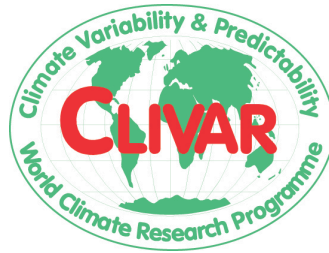


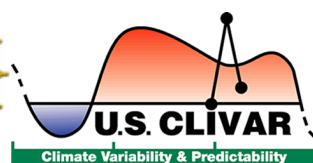


## WORLD CLIMATE RESEARCH PROGRAMME



## The Climate Variability and Predictability (CLIVAR) Handbook

February 2013



## Table of Contents

<b>CLIVAR Overview</b>	<b>3</b>
<b>Programme Structure</b>	<b>4</b>
<b>CLIVAR Panels and Working Groups</b>	<b>5</b>
<b>Cross-cutting or Global Panels</b>	<b>5</b>
CLIVAR Scientific Steering Group (SSG)	5
CLIVAR/PAGES Working Group	8
CLIVAR Asian-Australian Monsoon Panel (AAMP)	9
CLIVAR/GOOS Indian Ocean Panel (IOP)	10
Atlantic Implementation Panel	11
Pacific Implementation Panel	12
CLIVAR/CliC/SCAR Southern Ocean Panel	14
CCI/CLIVAR Expert Team on Climate Change Detection and Indices	17
<i>CLIVAR's Newsletter</i>	19
<i>Reports and Documents</i>	19
<b>International CLIVAR Project Office (ICPO)</b>	<b>20</b>
<b>CLIVAR Website</b>	<b>21</b>

## **CLIVAR Overview**

Climate Variability and Predictability (CLIVAR) is one of the four core projects of the World Climate Research Programme (WCRP). WCRP was established in 1980 under the joint sponsorship of the International Council for Science (ICSU) and the World Meteorological Organisation (WMO), and since 1992 has also been sponsored by the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The main objectives set for WCRP at its inception – which are still valid today – were to determine the predictability of climate and to determine the effect of human activities on climate. A detailed description of WCRP and its other three core projects are available at [www.wrcp-climate.org](http://www.wrcp-climate.org).

CLIVAR was established in 1995. CLIVAR's mission is to facilitate observation analysis and prediction of changes in the Earth's climate system, with a 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. The objectives of CLIVAR are to:

1. Understand the causes of climate variability on the intra-seasonal to centennial time scales through observation, analysis, and modelling;
2. Improve predictions of climate variability and change associated with both internal and external processes; and
3. Extend the observational climate record through assembly of quality-controlled paleoclimatic and instrumental data sets.

## Programme Structure

The organisational structure of CLIVAR is summarised in Figure 1.

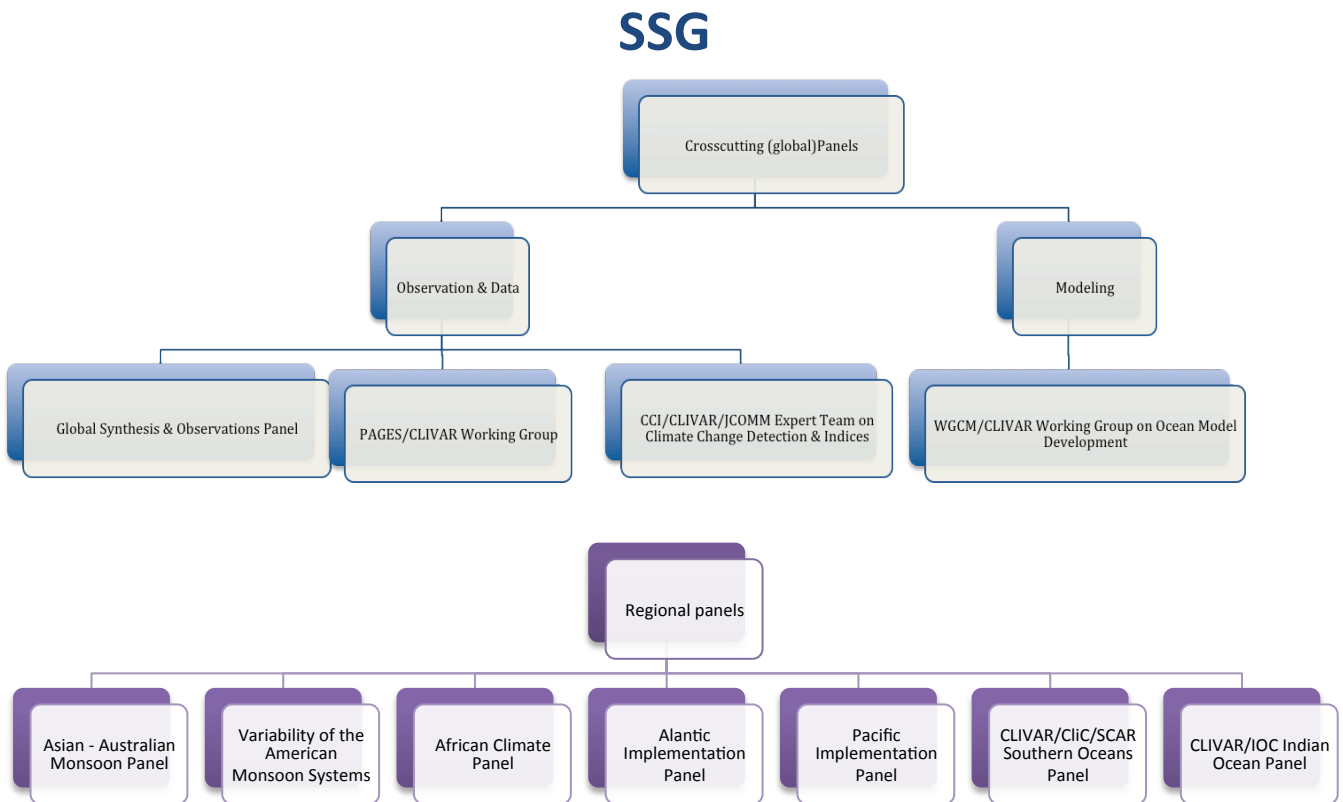
The Scientific Steering Group (SSG) has oversight over the implementation of CLIVAR and reports to the Joint Scientific Committee (JSC) of the World Climate Research Programme (WCRP).

For efficient implementation, coordination, and management of the CLIVAR programme, several panels and working groups have been established. Some are organised jointly with other WCRP component programmes or in close collaboration with the International Geosphere-Biosphere Programme (IGBP), the Global Climate and Global Ocean Observing Systems, or the Intergovernmental Panel on Climate Change (IPCC) activities.

The CLIVAR SSG continuously reviews the organisational structure of the programme with the aim of eliminating the distinction between the component programmes and combining them into a single CLIVAR programme that has common modelling, observing, and analysis projects.

The International CLIVAR Project Office (ICPO) is responsible for the coordination of both the scientific and administrative aspects of the CLIVAR programme under the oversight of the CLIVAR SSG. The ICPO is supported by the UK's Natural Environmental Research Council (NERC) and the US CLIVAR Office, which receives support from US funding agencies; primarily NASA, NOAA, and NSF.

The Terms of Reference and present membership of each of the CLIVAR panels and working groups are provided in section 3.



**Figure 1: Schematic diagram summarising the current structure of CLIVAR**

## 1 CLIVAR Panels and Working Groups

### 1.1 Cross-cutting or Global Panels

#### CLIVAR Scientific Steering Group (SSG)

##### Terms of Reference

1. To formulate the CLIVAR research programme on climate variability and predictability, based on coupled ocean-atmosphere models, guided by the analysis of observations including paleoclimatic reconstructions, as required to understand the phenomena and predict climate variations.
2. To organise an observing programme that would fulfil the data requirements of CLIVAR, taking into account the development of the operational Global Climate and Global Ocean Observing Systems and possible contributions from national research projects.
3. To provide scientific guidance for the implementation of CLIVAR, using advice of experts and expert groups as necessary.
4. To ensure the exchange and analysis of CLIVAR data and the dissemination of scientific results.
5. To establish scientific liaison with relevant organisations and existing programmes, as appropriate.
6. To advise the Joint Scientific Committee of the World Climate Research Programme of progress achieved in the implementation of CLIVAR and scientific advances in the understanding of climate variability and predictability.

##### Members

L. Goddard ((co-chair) (15)	Earth Institute at Columbia, USA
M. Visbeck (co-chair) (15)	IFM-GEOMAR, Kiel, Germany
A. Bracco (15)	School of Earth and Atmospheric Sciences, Atlanta USA
K. Drinkwater (14)	Institute of Marine Research, Bergen, Norway
S. Gulev (14)	Russian Academy of Sciences, Moscow, Russian Federation
E. Hawkins (15)	Department of Meteorology, University of Reading UK
V. Masson-Delmotte (13)	Atomic Energy Commission and Energy Alternatives, France
S. Rintoul (13)	CSIRO, Australia
P. Scheel Monteiro (15)	CSIR, South Africa
S. Schubert (14)	NASA Goddard Space Flight Center, USA
L. Wu (15)	Ocean University of China, China

##### Ex-Officio Members

One chair/co-chair from each CLIVAR panel and working group (with other co-chairs as alternates)

Dr Kevin Trenberth (chair, GEWEX)	NCAR, Boulder, USA
G. Bodeker (Co-chair SPARC)	Bodeker Scientific, New Zealand
T.G. Shepherd (Co-chair SPARC)	University of Reading UK
Greg Flato (Chair CliC)	

##### Contact

The group email address for the CLIVAR SSG is [clivar-ssg@clivar.org](mailto:clivar-ssg@clivar.org).  
The ICPO contact for the CLIVAR SSG is [Professor Roger Barry](#)

## CLIVAR/WGCM Working Group on Ocean Model Development (WGOMD)

### Terms of Reference

1. To stimulate the development of ocean models for research in climate and related fields, with a focus on decadal and longer timescales at mid- and high-latitudes.
2. To encourage investigations of the effects of model formulation on the results of ocean models, making use of sensitivity studies and intercomparisons.
3. To promote interaction amongst the ocean modelling community and between this and other communities through workshops and other activities.
4. To stimulate the validation of ocean models when used in stand alone mode and as part of a coupled ocean-atmosphere model, using oceanographic data and other methods, and to advise on the observational requirements of such studies.
5. To publicise developments in ocean models amongst the climate modelling community.
6. To collaborate with other activities in areas of overlapping responsibility.
7. To advise on ocean modelling and related issues and to report on its activities to the JSC/CLIVAR WGCM and the CLIVAR Scientific Steering Group.

### Members

G. Danabasoglu (14) (co-chair)	NCAR, Boulder, USA
H. Drange (14) (co-chair)	University of Bergen, Bergen, Norway
E. Curchitser (13)	Rutgers University, USA
K. Fennel (13)	Dalhousie University, Canada
D. Holland (13)	Courant Institute, NYU, USA
H. Johnson (14)	Department of Earth Sciences University of Oxford
S. Marsland (14)	CSIRO, Australia
G. Nurser (13)	National Oceanography Centre, Southampton, UK
H. Tsujino (14)	Japan Meteorological Agency, Tsukuba, Japan
M Winton (14)	Geophysical Fluid Dynamics Lab., NOAA, Princeton, USA

### Ex Officio Members

C. Böning	Leibniz Institut für Meereswissenschaften, Kiel, Germany
E. Chassignet	RSMAS, Miami, USA
R. Gerdes (CliC)	Alfred Wegener Institut für Polar- und Meeresforschung, Bremerhaven, Germany
A.M. Treguier	Laboratoire de Physique de Océans, IFREMER, France

### Contact

The group email address for this panel is [clivar-wgomd@clivar.org](mailto:clivar-wgomd@clivar.org).

The ICPO contact for CLIVAR/WGCM WGOMD is [Dr Anna Pirani](#).

## CLIVAR Global Synthesis and Observation Panel (GSOP)

### Terms of Reference

The CLIVAR Global Synthesis and Observations panel is established to:

1. Develop, promote and seek to implement strategies for the synthesis of global ocean, atmosphere and coupled climate information. Methods will include observation-based syntheses and model-based syntheses e.g. Reanalyses.
2. Define CLIVAR's requirement for globally sustained observations and promote the use of resulting data sets in global synthesis efforts. Provide strategic advice and supporting evidence in collaboration with WMO and IOC bodies, to help sustain, evolve and optimise the global ocean observing system based on new science and reanalysis insights.
3. Develop metrics to evaluate ocean and coupled syntheses, to promote the utility of synthesis products for climate applications, including initialisation of coupled forecasts, detection/attribution of climate change and variability, and determining the oceans role in the global heat, water and biogeochemical cycles.
4. Provide strategic advice and direction to CLIVAR/WCRP data management and processing activities within the Framework for Ocean Observing, related to production of climate quality global ocean synthesis products.
5. Liaise and collaborate with WCRP Councils, Panels and Working Groups in identifying the requirements for, and coordinating the development of, a sustainable Earth system monitoring and prediction system.
6. The Panel will report to the CLIVAR SSG.

### Members

K. Haines (co-Chair) (13)	ESSC, University of Reading, UK
T. Lee (co-Chair) (14)	Jet Propulsion Laboratory, USA
M. Balmaseda (14)	ECMWF, UK
B. Barnier (14)	Laboratoire Ecoulements Geophysiques et Industriels, Grenoble, France
C. Domingues (15)	CSIRO, Australia
P.P. Mathieu (15)	ESA, Italy
M. Palmer (14)	Met Office, Hadley Centre, UK
L. Yu (15)	WHOI, USA

### Ex-Officio Members

M. McPhaden (chair of the Tropical Moored Buoy Implementation Panel)	NOAA/PMEL, Seattle, USA
D. Roemmich (co-chair of the Argo Steering Team)	Scripps Institution of Oceanography, La Jolla, USA
U. Send (co-chair of OceanSITES)	Scripps, La Jolla, USA

### Contact

The group email address for this panel is [clivar-gsop@clivar.org](mailto:clivar-gsop@clivar.org).

The ICPO contact for GSOP is [Dr Nico Caltabiano](#).

## CLIVAR/PAGES Working Group

### Terms of Reference

The PAGES / CLIVAR Working Group will work to:

1. Promote improved high resolution, well-dated, quantitative paleoclimate records with seasonal to interannual resolution, in regions that are of direct relevance to IGBP and WCRP.
2. Formulate and promote, in collaboration with [PAGES](#) and CLIVAR, a programme for analysing and synthesising paleoclimatic data in order to reveal evidence of patterns of variability within the climate system over seasonal to millennial time scales.
3. Promote improved quantitative methods of model-data comparison and evaluation in order to understand the variability present in both the paleoclimatic record and the models.
4. Promote the use of paleoclimate data to examine issues of climate predictability.
5. Coordinate with other modelling activities of relevance to IGBP and WCRP.

### Members

G. Schmidt (co-chair) (12)	NASA/Goddard Institute for Space Studies, New York, USA
V. Masson-Delmotte (co-chair) (12)	Lab. de Modelisation d. Climat et de l'Environnement, Gif-sur-Yvette, France
K. Anchukaitis (14)	Columbia University, US
K. Cobb (12)	Georgia Institute of Technology, Atlanta, USA
J. Gergis (14)	University of Melbourne, Australia
M. Feng (14)	CSIRO, Australia
J. Jungclaus (12)	Max Planck Institute for Meteorology, Hamburg, Germany
H. Linderholm (14)	University of Gothenburg, Sweden
M. Mann (12)	Pennsylvania State University, USA
Y. Wang (14)	University of Sussex, UK

### Contact

The group email address for this panel is [clivar-pages@clivar.org](mailto:clivar-pages@clivar.org).

The ICPO contact for the PAGES/CLIVAR Working Group is [Dr Jennifer Riley](#)

The PAGES contact for the PAGES/CLIVAR Working Group is [Dr Thorsten Kiefer](#).



### CLIVAR Asian-Australian Monsoon Panel (AAMP)

#### Terms of Reference: Updated version

1. Evolve and coordinate strategies to increase understanding of climate variability, predictability and predictions of the coupled ocean-atmosphere-land system in the Asian-Australia-Africa monsoon on timescales from intraseasonal to decadal and longer (tie into WGSIP/THORPEX);
2. Promote improvement of model simulations, predictions, and projections of monsoon, especially recognizing the fundamental role of monsoon intraseasonal variability (tie into GCSS/GEWEX, WGCM, WGNE)
3. Contribute to design and implementation of monitoring strategies, including process studies and sustained long term observations, for the Indian Ocean, Western Pacific and surrounding marginal seas and land regions necessary for monitoring and investigating the structure and mechanisms of monsoon variability and change. (into IOP and PP)
4. Co-ordinate and promote interactions among meteorologists, oceanographers and hydrologists to foster the recognition of the coupled nature of the land-ocean-atmosphere of the monsoon and to better deliver predictions of monsoon variability including impacts on hydrology)
5. Work in co-operation with other existing and planned regional and multinational programs directed at improving our understanding of the monsoon system, which include investigations on regional weather forecasting, seasonal climate prediction and impacts on human activities.

#### Members

H. Hendon (co-chair) (13)	BMRC, Melbourne, Australia
K. Sperber (co-chair) (13)	Lawrence Livermore National Laboratory, Livermore, USA
A. Kitoh (13)	Meteorological Research Institute, Japan
M. Lengaigne (14)	National Institute of Oceanography, Goa, India
A. Turner (13)	University of Reading, UK
B. Wang (13)	University of Hawaii, Honolulu, USA
T. Zhou (13)	State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Dynamics, China

#### Contact

The group email address for this panel is [clivar-monsoon@clivar.org](mailto:clivar-monsoon@clivar.org).

The ICPO contact for the CLIVAR Asian Australian Monsoon Panel is [Dr Carlos Ereño](#).

## CLIVAR/GOOS Indian Ocean Panel (IOP)

The need for high-quality ocean observations is shared by research (CLIVAR) and ocean applications and services (GOOS) and there is a shared conviction that, together, the ocean community should endeavor to establish the basis for a comprehensive ocean observation network and oversee the staged implementation of a sustainable ocean observing system for the Indian Ocean. It is therefore agreed that a panel will be established and supported by CLIVAR and GOOS (through Indian Ocean GOOS and the Perth Office of the IOC) with the following terms of reference.

### Terms of Reference

1. Provide scientific and technical oversight for a sustained ocean observing system for the Indian Ocean and Indonesian Throughflow in order to provide ocean observations needed for climate variability research, and to underpin operational ocean applications and services relevant to the region, particularly with regard to ocean-state estimation and climate prediction.
2. Develop, coordinate, and implement a plan for a sustained ocean observing system for the Indian Ocean, to: (a) meet the common requirement of CLIVAR research themes and regional initiatives, particularly those identified by AAMP and VACS and the CLIVAR modelling panels; (b) satisfy the common requirements of GOOS and its modules; and (c) coordinate implementation activities in collaboration with relevant regional and global bodies and IOGOOS and JCOMM in particular.
3. Liaise with relevant research panels of CLIVAR and implementation panels of GOOS and JCOMM and provide a focal point for coordination of ocean observing networks in the region.
4. Report to the CLIVAR SSG through its AAMP and to GOOS through the IOC Perth Office.

### Members

W. Yu (co-chair) (13)	First Institute of Oceanography, Qingdao China
M. Ravichandran (co-chair) (14)	INCOIS, India
M. Feng (12)	CSIRO, Australia
W. Han (14)	University of Colorado, USA
R. Hood (12)	Horn Point Lab. Uni. Maryland, USA
T. Lee (13)	NASA Jet Propulsion Laboratory, Pasadena, USA
C. Magori (14)	Kenya Marine and Fisheries Research Institute, Kenya
Y. Masumoto (12)	FORSGC, JAMSTEC, Tokyo, Japan
M. McPhaden (13)	NOAA, PMEL, Seattle, USA
W. de Ruijter (13)	University of Utrecht, NL
T. Shinoda (14)	Navel Research Lab, Stennis, USA
A. Supangat (14)	National Council on Climate Change, Indonesia
G. Vecchi (13)	NOAA-GFDL, Princeton, USA
J. Vialard (13)	LOCEAN, Paris, France

### Ex-Officio Members

N. D'Adamo (IRF convener)	IOC, Perth Regional Programme Office, Australia
---------------------------	---

### Contact

The group email for this panel is [clivar-iop@clivar.org](mailto:clivar-iop@clivar.org).

The ICPO contact for the Indian Ocean Panel is [Dr Nico Caltabiano](#).

## Atlantic Implementation Panel

### Terms of Reference

1. 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 CLIVAR's Science and Initial Implementation Plans, particularly with respect to the Principal Research Areas D1 (NAO), D2 (TAV), D3 (THC), and anthropogenic climate change.
2. 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 initialise models.
3. Liaise with relevant CLIVAR 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 programmes.
4. Liaise with GSOP, OOPC, PIRATA, ARGO, and the IOC-CO2 panel to ensure that CLIVAR benefits from and contributes to GEOSS.
5. 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 programmes.
6. 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.
7. Report to the CLIVAR SSG.

### Members

L. Terray (co-chair) (12)	CERFACS, Toulouse, France
P. Brandt (co-chair) (13)	IfM-GEOMAR, University of Kiel, Germany
M. Baringer (12)	NOAA/AOML/PHOD Miami, USA
S. Camargo (12)	LDEO Columbia University, USA
P. Chang (12)	Texas A&M University College Station, USA
T. Farrar (13)	Woods Hole Oceanography Institution, USA
B. Hansen (13)	Faroe Marine Research Institute, Faroe Islands
Y. Kushnir (11)	LDEO, Columbia University, USA
M. Mata (12)	FURG Rio Grande, Brazil
M. Rouault (13)	University of Cape Town, South Africa
D. Smith (12)	Hadley Centre, Met Office, UK
A. Treguier (12)	LPO IFREMER Plouzane, France

### Ex-Officio Member

#### Contact

A. Koertzing (Carbon Rep.)      IfM-GEOMAR, University of Kiel, Germany

The group email address for this panel is [clivar-atlantic@clivar.org](mailto:clivar-atlantic@clivar.org).

The ICPO contact for the CLIVAR Atlantic Implementation Panel is [Dr Nico Caltabiano](#).

## Pacific Implementation Panel

### Terms of Reference

1. Oversee and facilitate the implementation of CLIVAR in the Pacific sector in order to meet the objectives outlined in the Science and Initial Implementation Plans, particularly with respect to:
  - Expanding and Improving ENSO predictions;
  - Variability and predictability of the Asian-Australian Monsoon system; and
  - Indo-Pacific Decadal Variability.
 And also on Pacific impacts on:
  - Variability and predictability of the American Monsoon system;
  - Southern Ocean Climate variability; and
  - Climate change prediction/detection and attribution.
2. Develop broad-scale atmospheric sampling plans and processes studies to complement the oceanic observations planned for the Pacific and as an integral component of the strategy to improve atmospheric and coupled models. To work with agencies and nations to sustain broad-scale atmospheric sampling in the Pacific.
3. Coordinate the activities of the Pacific nations, facilitating cooperative efforts and coordinating work within the boundaries of the various nations as well as outside those boundaries. To provide a forum for exchange and discussion of national plans in the Pacific.
4. Organise and conduct workshops that will entrain oceanographers, atmospheric scientists, and other investigators from the Pacific nations, that will lead to formulation of plans for broad-scale sampling and for sampling locations of high interest (such as boundary currents), and will coordinate not only the field activities but also the modelling, empirical, and paleo studies in the Pacific.
5. Collaborate with WCRP WG on Coupled Modelling, the CLIVAR WG on Seasonal-Interannual Prediction and the WG on Ocean Model Development in order to design appropriate numerical experiments. To be aware of the requirements of these groups for data sets needed to validate models.
6. Liaise with the Ocean Observation Panel for Climate (OOPC), with the Joint Commission for Oceanography and Marine Meteorology (JCOMM), with the Atmospheric Observations Panel for Climate (AOPC), and other relevant groups to ensure that CLIVAR benefits from and contributes to observations in GOOS and GCOS.
7. Advise the CLIVAR SSG of progress and obstacles towards successful implementation of CLIVAR in the Pacific.

### Members

W. Cai (co-chair) (13)	CSIRO, Div. of Atmospheric Research, Aspendale, Australia
A. Ganachaud (co-chair) (13)	Legos/IRD, Noumea, New Caledonia
K. Ando (14)	JAMSTEC, Japan
M. Collins (14)	University of Exeter, UK
M. Lengaigne (12)	LOCEAN, Paris, France
F. Molteni (12)	ECMWF, Reading, UK
S. Power (13)	BMRC, Melbourne, Australia
U Takayabu (13)	University of Tokyo, Japan
P. Wiles (14)	PI-GOOS, Samoa

L. Wu (14) Ocean University of China, Qingdao, China  
S. Yeh (14) Department of Environmental Marine Science, Hanyang University,

**Ex-officio Members**

M. McPhaden NOAA/PMEL, Seattle, USA (Tropical Moored Buoy Implementation Panel)

**Contact**

The group email address for this panel is [clivar-pacific@clivar.org](mailto:clivar-pacific@clivar.org).

The ICPO contact for the Pacific Implementation Panel is [Dr Nico Caltabiano](#).

## CLIVAR/CliC/SCAR Southern Ocean Panel

### Terms of Reference

1. Design a strategy to assess climate variability and predictability of the coupled ocean-atmosphere-ice system in the Southern Ocean region.
2. Engage and interact with the Southern Ocean Observing System (SOOS) programme on Southern Ocean sustained observations and model experiments needed to meet the objectives of CLIVAR, CliC, SOOS and SCAR.
3. Work in concert with relevant CLIVAR panels (e.g. regional panels, numerical experimentation groups), ACSYS/CliC Panels (DMIP, OPP, NEG) and other groups (e.g. Ocean Observation Panel for Climate, Argo Science Team) to integrate Southern Ocean observations with those in neighbouring regions to ensure the objectives of CLIVAR/CliC/SCAR are met and resources are used efficiently.
4. Enhance interaction between the meteorology, oceanography, cryosphere biogeochemistry and paleoclimate communities with an interest in the climate variability of the Southern Ocean region.
5. Serve as a forum for the discussion and communication of scientific advances in the understanding of climate variability and change in the Southern Ocean region.
6. Work with the CLIVAR, CliC, SCAR, SOOS and WCRP Data Council data systems on issues related to distribution and archiving of Southern Ocean observations.
7. Advise the CLIVAR, CliC, SOOS and SCAR SSGs on progress achieved towards implementation.

### Members

M. England (co-chair) (13)	University of New South Wales, Australia
L. Talley (co-chair) (15)	Scripps Institute of Oceanography, USA
K. Speer (13)	Florida State University, Tallahassee, USA
T. Chereskin (14)	Scripps Institute of Oceanography, USA
Y. Fukumachi (13)	Hokkaido University, Sapporo, Japan
S. Griffies (14)	NOAA, USA
H. Hellmer (14)	Alfred Wegener Institute, Germany
N. Lovenduski (14)	University of Colorado, USA
G. Marshall (13)	British Antarctic Survey, UK
A. Naveira Garabato (13)	National Oceanography Centre, Southampton, UK
A. Orsi (14)	Texas A&M University, College Station, USA (iAZone)
S. Swart (14)	CSIR, South Africa
D. Thompson (13)	Colorado State University, Fort Collins, USA

### Contact

The group email address for this panel is [clivar-sthnocean@clivar.org](mailto:clivar-sthnocean@clivar.org).

The ICPO contact for the CLIVAR Southern Ocean Panel is [Dr Jennifer Riley](#)

The ICPO South America contact is [Dr Carlos Ereño](#).

## Variability of the American Monsoon Systems (VAMOS) Panel

### Terms of Reference

1. Be responsible for the formation of detailed scientific plans and conceptual designs of international projects to investigate the variability and predictability of the American monsoon system in the context of global climate variability and predictability.
2. Promote and coordinate studies of climate change impacts on the American monsoon system as well as studies of adaptation, including the social sciences perspective.
3. Coordinate and promote interactions among atmospheric scientists, environmental scientists, oceanographers and hydrologists, and in general Earth System science researchers from interested nations to work on VAMOS problems.
4. Coordinate, advise and support other CLIVAR and WCRP groups on investigations that need to be carried out to meet VAMOS objectives, and provide the VAMOS products that may be useful to those groups.
5. Work closely and coordinate with other national, regional and international projects and organisations interested in this area of research, e.g. US CLIVAR, the Inter-American Institute for Global Change Research (IAI), the International Research Institute for Climate and Society (IRI), and GEWEX.

### Members

E.H. Berbery (co-chair) (13)	University of Maryland, USA
D. Gochis (co-chair) (14)	NCAR RAO, Boulder, Colorado, USA
R. Arritt (14)	Iowa State University, USA
W. E. Baethgen (14)	IRI, Palisades, USA
M. Barreiro (14)	Universidad de la Republica, Uruguay
I. Cavalcanti (14)	CPTEC, INPE, Brazil
A. Douglas (14)	Creighton University, USA
B. Kirtman (13)	RSMAS, Miami, USA
M Rojas (14)	University of Chile
P. Salio (14)	CIMA, Universidad de Buenos Aires, Buenos Aires, Argentina
M. Taylor (14)	University of the West Indies, Jamaica
R. Wood (14)	University of Washington
P. Zuidema (13)	Rosenstiel School of Marine and Atmos. Sciences, University of Miami

### Contact

The group email address for this panel is [clivar-vamos@clivar.org](mailto:clivar-vamos@clivar.org).

The ICPO contact for the CLIVAR VAMOS Panel is [Dr Carlos Ereño](#).

## The CLIVAR-GEWEX Africa Climate Panel

### Terms of Reference

1. Develop and refine the CLIVAR-GEWEX Africa Climate Panel (ACP) implementation plan to diagnose the variability and predictability of African climate and its relationship to the global climate system.
2. Promote the development and deployment of limited-period and sustained observations in support of CLIVAR in and around the African continent; establish links with, and present the requirements to, the other major climate-observing programs (e.g. GCOS, WWW, GOOS).
3. Promote and coordinate efforts for evaluations and improvements of model simulations (e.g., CMIP, seasonal to decadal simulations) for the African region.
4. Promote development of African climate databases and foster access thereto for research purposes in cooperation with projects such as CLICOM, DARE, and INFOCLIMA.
5. Promote the involvement of African scientists within the CLIVAR-GEWEX Africa Climate Panel and the use of ACP (formerly VACS) products in capacity building activities.
6. Develop cooperative investigations with other CLIVAR groups and national, regional, or international research programmes and organisations interested in this area of research.
7. Develop links with programmes and organisations interested in the application of the CLIVAR-GEWEX Africa Climate Panel research (e.g. CLIPS and START) and, as far as feasible, integrate requirements of these programmes and organisations into the CLIVAR-GEWEX Africa Climate Panel
8. Report to the CLIVAR SSG as required on progress and problems in developing and implementing the CLIVAR-GEWEX Africa Climate Panel plan.

### Members

R. Washington (chair) (13)	School of Geography and the Environment, University of Oxford, Oxford, UK
A. Tall (14) (chair)	Red Cross/Red Crescent Climate Center, and Université Cheikh Anta Diop de Dakar, Senegal
E. Afiesimama (14)	Nigerian Meteorological Agency, Nigeria
R. Anyah (14)	University of Connecticut, USA
M. Kadi (14)	ACMAD, Niamey, Niger
P. Lamb (14)	University of Oklahoma, USA
S. Mason (14)	IRI, USA
J. Mutemi (14)	University of Nairobi, Kenya
M. Rouault (14)	University of Cape Town, S. Africa
F. Semazzi (14)	North Carolina State University, USA
M. Shongwe (14)	Ministry of Tourism & Environmental Affairs, Swaziland

### Contact

The group email address for this panel is [clivar-africa@clivar.org](mailto:clivar-africa@clivar.org).

The ICPO contacts for the CLIVAR-GEWEX Africa Climate Panel are [Dr Nico Caltabiano](#) and [Dr Anna Pirani](#).



## CCI/CLIVAR Expert Team on Climate Change Detection and Indices

### Terms of Reference

1. Provide international coordination and help organise collaboration on climate change detection and indices relevant to climate change detection.
2. Further develop and publicise indices and indicators of climate variability and change from the surface and sub-surface ocean to the stratosphere.
3. Encourage the comparison of modelled data and observations perhaps via the development of indices appropriate for both sources of information.
4. Coordinate these and other relevant activities the ET chooses to engage in (such as perhaps observing system experiments that help determine where observations are needed for climate change detection) with other appropriate agencies such as GCOS, CBS, CIMO, CAgM, CHy, IPCC, and START, as well with the joint WCRP JSC/CLIVAR Working Group on Coupled Modelling, the WCRP Observations and Assimilation Panel, and regional associations.
5. Explore, document and make recommendations for addressing the needs for capacity building in each region, pertinent to this topic.
6. Submit reports in accordance with timetables established by the OPAG chair and/or Management Group.

### Members

X. Zhang (co-chair) (14)	Climate Research Division, Canada	CLIVAR
A. Klein-Tank (co-chair) (14)	KNMI, The Netherlands	CCI
L. Alexander (14)	University of New South Wales, Australia	CLIVAR
A. Dai (14)	NCAR, USA	GEWEX
G. Hegerl (14)	University of Edinburgh, UK	CLIVAR
K. Horsburgh (14)	National Oceanography Centre UK	JCOMM
M. Rusticucci (14)	University of Buenos Aires, Argentina	CCI
P. Stott (14)	UK Met Office, UK	JCOMM
B. Trewin (14)	Bureau of Meteorology, Australia	CCI
S. Woodruff (14)	NOAA, USA	JCOMM
X. Wang	Meteorological Service Canada	JCOMM
P. Zhai (14)	China Meteorological Administration, China	CCI
F. Zwiers (14)	Environment Canada, Canada	CLIVAR

### Contact

The group email address for this panel is [clivar-etccdi@clivar.org](mailto:clivar-etccdi@clivar.org).

The ICPO contact for the CCI/CLIVAR/JCOMM ETCCDI is [Dr Anna Pirani](#) & [Boram Lee](#)

## **Imperatives for CLIVAR Research**

The overall aim of WCRP's strategic framework for 2005-2015 (Coordinated Observation and Prediction of the Earth System, COPES) is to facilitate analysis and prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit, and value to society. To help focus its activities under COPES, WCRP has developed an Implementation Plan for its activities for the period 2010-2015 and a summary of its achievements under COPES to date. These can be downloaded via the following links:

WCRP Implementation Plan 2010-2015: [http://wcrp.wmo.int/documents/WCRP\\_IP\\_2010\\_2015.pdf](http://wcrp.wmo.int/documents/WCRP_IP_2010_2015.pdf)

WCRP 2008-2009 Achievements Report: [http://wcrp.wmo.int/documents/WCRP\\_AR\\_2008\\_2009.pdf](http://wcrp.wmo.int/documents/WCRP_AR_2008_2009.pdf)

At SSG 19 in La Paz, Mexico in June 2012 the following CLIVAR research challenges for the period after 2013 were identified:

- Intraseasonal, seasonal and interannual variability and predictability of monsoon systems
- Decadal variability and predictability of ocean and climate variability
- Trends, nonlinearities and extreme events
- Marine biophysical interactions and dynamics of upwelling systems
- Dynamics of regional sea level variability

The details of these are being developed by five Tiger Teams,

## **CLIVAR Publications**

### **1.2 CLIVAR's Newsletter**

CLIVAR produces a newsletter – entitled 'Exchanges' – four times a year. Exchanges provides information on CLIVAR activities, achievements, and issues. The Newsletter is available electronically at the following address:

<http://www.clivar.org/publications/exchanges/exchanges.php>

### **1.3 Reports and Documents**

Various reports and documents are generated by the ICPO staff, including meeting reports, descriptions of CLIVAR projects and summaries of cooperative programmes with other WCRP undertakings. These reports are available electronically at the following address:

<http://www.clivar.org/publications/reports/reports.php>

### **1.4 CLIVAR Bulletin**

A monthly e-newsletter to sign up please visit [here](#)

## International CLIVAR Project Office (ICPO)

The CLIVAR Programme is administered by the International CLIVAR Project Office, in consultation with the WCRP Joint Planning Staff Contact.

### Contact

International CLIVAR Project Office  
National Oceanography Centre, Southampton  
University of Southampton Waterfront Campus  
Southampton, SO14 3ZH  
United Kingdom  
tel: +44-23-8059-6777  
fax: +44-23-8059-6204  
email: [icpo@noc.ac.uk](mailto:icpo@noc.ac.uk)

### Director

Professor Roger Barry

email: [rogbar@noc.ac.uk](mailto:rogbar@noc.ac.uk)

### Staff

Dr Nico Caltabiano

email: [caetano@noc.ac.uk](mailto:caetano@noc.ac.uk)

Dr Carlos Ereño

email: [carlos\\_ereño@yahoo.com](mailto:carlos_ereño@yahoo.com)

Dr Anna Pirani

email: [anna.pirani@noc.soton.ac.uk](mailto:anna.pirani@noc.soton.ac.uk)

Dr Jennifer Riley

email: [jennifer.riley@noc.ac.uk](mailto:jennifer.riley@noc.ac.uk)

Mr Tim Waterfield

email: [timter@noc.ac.uk](mailto:timter@noc.ac.uk)

PA to Prof Barry

email: [ispo@noc.ac.uk](mailto:ispo@noc.ac.uk)

### WCRP Joint Planning Staff Contact

Mrs Valery Detemmerman  
c/o World Meteorological Organization  
Case Postale No. 2300  
CH-1211 Geneva 2  
Switzerland  
tel.: +41-22-730-8242  
fax: +41-22-730-8036  
email: [vdetemmerman@wmo.int](mailto:vdetemmerman@wmo.int)

## **CLIVAR Website**

The CLIVAR Programme has its own website at the URL-address:

<http://www.clivar.org/>

In addition to finding overviews about the structure and organisation of the CLIVAR programme, you will find information about recent and planned activities, meetings, conferences, CLIVAR projects, and publications. Links with other sites and programmes interfacing with CLIVAR are also listed. We hope to develop this site to the full potential of the medium in order that you, the interested scientist, can not only read about what others are doing in CLIVAR but can also provide feedback and actively participate in the implementation of the programme.

If you notice errors or have any suggestions regarding the contents of this handbook, please advise:

**International CLIVAR Project Office  
National Oceanography Centre  
Southampton, SO14 3ZH  
United Kingdom**

**tel: +44-23-8059-6777  
fax: +44-23-8059-6204  
email: [icpo@noc.ac.uk](mailto:icpo@noc.ac.uk)**