

**Report to CLIVAR SSG-18**

**Panel or Working Group:** Variability of the American Monsoon Systems (VAMOS)

**1. Contributions to developing CLIVAR science and fit, where appropriate, to the CLIVAR imperatives**

a) VOCALS contributions (2010/2011)

- Atmospheric Chemistry and Physics (EGU Journal) VOCALS Special Issue set up, ~45 papers in ACP special issue; 60-70 total
- AGU fall 2010 Session; 3<sup>rd</sup> Science Meeting Miami, March 2011; poster cluster planned for WCRP Open Science Conf., Denver, fall 2011
- Pre-field-experiment compilation of data and models along 20S  
  
The 20° S latitude line captures a wide range of boundary-layer/cloud processes, lending itself well to model-observational comparisons.
- The PreVOCA experiment: modeling the lower troposphere in Southeast Pacific for Oct. 2006, M.C.Wyant et al. (2010). Dynamics well-represented but coastal model boundary layers too low
- VOCALS observational analysis along 20S
- Southeast Pacific atmospheric composition and variability sampled along 20S during VOCAL-Rex, G. Allen et al. (2010) + Bretherton et al. (2010)
- 7 years of cruise data compiled along 20S in deSzoeker et al. (2010)
- Ongoing VOCALS high-resolution data-model intercomparison including aerosols  
  
First assessment reveals widely differing cloud-dynamical process representations independent of cloud-aerosol interactions; cloud-aerosol interactions appear to diminish cloud fraction
- 2 Climate Process Teams: NOAA and NSF
- Climate model improvement of boundary-layer representations assessment (e.g. NCAR CCSM)

b) IASCLIP contributions

- AMS 29th Conference on Hurricanes and Tropical Meteorology, May, Tucson: IASCLIP related talks and Town Hall Meeting of interested IASCLIPpers.
- Caribbean Outlook Forum, June, Barbados. Lisa Goddard.
- AGU Meeting of the Americas, August, Iguazu Falls. Dedicated IASCLIP session.
- NSF-CONACYT GPS-COCONet and "Tlaloc" Meeting, September, Puerto Vallarta. IASCLIP overview presented for NSF participants
- NSF-SMN-IASCLIP meeting on GPS-Tlaloc initiative, October, El Paso (Kursinski, Vazquez, Douglas).
- NOAA CDPW, October, Raleigh NC. IASCLIP session held jointly with DYNAMO. Town Hall Meeting of interested IASCLIPpers and CPO management. Tlaloc-IASCLIP meeting with Tom Karl.
- NSF-SMN-NOAA meeting held during the AMS Annual Convention, January 2011, Seattle. Discussion of Tlaloc and Caribbean GPS-COCONet. Karl, Vazquez, Fein, DeWeaver, Braun and members of NOAA's Office of International Affairs.
- NSF UNAVCO Caribbean GPS-COCONet meeting, February 2011, San Juan. NSF-GPS, SMN, IASCLIP.
- CPO has supported an IASCLIP team to visit countries within the region to assess government and university interest and possible participation in planned IASCLIP activities. Full detail of the activities at <http://www.eol.ucar.edu/projects/iasclip/>
- Seven Central American and Caribbean Nations are interested in IASCLIP but with some economic difficulties
- Caribbean Regional Climate Outlook Forum (RCOF), June 2010, see <http://www.eol.ucar.edu/projects/iasclip/documentation/forum2010.html>

c) MESA contributions (2010/2011)

- Review- Recent developments on the South American monsoon system. Marengo et al. 2010 Int. J. Climatology.
- Main structure and life cycle of the SAMS
- Diurnal, mesoscale, and synoptic variability
- Intra-seasonal variability
- Inter-annual and interdecadal variability
- Long-term variability and climate change
- Land-surface processes and the role of aerosols from biomass burning
- Modelling, prediction and predictability

d) NAME

- While NAME has already concluded, some activities continue:
  - The NAME Forecast Forum, see [http://www.cpc.ncep.noaa.gov/products/Global\\_Monsoons/American\\_Monsoons/NAME/index.shtml](http://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAME/index.shtml)

e) VAMOS Working Group on Extremes

- Update of the Atlas of Extremes for the Americas, main developer: Young-Kwon Lim (NASA/GMAO) <http://gmao.gsfc.nasa.gov/research/subseasonal/atlas/Extremes.html>
  - Basic climatologies
  - Precipitation extremes
  - SPI time series and maps
  - Precipitation return values based on GEV fits, including impact of ENSO
  - Various temperature extremes – latest
  - Data sets: MERRA, CFSR, gridded station obs (CPC, CDC)
  - Interaction with WP6 of CLARIS-LPB –Processes and evolution of extremes in La Plata Basin
  - Studies of extremes in several regions of South America: Amazonia, South-eastern, North-eastern regions, besides LPB region.

**2. Cooperation with other WCRP projects, outside bodies (e.g IGBP) and links to applications**

a) VAMOS panel is undertaking efforts with:

- i. WGSIP ((joint session in VPM-13, July 2010; VAMOS Modeling Plan, [http://www.clivar.org/organization/vamos/Publications/Vamos\\_Modeling\\_Plan\\_Jun08.pdf](http://www.clivar.org/organization/vamos/Publications/Vamos_Modeling_Plan_Jun08.pdf))
- ii. AIP (through VOCALS; Workshop on Coupled Ocean-Atmosphere-Land Processes in the Tropical Atlantic March 2011, a Task team has been proposed to prepare a review of hypotheses, Meeting Objectives, and will likely expand the domain to include IASCLIP)

b) VAMOS Working Group on Extremes (led by Siegfried Schubert and Iracema Cavalcanti) has prepared an Atlas of Extremes for the Americas, November 2010 (<http://gmao.gsfc.nasa.gov/research/subseasonal/atlas/Extremes.html>)

c) Studies of extremes and natural disasters in SA monsoon for applications (links to Brazilian projects on climate change and megacities)

d) Anthropogenic climate change in the context of VAMOS

- e) Changes in potential vegetation in Amazonia and “savannization” of Amazonia

### 3. Workshops/meetings held

- a) 10–14 May 2010: 29th AMS Conference on Hurricanes and Tropical Meteorology, Tucson, Arizona. IASCLIP related talks and Town Hall meeting of interested IASCLIPers
- b) 28-31 July 2010: 13th Annual Meeting of the WCRP/CLIVAR/VAMOS Panel (VPM13), jointly with the 13th Session of WGSIP, Buenos Aires, Argentina.
- c) 8-13 August 2010: dedicated VAMOS and IASCLIP sessions at the AGU 2010 The Meeting of the Americas, Foz do Iguaçu - PR, Brazil
- d) 8-12 November 2010, CLARIS LPB M26 Meeting, Porto Ingleses, Florianópolis, Brazil
- e) 13-17 December 2010, AGU Meeting. Dedicated VOCALS Session.
- f) 2-4 March 2011 (plus 5 March follow-on meeting) WCRP DIG Drought Workshop (Barcelona), with several presentations and posters from the Americas and the participation of the VAMOS Extremes WG:
  - About 140 attendees from all over the world
  - All presentations are available at:  
<http://drought.wcrp-climate.org/workshop/index.html>
  - Expect to finalize drought white paper in coming months
  - Key Action Items from workshop:
    - Develop a drought catalog that provides a summary of our current understanding of the causes of drought world-wide. E.g., a map that summarizes in each location the important time scales (e.g., subseasonal, seasonal, decadal, centennial) and mechanisms (e.g. ENSO, PDO, land feedbacks, global warming) with links to relevant publications
    - Define case studies and carry out coordinated (at the WCRP level) analysis of the mechanisms, predictability and prediction skill - here we will choose cases that have a high profile and strong links to user needs.
    - Define and develop an experimental drought early warning system (DEWS) that takes advantage of our current capabilities in drought prediction and monitoring (with links to the NIDIS drought portal and other national drought monitoring activities).
- g) 21-23 March 2011, Third VOCALS Science Meeting, hosted by the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida, USA
- h) 23-25 March 2011, Workshop on Coupled Ocean-Atmosphere-Land Processes in the Tropical Atlantic, hosted by the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida, USA
- i) 25-26 March 2011: 14th Annual Meeting of the WCRP/CLIVAR/VAMOS Panel (VPM14), jointly with the 11th session of the CLIVAR Atlantic

Implementation Panel (AIP) , hosted by the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida, USA

**4. New activities being planned, including timeline,**

a) VOCALS planned activities:

- A BAMS article in conception phase; probably organized more around highlights than the hypotheses
- VOCALS contributions to the VAMOS modeling plan
- VOCALS contributions to the VAMOS future activities; participation at the WCRP Open Science conf.
- VOCALS continued interest in creating legacy datasets, to be hosted at EOL
- Two focused model/observational assessments planned, one on coastal boundary layer representation, another on representation and impact of diurnal free-troposphere subsidence wave upon boundary layer.

b) IASCLIP planned activities

- New NSF COCO net GPS PW Sites planned for the Caribbean with Automatic Weather Stations
- The Warm Water Pool of the Americas provides a prominent source of memory for climate forecasting across the IASCLIP region. IASCLIP proposes to investigate why most climate models do not reproduce the warm pool.
- IASCLIP proposes enhancing the real time observing system in the region in support of operational modeling and climate monitoring.
- Improvement of climate forecast modeling for the region is paramount to IASCLIP's success.
- IASCLIP will concentrate on improved prediction of:
  - a. TC frequency and intensity, from intraseasonal to inter decadal time scales, including efforts to forecast landfall potential.
  - b. Regional flood events that frequently impact the U.S.
  - c. Regional droughts that frequently spread into the U.S.

c) MESA planned activities:

- Update of MESA scientific plan (2011) based on paper of Marengo et al 2010
- Plans for short and long term including new topics
- Short term: Contributions to IPCC AR5:
  - SAMS (regional section)
  - Main modes of variability in S.H.
  - SAM (South Annular Mode)
  - PSA (Pacific South America)
  - Storm tracks , blockings {observations (trends) , simulations, projections}

- Long term: Science questions (some examples related to diurnal cycle)
  - Which are the main processes underlying the identified diurnal cycles in different areas of the SAMS?
  - To what extent and through which mechanisms does soil hydrology affect the diurnal cycle?
  - How does the diurnal cycle relate to the lower-frequency variability and the mean of the SAMS and therefore to seasonal and longer predictability?
- Modelling and Simulations/Projections
  - Improvements of model prediction in SAMS area
  - Application of new techniques to analyze results
  - Analyze the role of soil moisture and topography (global and regional models)
  - Impact of climate change on SAMS (CMIP3, CMIP5 model simulations/projections)
- Develop a new site at CPTEC/INPE with information on South America Monsoon System:
  - Information about the life cycle
  - Monitoring features associated with late or early onset/demise
  - Forecasting onset/demise from model results
  - Main publications
  - Link to CPC/NCEP SAMS

d) VAMOS Extremes WG activities:

- Continue updating Atlas (adding new observations, extremes parameters, continue evaluation/validation)
- Expect to establish atlas based on station observations – <http://eca.knmi.nl/> (European Climate Assessment & Dataset (ECA&D) project) – Implemented by ECA&D, we provide the observations for the Americas
- Begin adding model results (initially from GMAO) – ½ degree global AMIP simulations for 1979-present – selected years at 10km
- Science (take advantage of atlas, observations and model runs)
- Propose new model runs – e.g., case studies
- A Special Session on Extremes at AGU in Sao Francisco –Dec 2011 was proposed to the Conference Organization.

**Extremes Atlas: Based on Station Data**

- Developed at KNMI for Europe
  - European Climate Assessment and Data (ECA&D)
  - [hMp://eca.knmi.nl/](http://eca.knmi.nl/)
- Recently ported to focus on Indonesia
  - Southeast Asian Climate Assessment and Data (SACA&D)
  - [hMp://saca-bmkg.knmi.nl/rcc/](http://saca-bmkg.knmi.nl/rcc/)
- Propose porting to focus on the Americas region
  - Americas Climate Assessment and Data (ACA&D)
  - Porting done by KNMI

- The WG would be responsible for providing and updating the data and a mirror-site
  - Have verbal agreement (contact: Gerard van der Schrier [schrier@knmi.nl](mailto:schrier@knmi.nl))
- e) Post NAME activity (see “A view forward for North American Monsoon research” article in the VAMOS Newsletter N° 7, [http://www.clivar.org/organization/vamos/Publications/vamos\\_nl7.pdf](http://www.clivar.org/organization/vamos/Publications/vamos_nl7.pdf) );
- f) Plans for a joint activity with AIP (through VOCALS)
- g) Survey on the VAMOS modeling community, along with other relevant researchers and model developers, to assess current perceptions and needs for future modeling activities for VAMOS (led by Ben Kirtman).
- h) Develop specific activities related to multidecadal and climate change in South America, following the imperatives of CLIVAR.
- i) VAMOS Modeling Workshop (see Annex B)
- j) Follow up on the Coupled-Ocean-Atmosphere Processes in the Tropical Atlantic workshop: Task Team proposal to SSG to continue with workshop objectives:
  1. Develop a coherent synthesis of the state-of-the-art knowledge on the Atlantic biases and their causes for the southeast and eastern tropical Atlantic, and sharpen hypotheses.
  2. Articulate an effective way forward.
  3. Identify an international network of interested, active researchers.
  4. Define the appropriate geographical focus or foci
- k) Poster clusters in the Open Science Conference in Denver (Oct 2011)

## Annex B

### Proforma for CLIVAR Panel and Working Group requests for SSG approval for meetings

Requests should be made through D/ICPO (Robert.Molinari@noc.soton.ac.uk) against the following headings:

1. Panel or Working Group: CLIVAR Variability of the American Monsoon Systems (VAMOS) Panel
2. Title of meeting or workshop: International Modelling Workshop in the American Monsoon Systems
3. Proposed venue/Proposed dates: Late May 2012, a three days meeting at the National Laboratory for Scientific Computing (*LNCC*), *Petrópolis, Brazil*.
4. Proposed attendees, including likely number: a variety from CLIVAR VAMOS, CLIVAR AIP, WGSIP, encompassing senior experts and early career postdocs or exceptional students. In order to foster collaborative discussion and a workshop environment, the number of attendees will be 50.
5. Rationale, motivation and justification, including: relevance to CLIVAR themes & JSC cross cutting topics and any cross-panel/working group links and interactions involved:

The main goals of this workshop are to review the state of the science and research activity in sub-seasonal to multi-decadal prediction and even climate change in the VAMOS domain. In order to advance prediction at all of these it is essential to develop a models that integrates all relevant weather and climate physical, dynamical, land surface and aerosol processes. This integrative approach is a core element of the Modeling Plan for VAMOS as it seeks to improve the prediction of warm season precipitation over the Americas, for societal benefit, and to assess the implications of climate change.

Essentially, the VAMOS community needs to assess progress on implementing the Modeling Plan for VAMOS, identify important research gaps and reinvigorate collaborations within WCRP, but also the WWRP (THORPEX).

Cross panel linkages include: WGSIP, AIP, AAMP and WGCM, SPARC and the THORPEX.

6. Specific objectives and key agenda items  
The workshop will be organized following the Modeling Plan for VAMOS. That is the workshop will have core themes:
  - A) Simulating, Understanding and Predicting the Diurnal Cycle
  - B) Predicting the Pan-American Monsoon Onset, Mature and Demise Stages
  - C) Modeling and Predicting SST Variability in the Pan-American Seas
  - D) Improving the Prediction of Droughts and Floods
 While these core themes are focused on the VAMOS region special emphasis will be placed on assessing how these aspects of the Pan-American monsoon are represented in global models. The workshop will also



emphasize understanding and predicting extreme events in the VAMOS region, and how the VAMOS research contributes to climate change assessments.

7. Anticipated outcomes (deliverables):  
A BAMS article summarizing the VAMOS modelling, how this has contributed to WCRP goals and future research directions.
8. Format: The workshop format will be a combination of invited presentations, and submitted oral and poster sessions as well as an open discussion.
9. Science Organising Committee (if relevant): VAMOS Modelling WG
10. Local Organising Committee (if relevant): to be determined
11. Proposed funding sources and anticipated funding requested from WCRP: US CLIVAR, NSF, IAI, Brazilian Supporting Agencies, and an estimated amount of USD15K from WCRP

**Proforma for CLIVAR Panel and Working Group requests for SSG approval for meetings**

Requests should be made through D/ICPO ([Robert.Molinari@noc.soton.ac.uk](mailto:Robert.Molinari@noc.soton.ac.uk)), against the following headings:

1. Panel or Working Group: Variability of the American Monsoon System (VAMOS) Panel
2. Title of meeting or workshop: 15th Session of the VAMOS panel (VPM15)
3. Proposed venue: National Laboratory for Scientific Computing (LNCC), Petrópolis, Brazil.
12. Proposed dates: A week at late May 2012. The Modelling Workshop in the American Monsoon Systems is scheduled for Monday to Wednesday. VAMOS meetings will be held immediately after the workshop. VAMOS panel plans to meet Thursday and Friday.
4. Proposed attendees, including likely number: VAMOS panel members and invited experts from VAMOS science and groups, and particularly from VAMOS modelling community (approximately 30).
5. Rationale, motivation and justification, including: relevance to CLIVAR themes & JSC cross cutting topics and any cross-panel/working group links and interactions involved:  
VPM-14 was held in March 2011. Given the plan to have a VAMOS Modeling workshop at the National Laboratory for Scientific Computing in Brazil, the closeness to a number of Institutions interested and/or participating in VAMOS modeling activities, this is an opportunity to have VPM-15 at the same time. Periodical meetings of the panel make it possible to review the progress of the different programs of VAMOS, the status of actions and recommendations approved at the previous sessions, update issues of importance to the panel, assess the interaction of VAMOS with other CLIVAR panels, its contribution to CLIVAR imperatives, the cross-cutting themes and other WCRP programs, such as GEWEX as well as IGBP programs.
6. Specific objectives and key agenda items:  
The panel plans to review and advise on progress with the VAMOS modelling activities, VOCALS, MESA, and IASCLIP project.  
  
The meeting will also review the progress on other cross-cut components, as Extremes, ACC, and assess the research in decadal prediction being carried within VAMOS activities.
7. Anticipated outcomes (deliverables):  
The panel expects to assess the progress of the ongoing VAMOS projects, in particular VAMOS modelling group, and to improve the activities being carried

out by the cross-cutting working groups.

8. Format:  
During the 1.5 days of the meeting the panel will meet with experts from the different scientific programs of VAMOS. The last half day will be devoted to a Executive Panel Session with special invitees from funding agencies and scientists.
  
9. Science Organising Committee (if relevant)  
We propose a small committee composed of the VAMOS co-chairs, Carlos Ereño and Iracema Cavalcanti and Pedro Silva Dias as local contacts.
  
10. Local Organising Committee (if relevant)
  
11. Proposed funding sources and anticipated funding requested from WCRP:  
US CLIVAR, Brazilian Supporting Agencies, and an estimated amount of USD15K from WCRP