimental design of GLACE, the participating groups and characteristic outputs. A GLACE paper published in 'Science' shows that while the 12 participating models differ in their land-atmosphere coupling strengths, certain features of the coupling patterns are common to many of the models. Two papers are currently being prepared for the Journal of Hydrometeorology. A number of planned studies are also in the pipeline. Consideration is being given to a coordinated sequel to GLACE, including the "do nothing" option. Further information on GLACE can be found at: http://glace.gsfc.nasa.gov/.

In discussion of the options for an extension of GLACE, WGSIP endorsed GLACE II, idea 3, i.e an idealized experiment quantifying the ability of a model to "predict itself" and the impact of land initialization on this ability through the following ensemble runs:

- Ensemble 1 (control): 1-month subset of standard AMIP ensemble
- Ensemble 2: Like ensemble 1, except
  - o Initialize with realistic soil moisture and
  - o Compare forecasts against observations.

The WGSIP also expressed a wish to participate in such an experiment.

Action 9: Soil moisture initialization for seasonal prediction (Koster interaction with GEWEX) (2)

- WGSIP endorses the experiment.
- Koster/GEWEX to provide experimental protocol.

3.7 COPES-WGSIP interactions and update

Dr Kirtman reported to the group on the rationale for and activities of the WCRP COPES Task Force on Seasonal Prediction. The Task Force had been set up to:

- Determine the extent to which seasonal prediction of the global climate system is possible with currently available models and data.
- Identify the current limitations of climate system models and observational data sets used to determine seasonal predictability.
- Develop a coordinated plan for pan-WCRP climate system retrospective seasonal forecasting experiments.

It is predicated on the hypothesis that there is currently untapped seasonal predictability due to interactions (and memory) among all the elements of the climate systems (atmosphere-ocean-land-ice). The TFSP had its first meeting in Honolulu from 3-5 November 2003 in association with WGSIP-8. The meeting reviewed current seasonal prediction activities in centres worldwide and made proposals for a pan-WCRP interactive atmosphere-ocean-land-ice seasonal prediction experiment. Details can be found at: http://copes.ipsl.jussieu.fr/PDF/TFSP/COPE_TFSP1_reportAll.pdf.

The experiment will use the best possible observationally-based initialisation of all components of the climate

system. 6 month lead ensemble (10 member) fully interactive predictions of the climate system with predictions initialised each month of each year from 1979-present will be carried out. Progress with the planning of the experiment had been reported to JSC XXV. The JSC had requested in particular that the TFSP:

- seek to broaden and strengthen the involvement of the WCRP core projects and activities and regional panels in the TFSP
- develop a timeline for the proposed prediction experiment that takes full account of the opportunities of benefiting from and contributing to any complementary modelling activities in support of the IPCC Fourth Assessment Report
- perform a rigorous evaluation of current seasonal prediction capability and skill as part of the total climate system prediction experiment
- seek to embrace appropriate existing or planned national and international predictability and prediction experiments, in particular, the EU-funded ENSEMBLES
- consider extending the range of possible predictability experiments to optionally include decadal timescales
- ensure that appropriate data are archived to enable diagnostic studies of processes and errors
- include an element of model evaluation, diagnosis and development in the implementation plan for the experiment, which should provide feedbacks to the projects with respect to process studies

WGSIP activities are relevant to making progress with a number of these issues. Indeed the limited lifetime of TFSP meant that WGSIP would need to be the leader of seasonal to interannual prediction in COPES in the longer term. As part of the WGSIP/TFSP activity, Dr Kirtman proposed to develop a catalogue of seasonal to interannual prediction activity. This would include both statistical and dynamical forecast systems. It would include information on forecast methodology, data location, data availability, skill assessments etc. Though Dr Kirtman will initiate this, a long term action will be for the ICPO to develop a suitable web page and update it from contributions. Dr Harrison noted that such a catalogue already exists under CLIPS (see www.wmo.ch/web/wcp/clips2001/html/). As Dr Kirtman pointed out, however, this links mainly to operational centres whilst his proposed catalogue will be broader in scope having more to do with active research. The first attempt to develop the catalogue will be through WGSIP and TFSP members.

Action 10: WGSIP-TFSP Seasonal Forecast catalogue primarily for research use (Kirtman)

- Kirtman to email WGSIP and TFSP seeking input to the catalogue
- Kirtman to prepare catalogue as web site and circulate to WGSIP, TFSP for comment
- ICPO to put catalogue on CLIVAR web site.

Dr Kirtman stressed the need to ensure that good science would come out of the planned TFSP experiment. It should not be just a model intercomparison. There will be a need to reach out to the CLIVAR regional panels and others to help with analysis. There is the potential for many experiments and diagnostic subprojects, n particular in regional modeling. There is also the need for a data management strategy. JSC is taking the data management issue up through the new COPES overarching WCRP Modelling and Observations and Assimilation Panels (section 2.3). One particular outstanding issue is observational data requirements. It may be appropriate for WGSIP to communicate the WGSIP SMIP experience to these panels and its implications for COPES activities in the future.

Action 18: WGSIP letter to WCRP Modelling Panel regarding data management (Kirtman and Stockdale)

- Serious obstacle to WGSIP-TFSP activities
- Serious obstacle to collaboration with regional panels

Dr Kirtman noted IPCC relevance of the TFSP activity through the opportunity the experiment gave for IPCC-class models to be involved and this needs to be recognized. With regard to IPCC, Dr Cattle reminded the group of the request coming out of the CLIVAR assessment that WGSIP be involved in the analysis of seasonal to interannual aspects of the IPCC-class runs. Scott Power agreed to check on what the current level of activity is in the community on this issue. There were implications here for the 5th IPCC Assessment.

Action 17: WGSIP to examine seasonal to interannual variability in IPCC simulations

- Power to coordinate.

3.8 El Niño definition

Previously, on request from the CLIVAR SSG, WGSIP had considered the issue of the definition of El Niño (see the report of WGSIP-7), proving advice encapsulated in Appendix D of the WGSIP-7 report. It was understood that the WMO Commission for Climatology was re-opening the issue. The WGSIP felt that the issues involved

needed to be clarified.

Action 16: Determine status of El Nino definition within WMO

- Cattle and Harrison to update.

4. Reports from other groups and possible WGSIP collaborations

4.1 Report from the JSC/CAS Working Group on Numerical Experimentation (WGNE) and areas of possible collaboration

An outline of WGNE status was provided by Dr Déque. He noted that although WGNE has officially existed for about 20 years, it actually started its activities in the late 70's. It is thus one of the oldest working groups in the wide WMO family.

WGNE is well known in the modelling community through two outcomes:

- The "blue book "Research Activities in Atmospheric and Oceanic Modelling.
- The AMIP project.

WGNE is interested in research, but has a strong focus on operational activities. Overall it covers a wide range of activities

- Assimilation
- Nowcasting
- Numerical Weather Prediction (short and medium range)
- Mesoscale processes
- Surface processes
- Seasonal Prediction
- Climate modelling

The intersection with WGSIP activities is clearly the design of common numerical experiments and the way they are evaluated. Most of the xxMIPs have been generated, or at least blessed, by WGNE. The need for selecting the same initial dates and experimental setup is clear in seasonal forecasting, if one wants to construct reliable multi-model ensembles. Defining the same diagnostics and the same score is also an important task in this domain. WGNE has a large experience in evaluation of model outputs. On the other hand, ocean assimilation, statistical downscaling, which are part of WGSIP activities, are not covered by WGNE.

Discussion took place of how WGSIP might best interact with WGNE at this point in time, including the desirability of raising WGNE awareness of problems with atmospheric models in applications to seasonal to interannual prediction. Action centred around the development of a short list of key coupled diagnostics with the aim of proposing to WGNE that they and WGSIP and might then work together to evaluate model performance against these.

Action 6: Develop potential list of coupled diagnostics for interaction with WGNE (Déque, Stockdale) (1, 3)

- Déque and Stockdale to develop list of diagnostics for circulation to WGSIP.
- WGSIP to comment.

4.2 Report on the C20C project and possible WGSIP collaboration

The history, purposes and achievements of the Climate of the Twentieth Century (C20C) project were presented by Professor Chris Folland on behalf of himself and Dr Jim Kinter (COLA, USA) with emphasis on how C20C might interact with WGSIP. C20C is currently largely based on forcing AGCMs against the HadISST sea surface temperature (SST) and sea extent data set over two main periods, 1871-2003 and 1950-2003. It started in the mid 1990s as a Hadley Centre led AGCM project, with AGCMs forced by an early GISST SST and sea ice extent data set. C20C contributed to the Climate Models Evaluation chapter of IPCC 1995 and to the first AMIP International Conference in 1995. Lack of organisational resources caused C20C to be put on ice until COLA, through Professor J. Shukla, offered long term support in 1999.

Soon afterwards, HadISST became available and a second Workshop was held at COLA in early 2002. It was agreed that C20C differs from AMIP in not being primarily focussed on model evaluation (though this can be a component). Indeed it is particularly focussed on predictability on the seasonal to multidecadal time scale, with much longer integrations than AMIP in ensemble mode. It was also agreed to include an anthropogenic component – how do anthropogenic influences affect the predictability and character of regional climatic phenomena? Accordingly, a comprehensive set of natural and anthropogenic forcings was discussed. The set used in the Hadley Centre (e.g. for climate change detection and studies of the recent Holocene) was agreed in principle (and since then expanded), though there are many current problems in implementing some aspects

of it, except in the Hadley Centre model. A fairly comprehensive study was presented at the 2002 C20C COLA workshop by Dr Jim Hurrell showing that the problem of underestimating climate variability due to unrealistic fluxes when an AGCM is forced with observed SST was not very serious overall but was not negligible. Later work generally confirms this, but the possibility of particularly erroneous SST forcing in a few important regions e.g. in the Indian ocean, remains a key question. It is recognised that fully coupled models were also needed to cast light on mechanisms, e.g. thermohaline circulation variation effects.

Two peer reviewed papers that explicitly reference C20C appeared in 2003 and 2004, notably a successful simulation of the USA "Dust Bowl" drought published in Science. A Workshop was held in Trieste in 2004, with a representative from WGSIP present and an expanded set of 15 modelling groups. C20C essentially requires that the time sequence of climatic phenomena be simulated by models. Following on from the COLA workshop, there was debate about possible ways around the problems of unrealistic fluxes for the future development of C20C, e.g. through use of slab ocean interactions in the extratropics and perhaps parts of the tropics, and observed SST forcing in one or more tropical oceans to retain the important forced components (from the ocean) of interannual variability. It was agreed that the issue of how best C20C should evolve in such ways to interact effectively with other relevant parts of CLIVAR should be taken forward initially at the WGSIP meeting in Oct 2004.

C20C and its future plans had been presented at the 2004 International CLIVAR Conference in Baltimore in the form of a poster. Diagrams on the poster created after the Trieste Workshop highlighted a set of multi-model diagnostics of the North Atlantic Oscillation, the Southern Oscillation, global surface air temperature and Sahel rainfall over the half century 1950-2002.

During his presentation, Prof Folland identified a number of key issues:

- What are the limitations of AGCM runs that have no direct coupling to the ocean surface? Are local / regional fluxes misleading?
- Is there a better modelling strategy, given the aims of C20C?
- How should we include coupled models in C20C work, e.g to study thermohaline-forced variations in climate and for understanding interannual predictability?
- Should a set of common or core diagnostics be adopted that all groups will produce in order to contribute to IPCC assessments (e.g. model evaluation) in a more systematic way?
- How do we use a more consistent set of forcings in the different models that are "state of the art"?
- How can C20C experiments contribute to the goals of WGSIP?

The discussion that ensued centred largely around coupling issues. In response to the first bullet above, it was suggested that weak coupling using "pace-maker" slab experiments be tried. Pilot experiments would be needed to design and implement. Runs could be done with different SST datasets (e.g HadISST & Reynolds OI) to determine how sensitive models are to differences between these. A need was identified for C20C and WGSIP to identify how they might move ahead together. It was proposed that WGSIP participate in C20C from the perspective of coupling and predictability, to identify, for example if coupled interactions are relevant to simulation of dustbowl conditions.

Action 11: WGSIP-C20C interactions (Kirtman, Nobre, Kang, Folland (C20C))

- Kirtman and Folland to iterate on possible July meeting in Prague
- Nobre, Kang, Kirtman to develop potential pace-maker experimental design

4.3 Report from the International CLIVAR Atlantic Panel: the Atlantic Predictability Workshop and overview of TACE and AMMA

4.3.1 Report of the Atlantic Predictability Workshop

Dr Rowan Sutton reported on the Atlantic Predictability Workshop, jointly sponsored by CLIVAR, the UK Met Office, NOAA, the UK Natural Environment Research Council through its Coupled Ocean Atmosphere Processes and European Climate (COAPEC) special topic, and the University of Reading, UK. The Workshop was held from 19-22 April 2004. It's science programme was jointly organised by members of the CLIVAR Atalntic Panel and WGSIP. The objectives of the workshop were to:

- Provide an up to date assessment of the state of knowledge concerning the predictability of climate in the Atlantic Sector, with particular emphasis on the role of the Atlantic Ocean.
- Improve communication between the operational prediction centres and regional fora and the research community concerning the predictability of Atlantic Sector climate.
- Identify gaps in knowledge, and in observing systems, required for the further development of systems for forecasting Atlantic Sector climate.
- Recommend priorities for future research, observational programmes and development of prediction

systems.

The structure of the workshop was as follows:

Session 1: Ongoing prediction activities

- Reports from operational centres and climate fora including communication with communities of users.

Session 2: White papers, which:

- Were aimed at providing an overview of the current status of knowledge and capability, and an assessment of key issues for the future.
- Addressed: a) scientific underpinning of prediction, b) infrastructure for prediction, c) regional scale predictability and prediction.

Poster Sessions

Guest lecturers:

- Tim Palmer: "Developments and future prospects in understanding predictability".
- Neil Ward: "Merging forecasts with applications".

Breakout groups and plenary discussion:

- To agree recommendations.

The workshop identified two overarching challenges for Atlantic climate prediction over the next 5-10 years:

1) To realise fully the potential of seasonal predictions for the tropical Atlantic region

The potential skill and value of seasonal forecasts is highest in the tropical Atlantic. The challenge is to build a seasonal climate prediction system for the tropical Atlantic region that is comparable (in terms of data coverage, model fidelity, and - subject to physical limits - forecast skill) to that in the tropical Pacific. This will entail:

- Significant enhancement of sustained observations in the tropical Atlantic region, in the ocean, at the land surface, and in the free troposphere
- Major effort to reduce the systematic errors in simulation of tropical Atlantic climate in models used for seasonal prediction
- Research to better understand the fundamental ocean-atmosphere-land processes that control the climate of the tropical Atlantic region, its variability and predictability, including the statistics of sub-seasonal variability
- Improvement of data assimilation systems for the Atlantic Ocean (especially the treatment of salinity)
- Development of reliable methodologies for making seasonal forecasts relevant and useful to decision makers.

2) To take a lead in the development of systems for decadal climate prediction

The development of useful decadal climate predictions, incorporating both initial condition constraints and transient boundary forcings, is a "grand challenge" whose importance is increasingly recognised. Because of the key role played by the Atlantic Ocean in the global overturning circulation, the Atlantic climate community is naturally placed to take a lead in this area. A number of specific challenges may be identified, for example:

- Development of an observational system for monitoring the MOC (already in progress).
- Understanding the limits of predictability in the MOC and the mechanisms that determine predictability.
- Identifying which aspects of the oceanic initial conditions most constrain the future behaviour of the MOC.
- Development of data assimilation methods for initialisation of decadal MOC forecasts.
- Understanding how initial conditions and changing external forcings combine to determine climate evolution on decadal timescales, and (relatedly) development of suitable ensemble techniques for sampling forecast uncertainty.
- Understanding and quantifying the regional climate impacts of MOC change and the predictability of these impacts.

The full report of the workshop can be found at: www.clivar.org/organization/atlantic/index.htm#PUBS. The value of the "White Paper" approach used at the Atlantic predictability Workshop was recognised by the group and it was suggested that this be more widely utilised by CLIVAR. It was also suggested by Dr Stockdale that WGSIP add an Atlantic index to the Standards Project Niño Pilot Project whilst the importance of developing indices of tropical Atlantic variability was noted in discussion by Dr Nobre.

4.3.2 The Tropical Atlantic Climate Experiment (TACE) and its links to AMMA

Dr Sutton next briefed the group on progress with TACE planning, starting with the history which had led up to the concept of TACE and the charge by the CLIVAR Atlantic Panel to a sub-group to draft a "White Paper"

on TACE. This White Paper which is now at www.clivar.org/organization/atlantic/TACE/#planning provides an overview of the physical processes affecting climate variability in the tropical Atlantic and priorities for further study. A shorter synopsis of TACE can be found at: www.clivar.org/organization/atlantic/TACE/TACE_EXEC.pdf

The overarching goal of TACE is "to advance understanding of coupled ocean-atmosphere processes and improve climate prediction in the tropical Atlantic region". Specific goals are to a) advance understanding of processes that control SST interactions with the Atlantic Marine ITCZ (AMI), and related climate predictability in the eastern tropical Atlantic and b) contribute to the design of an enhanced sustained observing system to the tropical Atlantic region. TACE is envisioned as an order 5 year enhanced monitoring/process study, ultimately leading to specification of the sustained observations network in the tropical Atlantic needed to meet CLIVAR goals. Thrusts include the need to i) enhance the existing observing system to provide the data needed for research and operations; ii) improve coupled predictive systems and ocean synthesis and iii) collaborate with prediction centres to ensure a rapid knowledge transfer from science to operations. Key science areas relevant to TACE include the SST gradient and Atlantic Niño modes of variability, the Benguela "Niño", the roles of the large-scale ocean circulation in tropical Atlantic variability including the role of advection, upwelling and vertical mixing in the eastern central equatorial and off-equatorial eastern Atlantic.

TACE observational strategy includes extension of the PIRATA array, enhanced drifter/float coverage, and use of subsurface moorings, atmospheric soundings and glider deployment. TACE looks to links with the AMMA (the African Monsoon Multidisciplinary Analysis project) and the French observational programme EGEE (Etude de la circulation oceanique et de sa variabilite dans le Golfe de Guinee) which is closely tied to the observational periods of AMMA. On the modelling front, TACE will employ coupled predictive systems and ocean synthesis to help determine oceanic processes important in regulating SST in the tropical Atlantic and associated atmospheric responses with a focus on validating and understanding the mixed layer heat budget in upwelling regions and processes affecting subsurface heat content variability. Key activities modelling contributing to TACE will include:

- Systematic investigation on effects of resolution of ocean models on representation of ocean dynamics and coupling.
- Testing of new parametrizations for mixing, convection and boundary layer processes.
- Assimilation of all collected observations into ocean models forced with surface fluxes over the TACE observational period
- Hindcast simulations with atmospheric models forced with observed SST variability
- Collaboration with prediction centres to identify sources of model error that impact forecast skill.

The future evolution of TACE will take place through:

1. An international coordination and implementation meeting (Miami, 3 February 2005)
2. Submission of the TACE White Paper and Synopsis to the CLIVAR SSG for endorsement.
3. A tropical Atlantic science meeting (Venice, October 2005)
4. Programme implementation (2006, phased in with the beginning of AMMA/AMI)

The group were invited to forward comments on TACE to Dr W Johns at RSMAS/University of Miami. In discussion, Dr Nobre commented on the focus of TACE on the eastern Atlantic. He pointed to the important circulation path lying in the western Atlantic. This viewpoint was supported by Dr Stockdale who pointed to the thinly-stretched observing system along the equator and the importance of not only the eastern but the western equatorial region to prediction. This pointed to more effort being needed on the western side of the equatorial Atlantic. He encouraged WGSIP members to examine TACE plans through consideration of the synopsis document (see above) in the first instance and to forward comments to Dr Johns as requested.

Action 15: WGSIP to comment on TACE (All) (2)

- All WGSIP members to comment by email regarding proposed observing system.

4.4 Interactions with the Pacific Panel

4.4.1 Proposed CLIVAR/OOPC/GOOS/Argo South Pacific Workshop

Dr Kelvin Richards began his presentation with an outline of the proposed CLIVAR/OOPC/GOOS/Argo South Pacific Workshop currently being planned to take place from 11-14 October 2005. The objectives of the workshop are to:

- Review our present understanding of the role of the South Pacific in seasonal to decadal variability of the climate system (ENSO, South America).
- Assess the adequacy of present day climate models to capture the essential physics and observational networks to monitor climate variability and change of the region.

- Support and help coordinate existing and beginning climate observing effects in South America.
- Identify deployment opportunities for the observing network, e.g. Argo floats
- Identify where the existing observing network needs to be supplemented (such as the location of the GLOSS tide gauges).
- Look for coordination of CLIVAR activities with other programmes such as SOLAS and IMBER in the South Pacific.

Inclusion of discussion of seasonal prediction over the region, possibly through presentation of a "White Paper" was also an option if there was interest from WGSIP. Dr Kirtman noted WGSIP interest in participating from the perspective of the South Pacific's role in decadal variability of ENSO and its impact on seasonal to interannual prediction and small group was tasked with commenting on the plans for the workshop from a WGSIP perspective (see below). VAMOS interest in the workshop was also noted by Dr Saulo.

4.4.2 Proposed joint project on Assessment of Ocean models used In ENSO Prediction

Dr Richards went on to outline a newly proposed joint activity between the Pacific Panel and WGSIP which would be entitled "Assessment of Ocean models Used In ENSO prediction" and, because of the nature of the 5 underlined letters in the title, bearing the shortened name of VOWELS. VOWELS would be directed at answering two questions:

- How much is our ability to predict ENSO limited by the representation of the ocean in models?
- What uncertainties arise from the ocean component as compared to other factors such as surface forcing or initial conditions?

The elements of VOWELS would include i) cataloguing results from ocean only, free-running coupled models and seasonal prediction (including results from e.g. the WGOMD Coordinated Ocean Reference Experiment (CORE) runs, ENACT, ENSEMBLES); ii) the bringing together results of case studies (including COARE, EPIC and PUMP); iii) perturbation experiments and iv) observational analysis. In particular VOWELS would give strong encouragement for 'reference' ocean-only experiments with two specified forcings to provide a benchmark. A common set of metrics would be employed and experience of useful metrics (e,g, SST (Niño 3.4, annual cycle, position of warm pool), thermocline (depth, thickness), STCs (strength, propagation of anomalies)) would be pooled.

In discussion, the group noted the potential of VOWELS for providing an international input to PUMP. Dr Stockdale noted it to be akin to the Standards Project in terms of the need to establish a protocol for the setting up of the ocean reference experiments, to include two wind forcing datasets. He saw the science interest as being in high resolution runs and noted the particular need to ensure that the modelling carried out by international community running with VOWELS is consistent with whatever is being established for PUMP. In response to a question from Dr Kirtman, Dr Richards noted the key science questions to revolve around model resolution, mixing parameterizations and surface forcing issues. There was support for the idea of model runs with two forcing datasets, going beyond the simple MIP approach. It was suggested that reference to the ENACT protocol may be helpful.

Action 2: Pacific Panel interactions – coordinate experiments to improve OGCMs for ENSO prediction (DeWitt (WGSIP), Richards (Pacific Panel), Balmaseda (Pacific Panel), Alves (BMRC, Australia)) (1.3)

- South Pacific Workshop: Kirtman, Saulo, Power to comment on plan.
- VOWELS:
  - o Establish experimental protocol using two different forcing datasets; provisional experiments.
  - o Collate existing results
  - o Explore possibility of workshop
  - o Establish links to the Pacific Upwelling and Mixing Physics (PUMP) experiment (www.pmel.noaa.gov/%7ekessler/clivar/pump.html).

5. Developments in coupled seasonal/interannual forecasting systems

5.1 Meteorological Service of Canada

Dr Boer reported on seasonal prediction activities being carried out by the Meteorological Service of Canada of Environment Canada. The Canadian Meteorological Centre has been producing 0-3 month outlooks for Canada since September 1995 based on an ensemble of 12 model runs (6 runs from a Global Environmental Multiscale model (GEM) and 6 from AGCM2 of the Canadian Center for Climate Modelling and Analysis (CCCma)). The outlooks are of the surface air temperature and precipitation anomalies for a period of 3 months. Further information is available at: www.weatheroffice.ec.gc.ca/saisons/howto_seasonal_0-3_e.html and www.cccma.bc.ec.gc.ca/data/cmc/cmc.shtml. Seasonal forecasts based on statistical techniques are also produced – see

www.weatheroffice.ec.gc.ca/saisons/howto_seasonal_3-12_e.html.

Dr Boer also reported that funding for the Canadian Climate Variability Research Network (CLIVAR) (see www.nserc.ca/programs/resnet/clivar_e.htm) is coming to an end though a new proposal based around prediction activities is being formulated.. The network is funded by the Natural Sciences and Engineeering Research Council of Canada.

5.2 Development in Seasonal Forecasting Systems at the South African Weather Service (SAWS)

Dr Landman outlined the models and approaches available at the SAWS for seasonal prediction. These covered statistical global SSTs from Canonical Correlation Analysis (CCA), runs of the COLA T30 GCM, CCA rainfall and temperature, GCMs run at local universities (HadAM3 at the University of Cape Town and C-CAM at the Unviersity of Pretoria), Model output statistics combined with perfect prognosis (ECHAM4.5 from IRI), ECMWF, UKMO and IRI products from the internet. Dr Landman illustrated a number of outputs using the different approaches, including:

- CCA forecasts for South Africa and statistical model outputs for Niño 3.4 and the equatorial Indian Ocean.
- An example of a forecast using the COLA T30 GCM. Persisted SST anomalies and CCA-predicted SST anomalies are used as forcing fields and 2x10 member ensembles are run using NCEP initial conditions from the most recent month. Lead times are up to 6 months.
- ECHAM 4.5 Model Output Statistics (MOS) derived from an ensemble of 24 members using simultaneous observed SST as the lower boundary forcing. MOS equations are for all 3-month seasons (DJF, JFM, FMA etc) and the MOS-CCA training period is from 1960-2001. The technique uses forecast fields from the same GCM at different lead times in the MOS equations, reminiscent of a perfect prognosis method.
- Operational forecasts available at www.weathersa.co.za.

Various system developments were also described, including combining MOS forecasts; a forecast output library; tailor-made products based on MOS; work on intra-seasonal characteristics and extreme season forecasting.

5.3 Japanese Meteorological Agency (JMA) activities

Dr Sugi noted activity on model development, spurred by a new computer system. The atmospheric part is being developed at JMA. He also outlined JMAs system for producing El Niño outlooks, including JMA's definitions of El Niño and La Niña. The latest outlook issued on 12 October 2004 showed that:

- Niño 3 SST is likely to be slightly warmer than normal from autumn to winter.
- At present it is unlikely that El Niño will develop throughout the prediction period (October 2004-April 2005). However the possibility of the occurrence of El Niño has gradually increased.

He also illustrated some aspects of summer climate over Japan, contrasting the cold summer of 2003 with the very hot summer of 2004 when many typhoons hit the country, and demonstrated potential links between wider global conditions and Japanese climate in terms of the character of the Okhotsk and subtropical highs and the Baiu front.

5.4 Activities in seasonal forecasting at Météo-France

Dr Déqué noted that operational seasonal forecasts have been produced at Météo-France since 1999. They use a TL63L31 version of ARPEGE (as in DEMETER). However, there is no ocean model in this case (statistical SST prediction is used). Each forecast is produced monthly, with 9 members, at 4-month range. A 40 year reference is used to calculate anomalies and evaluate skill.

A European multi-model forecast is also produced at ECMWF with 3 models (ECMWF, UK Met Office and Météo-France). This is produced monthly using 40 members per model. The forecast range is 6-months. The Météo-France system is more recent than the DEMETER version (it uses ARPEGE4+ORCA). Ocean analyses are produced by the MERCATOR group. The 3 models have run since January 2004 with the official start of the system being in early 2005.

5.5 IRI ENSO and tropical cyclone forecasts

Dr DeWitt showed a number of recent IRI directly coupled ECHAM4.5 atmosphere-MOM3 ocean GCM forecasts for the Niño 3.4 area and then the IRI multi-model ENSO outlook and probabilistic ENSO forecasts for the same region for the months from June to July 2004. He then turned to describe and illustrate the IRI probabilistic forecasts of tropical cyclone activity and its production. Sea surface temperature predictions are used to force the ECHAM4.5 atmospheric model. Tropical cyclone-like structures are then detected and tracked and then corrected statistically, based on the model climatology. Probabilistic forecasts of tropical cyclone activity are then produced and the IRI experimental seasonal tropical cyclone outlooks released.

5.6 Coupled ocean-atmosphere modelling at CPTEC

Dr Paulo Nobre outlined the CPTEC coupled model used for seasonal prediction studies and which comprises the CPTEC/COLA AGCM and the MOM 3 OGCM and the system for initialisation. Initialisation is currently based on the use of NCEP reanalysis data for the atmosphere and a run of the OGCM forced by surface fluxes of heat and momentum, though the eventual goal is to initialise the model from a process of coupled data assimilation. Dr Nobre showed various outputs from the model including coupled forecasts of Pacific SST and precipitation and the latest ENSO forecast for 2005. He also demonstrated AGCM-only and CGCM forecasts of Hurricane Catarina which hit Brazil on 24 March 2004. In this case the models were coupled over the area from 40N to 40S with prescribed SSTs in higher latitudes.

5.7 Coupled prediction systems for Atlantic sector climate

Dr Stockdale went through his presentation (co-authored with Dr Magdelana Balmaseda, ECMWF) to the Atlantic Predictability Workshop (Reading, 19-22 April 2005 – see section 4.3.1 above). He concluded that our ability to predict the future evolution of tropical SST anomalies in the Atlantic ocean seem to be still rather limited. In the northern sub-tropical Atlantic, the main issue seems to be the fundamental predictability limit. Current model performance is not too bad when measured against this. However for the equatorial and southern Atlantic, other problems arise also (see the White Paper for the workshop by Stockdale and Balmaseda, the full version of which is available at: www.clivar.org/organization/atlantic/Atl_Wshop_Proceeds.pdf).

5.8 Predictive ocean atmosphere model for Australia (POΛMΛ)

Dr Scott Power described POΛMΛ which is a seasonal to interannual climate forecast system based on ocean/atmosphere general circulation models coupled through an OASIS coupler. It has been developed in a joint project involving BMRC and CSIRO Marine Research, with funding from the Australian Climate Variability and Agriculture R&D programme. The system is run operationally in real time by the Australian National Meteorological and Oceanographic Centre and products are issued by the National Climate Centre. Dr Power demonstrated various outputs from the system, further details of which can be found at: www.bom.gov.au/bmrc/ocean/JAFOOS/POAMA/.

6. Organisation of future activities

6.1 New studies addressing particular scientific questions etc

This was addressed through discussion of, and agreement on, the action list presented at the head of this report. It was also agreed that the presentations from the meeting should be placed on the web (password protected) or made available on a CD.

Action 20: Presentations to go on web (password protected) or CD (Cattle)

6.2 Review arrangements for the activities to be continued under WGSIP auspices

This was addressed as part of the review of actions under 6.1 above. In addition, Dr Boer summarised arrangements for the joint WGNE/WGSIP/WGCM "Workshop on Ensemble Methods – from weather forecasting to climate change" scheduled to take place at the UK Met Office from 18-21 October 2004 almost immediately following WGSIP-9. There were over 165 registrants for the workshop, 10 invited speakers, 50 oral and 50 poster presentations and 5 summary plenary speakers. The Workshop was sponsored by the Met Office, WCRP and the World Weather Research Programme and the US NOAA Office of Global Programs, NASA and National Science Foundation. The WGSIP wished to record its thanks to all the sponsors and to the Met Office for hosting the workshop which looked to be a very valuable event.

6.3 Discussion of the possibility of joint meetings with other CLIVAR groups (e.g. regional panels)

Following discussion, it was agreed that this should be addressed post-meeting following discussion of possible scheduling between Drs Kirtman and Stockdale and the ICPO. Interaction with AAMP was one possibility.

Action 21: Meetings with other groups – explore possibilities (Kirtman, Stockdale, Cattle)

6.4 Membership

It was noted that, following some mid-year adjustments in response to SSG-13 and the CLIVAR assessment, no membership changes were anticipated at the end of 2004. Membership changes would need to be considered at the next meeting of the group.

6.5 Date of the next meeting

It was agreed that, subject to funding, this should be held in the southern hemisphere in early 2006.

Action 22: date of next meeting early 2006, location tbd (Kirtman, Stockdale)

Annex A

WGSIP-9 - List of participants

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Annex B

CLIVAR Working Group on Seasonal-to-Interannual Prediction 9th session

Exeter, UK, 14-16 October 2004

FINAL AGENDA

Thursday 14 October 2004

1. Welcome and opening remarks (T. Stockdale and Ben Kirtman (co-chairs, WGSIP), Howard Cattle)
2. Review of relevant developments and activities
   - 2.1. Report from the International CLIVAR Project Office (H. Cattle)
   - 2.2. Report from the 13th session of the CLIVAR SSG (T. Stockdale, B. Kirtman, H. Cattle)
   - 2.3. Overview and report on WCRP-COPE structures (lead, B. Kirtman, H. Cattle).
   - 2.4. Report from International CLIVAR VAMOS Panel (Celeste Saulo)
   - 2.5. Reports from other CLIVAR regional monsoon panels: (AAMP, VACS) and on pan-WCRP monsoon activities (all, lead B. Kirtman, T. Stockdale, H. Cattle)
   - 2.6. Other WCRP modelling activities: GCSS/WGNE Pacific Cross Section Intercomparison
   - 2.7. Reports from regional or national CLIVAR Committees (e.g., US CLIVAR). (all, lead B. Kirtman, T. Stockdale)
   - 2.8. Update on related studies
   - 2.9. Application programmes (CLIPS, START, etc.) (T. Stockdale, B. Kirtman, M Harrison)
   - 2.10. Proposed WMO CBS infrastructure for long-range forecasting products (M. Davey).

Friday 15 October 2004

3. WGSIP activities
   - 3.1. New NCEP Coupled Model Predictions (S. Lord)
   - 3.2. Seasonal forecasting at UK Met: coupled and uncoupled models (R. Graham)
   - 3.3. Model experimentation and outputs standards project (T. Stockdale)
   - 3.4. Dynamical seasonal prediction project: Progress of "SMIP-2" as a follow-on to phase 1 (SMIP). (G. Boer, M. Sugi) SMIP-Data Management Issues
   - 3.5. AA-Monsoon update (I. Kang)
   - 3.6. Interactions with GEWEX - GLACE (R. Koster)
   - 3.7. COPES-WGSIP Interactions and Update (B. Kirtman)
   - 4. Reports from other groups, and possible WGSIP collaborations
   - 4.1. Report from JSC/CAS Working Group on Numerical Experimentation (WGNE) and areas of possible collaboration, M. Deque
   - 4.2. Report on C20C project and possible WGSIP collaboration, Chris Folland
   - 4.3. Report from International CLIVAR Atlantic Panel: the Atlantic Predictability Workshop, and overview of TACE (R. Sutton)
   - 4.4. Interactions with the Pacific Panel (K. Richards, T. Stockdale, S. Power)

Saturday 16 October 2004

5. Developments in coupled seasonal/interannual forecasting systems
   - 5.1. Participants will be given the opportunity to summarise briefly developments in coupled seasonal/interannual forecasting systems at their home institutions (if not already covered in previous discussion); (all)

6. Organization of future activities (T. Stockdale and B. Kirtman).
   - 6.1. New studies addressing particular scientific questions, particular forecasts, etc. (all)
   - 6.2. Review arrangements for the activities to be continued under its auspices
   - 6.3. Discuss the possibility of joint meetings with other CLIVAR groups (e.g. regional panels).
   - 6.4. Membership
   - 6.5. Agree on a date and place for next WGSIP session

Morning start: 8.30am
Break: 10.00am
Lunch: 12.30pm
Break: 3.00pm

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