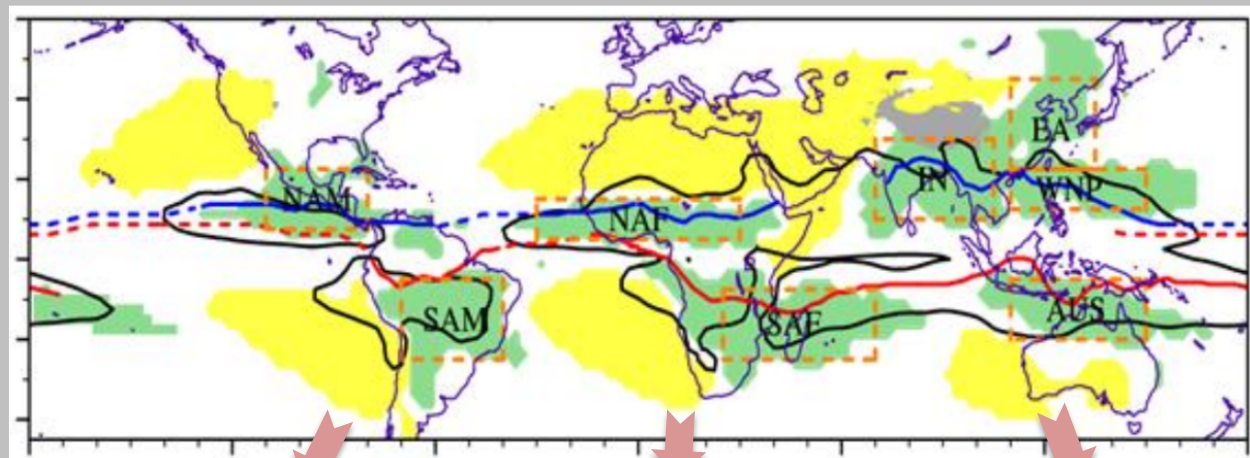


GEWEX/CLIVAR Monsoons Panel

Co-Chairs: **Dr Aurel Moise** (Australia/Singapore) & **Dr Francoise Guichard** (France)

Presented by **Dr Rupa Kumar Kolli**, Executive Director, ICMPO (India)



American
Monsoon WG

African
Monsoon WG

Asia/Australian
Monsoon WG

***A joint panel spanning both CLIVAR & GEWEX with membership from both communities
Established in its current form after June 2014 GEWEX Conference***

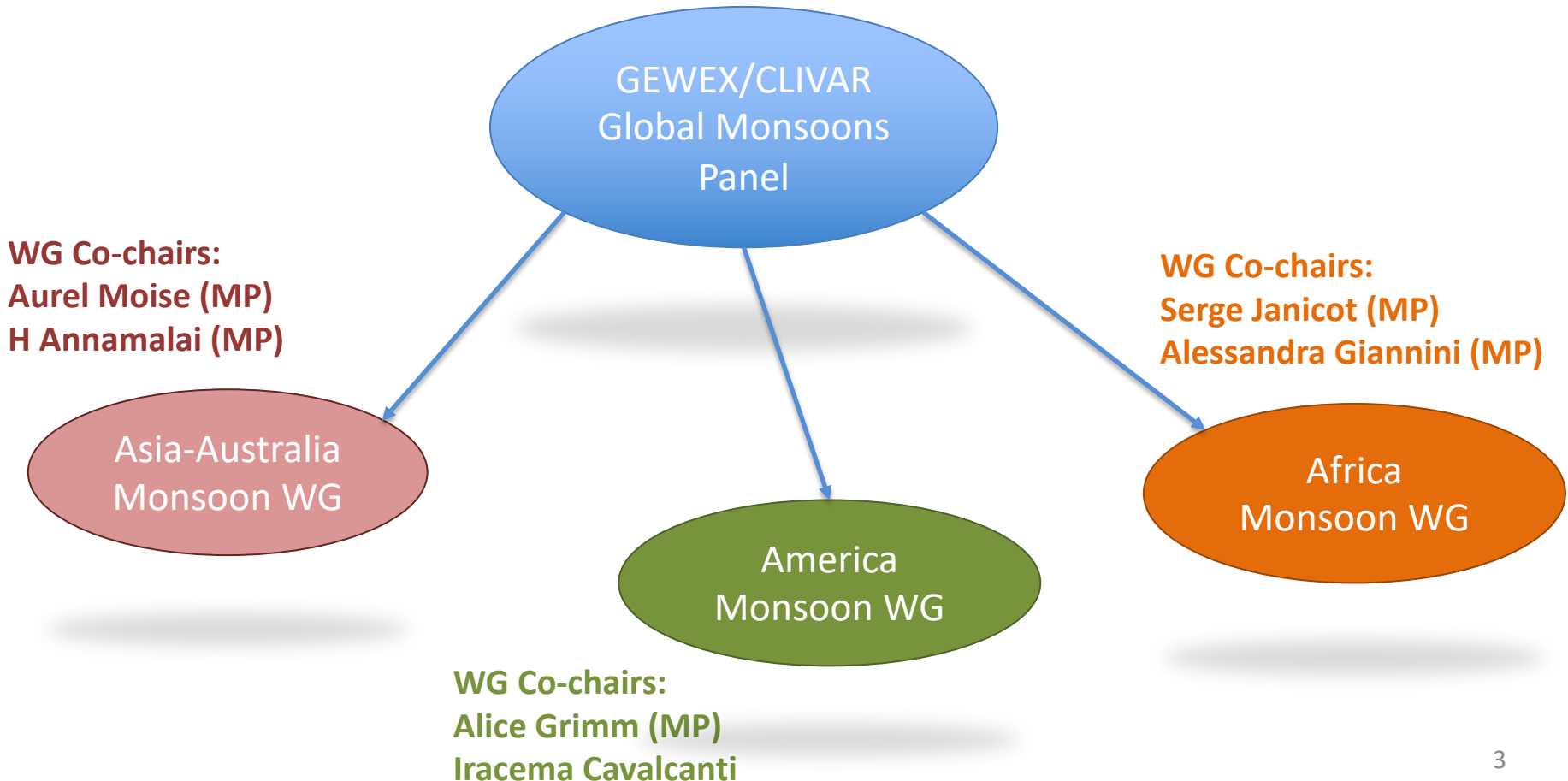
<http://www.clivar.org/clivar-panels/monsoons>

Context

- Monsoon systems
 - Major mode of variability in the tropics, water and energy budgets
 - Affect the lives of billions of people, in several of the world's poorest nations
 - Poor skills in climate simulations and predictions on all time and space scales (NWP, seasonal, decadal, climatic)
- CLIVAR and GEWEX recognize a general need for
 - A more global view of the monsoons
 - Sharing knowledge and best practice
 - Better coordination of monsoon research

Panel structure

- Regional WGs tasked with identifying priority areas for targeting advances
- Regional WGs relatively flexible to organize themselves under the guidance of the Monsoons Panel



Panel Objectives

Overarching Goal: advancing understanding of monsoon variability and improving its prediction with observations and modelling as cornerstones of research activities

- Enhanced emphasis on linkages across scales and physical processes
- Seek for new methods to enhance monitoring, advance diagnostics and improve models
- Development of more elaborated process studies coordinated with modelling activities (e.g. CMIP6)
- Empowering the next generation of scientists around the world to advance our knowledge of monsoon systems, in particular in key regions of interest

Membership

with proposals for changes

Current Membership and Status

Focus Area	Name	Role	Year	Institute	Country
Africa; GEWEX	Françoise Guichard	Co-Chair	2019	CNRM-GAME	France
Asia-AUS + MC; CLIVAR	Aurel Moise	Co-Chair	2020	Bureau of Meteorology Centre for Climate Research Singapore (CCRS)	Australia Singapore
Americas; CLIVAR	Alice Grimm	Member	2020	Federal University of Paraná	Brazil
SA; GM	Andrew Turner	Member	2019	University of Reading	UK
EA; GM	Tianjun Zhou	Member	2019	IAP	China
Africa	Cathryn Birch	Member	2019	University of Leeds	UK
Asia-AUS; CLIVAR	Hariharasubramanian Annamalai	Member	2020	IPRC, University of Hawaii	USA
Americas; GEWEX	Francina Dominguez	Member	2019	DAS, University of Illinois	USA
Africa	Aida Niang	Member	2021	ANACIM	Sénégal
South Asia;	Suryachandra Rao Anguluri	Member	2021	Indian Institute of Tropical Meteorology (IITM)	India
East Asia	Yukari Takayabu	Member	2021	Atmosphere & Ocean Research Institute, The University of Tokyo	Japan
Africa	Vincent Moron	Member	2021	CEREGE	France

Dr Rupa Kumar Kolli
Executive Director
International CLIVAR Monsoon Project Office
Indian Institute of Tropical Meteorology
Pune, India

Dr Jose Santos
Executive Director
International CLIVAR Global Project Office
Qingdao, China

Very good interactions with Jose and Kumar!



Membership renewals

- 5 current membership terms expired at the end of 2019
- Regional WGs were tasked to identify potential candidates for discussion at Monsoons Panel meeting (Dec 2019)
- International monsoon experts also approached for suggestions
- Balance sought between regional interest, GEWEX/CLIVAR relevance, expertise, gender, etc...

***FUTURE** Membership and Status*

Focus Area	Name	Role	Year	Institute	Country
Africa; GEWEX	<i>Françoise Guichard</i>	Co-Chair	2020	CNRM-GAME	France
Asia-AUS + MC; CLIVAR and GEWEX	Aurel Moise	Co-Chair	2020	Bureau of Meteorology; now Centre for Climate Research Singapore (CCRS)	Australia Singapore
Americas; CLIVAR	Alice Grimm	Member	2020	Federal University of Paraná	Brazil
South-Asia; GM	<i>Andrew Turner</i>	Member	2020	University of Reading	UK
East-Asia; GM	Renguang Wu	Member	2022	IAP/Zhejiang University	China
Asia-AUS; CLIVAR and GEWEX	Gill Martin	Member	2022	Met Office	UK
Asia-AUS+MC; CLIVAR	Hariharasubramanian Annamalai	Member	2020	IPRC, University of Hawaii	USA
Americas; CLIVAR and GEWEX	Rong Fu	Member	2022	UCLA	USA
Africa; GEWEX	Aida Niang	Member	2021	ANACIM	Sénégal
South-Asia	Suryachandra Rao Anguluri	Member	2021	Indian Institute of Tropical Meteorology (IITM)	India
East-Asia	Yukari Takayabu	Member	2021	Atmosphere & Ocean Research Institute, The University of Tokyo	Japan
Africa; CLIVAR	Vincent Moron	Member	2021	CEREGE	France
Americas; CLIVAR	Leila Carvalho	Member	2022	UCSB	USA

→ Regional WG membership will be reviewed and updated by the new Monsoons Panel

Recent Activities

Monsoons Panel and its Regional WGs

Global Monsoons Panel meetings

- MP1 at CLIVAR OSC, Qinqdao, September 2016
- MP2 at WMO IWM6, Singapore, November 2017
- MP3 at 8th GEWEX Open Science Conference, Canmore Alberta, Canada, May 2018
 - Includes interaction with GEWEX activities and Member participation in main conference
 - Also updates from SPARC ACAM activities
- **MP4**
 - **At AGU2019 Fall Meeting**
- Monsoon Panel as well as its Regional WGs have been meeting regularly via telecon to pursue their activities

Regional WG on Asian-Australian Monsoons

- Enhanced focus on stakeholder engagement
 - Involvement in regional climate outlook fora (RCOFs) to engage with key players in the region; specifically, to get feedback on how the WG could contribute and enhance existing activities
- Assemble a website on regional monsoons (including stakeholder concerns) to be hosted via the CLIVAR/ICMPO portals
- Continue systematic biases work/determining sources of error in GCMs for monsoon
 - high-level manuscript was submitted to BAMS with several WG members being co-authors (for submission to AR6)
 - Recent study: BL processes errors drive the overall errors in rainfall in GCMs more than SST errors
- Continued exploitation of S2S database for short time-scale prediction, through the monsoons subproject (Andrew Marshall) and CCRS (Singapore) engagement in S2S
- QJRMS special issue on INCOMPASS is coming out soon; also working on seasonal prediction using ECMWF system
- Work on aerosol forcing and effective radiative forcing

Regional WG on American Monsoons

- American Monsoons Session at AMS January 2019 meeting
- Invited talk and participation in a round table discussion at Brazilian Congress of Meteorology
- Continued exploitation of the S2S database for the South American monsoon, to assess possibility for subseasonal prediction
 - Extreme events, onset & demise, active & break periods
- Skill assessment of S2S-participating models in simulating MJO impacts on the American monsoons
 - Precipitation anomalies & associated teleconnections
- Attempted improvement in sub-seasonal prediction through calibration procedures
- Preparations for and organization of American Monsoons Workshop and Training Activity (more details later)

Regional WG on African Monsoons

- CORDEX-Africa (ongoing activities)
 - Development of potential Flagship Pilot Study (FPS) projects (lead C. Lennard)
 - Entrainment of Central Africa into this work
- S2S activities for Africa and in the context of the global monsoons
- Ongoing S2S activities within e.g. SWIFT, CREWS projects
- Detection-Attribution issue, to exploit GMMIP and other potential research initiatives
- Links to ongoing Future Climate For Africa (FCFA) programme
 - CP4-Africa and Atlas for end-users
- Climate Services for Africa (ongoing)
- Capacity building
 - Particularly of Central Africa community (ongoing)
 - LMI ECLAIRS2
 - Meeting on Sahelian Heat Waves and Health issues (Oct. 2018, ACASIS)

Cross-Panel and Cross-Regional activities

Asian-Australian Monsoons

- S2S: Developing capacity of Southeast Asian countries to apply subseasonal-to-seasonal forecasts in impact forecasting tools
- RCOFs: Participation in South Asian Climate Outlook Forum (SASCOF) sessions

Global Monsoons MIP (GMMIP) contribution to CMIP6

- GMMIP Co-Chairs: T. Zhou, J. Kinter III and A. Turner
- 21 modelling groups signed up
 - Tier 1 Extended AMIP
 - Tier 2 Ocean pacemaker (AMO, PDO)
 - Tier 3 orographic forcing
- CMIP6 delayed ~1yr due to fixing of forcing data
- Pilot experiments performed by Zhou/IAP and Turner/UoR groups
- **The 1st International Workshop on GMMIP was held from 27-30 October 2019** at the Institute of Atmospheric Physics, Chinese Academy of Sciences (IAP/CAS) in Beijing, China.
- **GMMIP was initiated through the Monsoon Panel.**
- ESG has already data from GMMIP and is being analysed

Interaction with WMO/WWRP Monsoons Panel

- Invited review articles being revised for next volume of The Global Monsoon: Research & Forecast, 5th Edition
 - A. Grimm – South and North American monsoons
 - A. Moise – The Australian summer monsoon
 - A. Lenouo, S. Janicot, F. Kamga et al. – The Central African monsoon
 - H. Annamalai (and members of the Asia-Australia WG) – Grand challenges in monsoon modelling and systematic biases
- Participation in WMO/WWRP workshop, China (December 2019)
 - Focus was the **Monsoon Attribution Report/Book** that CP Chang is leading and Bin Wang driving as Science Lead
 - WWRP monsoon group supported
 - WGTMR from WMO has requested this report
 - Submitted a BAMS paper on this (by the end of December for IPCC AR6 deadline)

Interaction with SPARC

- Already well-established ACAM (Aerosol Composition & Asian Monsoon) activities (Laura Pan etc.)
- Of most interest and relevance to GEWEX/CLIVAR Monsoons Panel is the work in monsoon teleconnection dynamics
- A short “straw-man” white paper was prepared for the SPARC SSG meeting: Tianjun presented at SPARC SSG meeting
- How does the stratosphere modulate monsoon teleconnections?
 - Does the QBO perturb monsoon interannual teleconnections such as to ENSO and the IOD, and if so how?
 - What signals can be found in the stratosphere when the Asian monsoon excites CGT/SRP activity on the subtropical jet and does this connect to the surface at higher latitudes? Do SSW modulate this behaviour?
- Discussion at SPARC SSG was very positive; strong sense that a collaboration should be developed
- SPARC also keen to be involved in monsoon-related summer schools / training workshops
- SPARC traditionally works through focussed activities, so it would be good to define one of those which coordinates work associated with Monsoon Panel

IPCC AR6 Activities

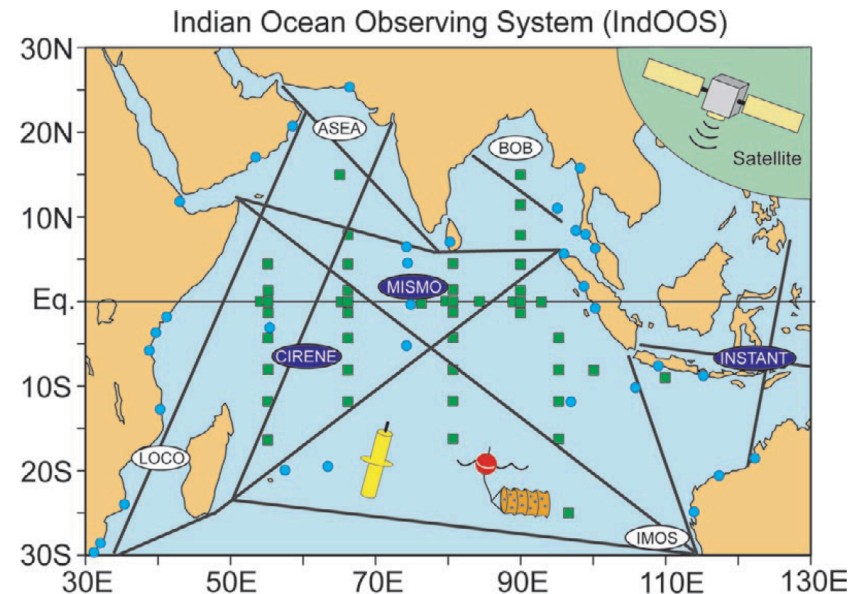
- 15 monsoon-relevant authors across the chapters
- Most of the monsoon topic is covered in Ch. 8: Water Cycle Changes
- Currently at internal draft/ZOD stage, between LAM1 & LAM2
- FOD finished and SOD deadlines just passed
- Feb-Apr 2020: all can nominate themselves as expert reviewers of the SOD

Interaction with GEWEX activities

- In discussion with GASS Co-Chairs on cross-panel activities during 2020
 - Invited Xubin to GMP meeting at AGU for a discussion on connection to the GASS White Papers
 - The diurnal cycle white paper/project could provide a good way forward for further collaborations

Links with ocean activities

- CLIVAR/IOC-GOOS Indian Ocean Region Panel (IORP):
 - Annamalai contributed to the IORP activities (cross CLIVAR activities): "Sustained observations over the Tropical Indian Ocean": H. Annamalai, M. Nagura and K. Richards, 2019: Indian Ocean and South-Asian monsoon: upper-ocean processes relevant to the monsoon annual cycle; IndOOS (2020-40) White Paper (invited article – in press)
- Review on the ENSO Impact on South America
 - Impact of El Niño-Southern Oscillation on South America in a changing climate, Wenju Cai et al.



Training and workshops

Highlight of 2019 was the very successful workshop organised by the Americas WG and supported by (amongst others CLIVAR and GEWEX)



ADVANCED SCHOOL AND WORKSHOP ON AMERICAN MONSOONS – PROGRESS AND FUTURE PLANS

August 19-24, 2019

at Instituto de Física Teórica – UNESP, São Paulo, Brazil
The Advanced School and Workshop will bring together scientists and students for presenting and discussing the progress in research on the American monsoons and their role in the global monsoon system, and for planning future activities.

The American monsoons are important components of the global monsoon system. A very high percentage of the annual precipitation over most of South America occurs during the summer monsoons, including subtropical regions. The economy, agriculture, water and energy resources and, consequently, the livelihoods of the great majority of South America population are heavily dependent on the summer monsoon. Also the North American monsoon provides crucial water resources for Mexico, Central American countries, several island nations in the Caribbean and parts of the southern USA. Predicting the intensity of American monsoon rainfall is not only a regional challenge, but is also relevant in the framework of a global sub-seasonal to seasonal forecasting system.

The Advanced School and Workshop are fostered by the Working Group on American Monsoons, one of the regional monsoon working groups established under the coordination of the CLIVAR/GEWEX Monsoons Panel.

There is no registration fee.



ORGANIZERS

Alice B. Grimm (UFPR, Brazil)
Iracema Cavalcanti (INPE, Brazil)
Manoel Gan (INPE, Brazil)
Fred Knutson (ICTP, USA)

SPEAKERS

Marlene Rienecker (UCI, USA)
Leticia M.E. Carvalho (UFPA, Brazil)
Inês E.A. Cavalcanti (CPTEC, INPE, Brazil)
Thomas Gochis (USGS, USA)
María Anunciación E. de Silva Dias (UFPA, Brazil)
Paula L. de Silva Dias (UFPA, Brazil)
Francine Rodrigues (UFPA, Brazil)
Reeg Pe (UTAS, Australia)
Manoel Gan (INPE, Brazil)
Alice B. Grimm (UFPR, Brazil)
Guilherme Malheiros (INPE, Brazil)
Mary Kaghan (ICTP, USA)
Fred Knutson (ICTP, USA)
John Monser (OSU, USA)

Deadline for requesting financial support: April 14, 2019

Registration deadline: June 9, 2019

Online registration form and information: <http://www.ictp-saifr.org/american19>

Advanced School and Workshop on American Monsoons

São Paulo, Brazil, 19-24 August 2019 CLIVAR/GEWEX Monsoons Panel American Monsoons Working Group

~ 80 people attended and many more had to be rejected (no \$\$)

Alice Grimm - Federal University of Paraná (UFPR), Department of Physics, Curitiba, Brazil
Iracema Cavalcanti - National Institute for Space Research (INPE), CPTEC, São Jose dos Campos
Manoel Gan - National Institute for Space Research (INPE), CPTEC, São Jose dos Campos



Extended abstracts: <https://www.ictp-saifr.org/american-monsoons-progress-and-future-plans/>

BOOK OF ABSTRACTS
August 19-24, 2019
Instituto de Física Teórica – UNESP
São Paulo, Brazil



America WG



Wenju Cai presenting



Not all could fit...

Future Plans

2020

Panel Activities

- Continued interaction with the IPCC AR6 and CMIP6 process, especially GMMIP through Andy Turner and Tianjun Zhou.
- Promote continued S2S diagnosis: we will seek to engage further with regional activities (S2S-SEA) and the university sector in analysing the available large data
- Finalise plans for engagement with SPARC
- Finalise plans for further engagement with GEWEX GLASS & GASS (in particular regarding land-surface interactions and projects such as ALMIP, coordinated by A. Boone)
- The Panel is also supporting a planned conference/workshop – possibly towards the end of 2020.

Regional WGs

- **American Monsoons:**
 - Exploitation of the S2S database for the South American monsoon
 - Participate in the S2S Pilot Project using operational forecasts (not hindcasts)
 - Carry out studies on soil moisture anomalies
 - Verify simulation of SAMS features in S2S hindcasts.
- **African Monsoons:**
 - Continue with weekly briefings between Senegal, Mali, Niger, Burkina and French Meteorological Services initiated via CREWS Burkina project
 - Study of new CMIP6 simulations and projections over Africa
 - Continued involvement in SWIFT, WASCAL, CREWs projects.
 - Contribute to a project of White Book concerning the West African Climate
- **Asian-Australian Monsoons:**
 - Co-leading the proposal and organization of a focused conference/workshop - Perhaps towards the end of 2020.
 - Contribution to a Summer/winter school: possible topics are: "Advanced diagnostic tools for assessing monsoons in weather and climate models"
 - Continued engagement with end user groups such as the National Met Services and regional centers (e.g. WMO Regional Climate Centre).
 - Analysis of GMMIP simulations for the region and application of the monsoon metrics packages co-developed with panel members

GEWEX Activities

- GHP
 - Possibility of linking with Francina Domingues who moved from GMP to this GEWEX activity
 - Regional Hydroclimate Projects (RHPs) looking at physical processes
 - GHP cross-cutting projects with questions that cut across all GHP's; for example INTENSE CC – looking at sub-daily precipitation, data acquisition and analysis
 - Also possible: new AsiaPEX: proposal to become a RHP, involving 10 countries in Asia.
 - We want to find out what links to the GMP can be established
- GASS
 - Two important meetings for our collaboration: Pan-GEWEX Conference in October 2020 (Paris) and Pan-GASS in 2021
 - Xubin explained several of the projects and panels in GASS, the initiative: Improving the Simulation of Diurnal and Sub-Diurnal Precipitation over Different Climate Regimes, has many connections with MP.
 - The Third Pole Environment (TPE) project as well (e.g. influence of the TP spring temperature on subsequent precipitation further South in the region)

Other Activities (1/2)

- Engage more closely with YESS community
 - Started at last GMP meeting in December with 2 YESS member attending the pre-meeting
 - The aim is to encourage YESS members to join the regional WGs
- SPARC interaction plans for 2020:
 - Resulting from the invited discussion with Hans Volkert at our GMP meeting at AGU, we will organise a telecon with SPARC activity leads for further discussion
 - Take Andy Turner's strawman proposal as a base: ENSO teleconnections to Asian Monsoon/stratosphere link

Other Activities (2/2)

- WCRP CORA
 - Had interactions with Beatriz at AGU2019 to gain an overview of CORA and new WCRP Coordinated Regional Activity
 - Regional Task Force teams engaging with regional stakeholder to co-develop a plan, suggest new structures and elements of the new program.
 - We need further information on the flagship projects to be able to better understand links to the GMP and also the links to stakeholders
 - How were the choices of flagship projects made and what is the future consultation process across panels ?
- CLIVAR IORP
 - Conference on “Indian Ocean – ENSO – Monsoon Interactions in Changing Climate” is proposed to be held in Fall 2020 in Pune, India. Current proposal has IORP, GMP, IITM and WSU included.

Proposed Monsoon Workshop/Conference

- Motivation:
 - Support capacity building in monsoon science in South-east Asia
 - Supporting local operational/outreach activities such as S2S, RCC, SEACOF, etc.
 - Alignment with timing of CMIP6 analysis and first results
 - Alignment to AR6 WGI, II and III chapter writing
 - Only other such meeting is the WWRP coordinated and WMO-funded IWM series which is held every 4 years. The last one was in 2017 in Singapore.
- Proposed Location/Date: Singapore/Early December 2020
- Just learnt that IWM-7 is proposed to be held in India around March 2021; possibility to join WWRP effort rather than organize a separate conference so close.

Constraints and Challenges

- The main obstacle remains, that the combination of small funding and diversity (of scientific interests) presents a philosophical problem over choice of Panel meeting location.
- Regional meetings pertaining to the monsoon (or a monsoon) are not necessarily attractive to the full range of membership.
- Also, pressures on membership diversity: CLIVAR/GEWEX; regional monsoon balance; topic balance; gender balance; etc.

Future Evolution of ICMPO

- Towards a well-balanced and equitable engagement of CLIVAR and GEWEX governance with the ICMPO activities in support of the Monsoons Panel and its associate groups;
- Contribute to synergy between WCRP and WWRP on monsoon research;
- Consolidate all the monsoon research activities of both WCRP and WWRP, and organize support to the relevant expert groups and governing structures through a much wider portfolio of the next version of ICMPO, possibly with a changed title;
- A discussion paper under review to engage all the concerned stakeholders;
- Status quo until new arrangements are agreed by all parties.

Thank you for your attention

Supplementary Slides

With additional information

Regional WG members Asia-Australia

- **H Annamalai** (Co-Chair; IPRC, Hawaii, USA)
- **Aurel Moise** (Co-Chair; formerly BOM, Australia; now CCRS, Singapore)
- Andrew Marshall (BOM, Australia)
- Gill Martin (Hadley Center, UK)
- Bill Boos (UCB, USA)
- Partha Mukopadhyay (IITM, India)
- Suryachandra Rao (IITM, India)
- Randy Wu (IAP, China)
- G Srinivasan (RIMES, Thailand)
- Koh Tieh Young (SUSS, Singapore)
- Yi Ming (GFDL/NOAA, USA)
- Brian Mapes (RSMAS-Miami, USA)

Good representation
across South, East,
South East Asia plus
international
dynamics, convection
& seasonal prediction
experts

Highlighted = Currently on GMP

Regional WG members Americas

- **Alice M. Grimm** (Co-Chair; Federal University of Parana, Brazil)
- Iracema F. A. Cavalcanti (Co-Chair; CPTEC/INPE, Brazil)
- **Francina Dominguez** (University of Illinois at Urbana, USA)
- Manoel A. Gan (CPTEC/INPE, Brazil)
- Marcelo Barreiro (Universidad de la Republica, Uruguay)
- Pedro L. da Silva Dias (University of São Paulo, Brazil)
- Rong Fu (University of Texas at Austin, USA)
- Tereza Cavazos (CICESE, Mexico)
- Leila M. V. Carvahlo (UCSB, USA)

Good representation
across NAMS/SAMS;
majority women

Highlighted = Currently on GMP

Regional WG members Africa

- **Serge Janicot** (Co-Chair; IRD/France & AMMA)
- **Alessandra Giannini** (Co-Chair; IRI/USA)
- Françoise Guichard (CNRM & Meteo-France)
- Cathryn Birch (Univ Leeds/UK & FCFA)
- Benjamin Lamptey (ACMAD & CR4D)
- Fredrick Semazzi (NCSU/USA & HyVic)
- Mouhamadou Bamba Sylla (WASCAL & CORDEX)
- Pauline Dibi Kangah (UFHB/Ivory Coast)
- Claudine Wenhaji-Ndomeni (CNR-ISAC/Italy)
- Christopher Lennard (CSAG, Univ Cape Town/SA)

Good representation
across Global
North/South; gender

Highlighted = Currently on GMP

Membership: new candidate proposals

Africa

- Extend Dr Françoise Guichard's term for 1 year

Asia-Aust

- Extend Dr Andy Turner's term for 1 year

Americas/
Asia-Aust

- **Position 1 Dr Leila Carvalho (USA)** vs Dr Elena Surovyatkina (Germany) – **NEW** panel position

Asia-Aust

- **Position 2 Dr Gill Martin (UK)** vs Dr Salvatore Pascale (Italy/USA) - to replace C. Birch

Asia-Aust

- **Position 3 Dr Renguang Wu (China)** vs Dr Hirokazu Endo (Japan) – to replace T. Zhou

Americas

- **Position 4 Dr Rong Fu (USA)** vs Dr Rodrigo Bombardi – to replace F. Dominguez