

## Decadal Climate Variability and Predictability (DCVP)

Co-Chairs:

Yochanan Kushnir ([kushnir@ldeo.columbia.edu](mailto:kushnir@ldeo.columbia.edu)) and  
Christophe Cassou ([christophe.cassou@cerfacs.fr](mailto:christophe.cassou@cerfacs.fr))

### RF overview

DCVP's objectives is to act within CLIVAR to advance the study of decadal climate variability characteristics, mechanisms, and predictability by focusing on key challenging phenomena with significant impact on near-term climate evolution and with potential for rapid progress, by:

- Monitoring and reviewing the state of understanding of the governing mechanisms and predictability of these phenomena, and of their impact on regional and global climate variability – including their attribution to internal interactions or external forcing.
- Identifying gaps in knowledge and recommend observations, analysis and model experiments to address these gaps.
- Facilitating interaction between CLIVAR and WCRP scientists to discuss the results of these studies and communicate conclusions and remaining challenges to the scientific community and beyond.
- Report to the CLIVAR SSG on the state of DCVP research and assist the SSG in preparing the new CLIVAR Science Plan on the subject of DCVP.

In line with its objectives, DCVP identified two research foci:

1. *Advance the predictive understanding of **Atlantic Decadal Climate Variability**, i.e., the variations of ocean circulation systems in the North Atlantic (AMOC, gyres), their related SST variability (AMV/AMO, extratropical and tropical SST) and association/impact on atmospheric variability (NAO/AO, blocking, etc.). Determine the governing mechanisms - internal and external - and their interactions and impact on climate variability over land and over other ocean basins and on the GMST.*
2. *Advance the predictive understanding of **Pacific Decadal Climate Variability**, i.e., the decadal variability of tropical Pacific SST (IPO), its links to North Pacific Ocean SST and circulation (PDV) and to the atmosphere and stratosphere (PNA, NAO). Determine the governing internal and external mechanisms and the impact and interactions with climate variability over land, other ocean basins and on the GMST.*

DCVP is well in line with its planned activities for 2016/17. Our main mission now is to follow the progress in the two areas of research as described above and to encourage presentations of these subject in the upcoming WCRP "International workshops on subseasonal to decadal prediction" to be held 17-21 Sep 2018 at NCAR, Boulder, USA.

### **Membership:**

Amy Sololon and Wolfgang Müller have left the RF, and were replaced by Matt Newman and Holger Pohlmann

### **Achievements for 2016-17**

- Contributed to planning the session on Decadal Climate Variability in the CLIVAR OSC 2016 in Qingdao.
- Published a Joint issue CLIVAR Exchanges/PAGES Magazine on Decadal Climate Variability (Exchanges 72, doi :10.22498/pages.25.1). The issue containing 13 articles that cover different aspects of DCVP and the associated current research finding.
- Published In Box article summarizing the state of DCVP (Cassou et al., 2017, see below).
- DCVP working group members continually contribute to the activities of Decadal Climate Prediction Project (DCPP, final design of the component-C protocol) and the WCRP Grand-Challenge on Near Terms Climate Prediction (GC-NTCP).
- Contributed to the planning of the WCRP WCRP "International workshops on subseasonal to decadal prediction" to be held 17-21 Sep 2018 at NCAR, Boulder, USA.

### **Plans for 2018 and beyond**

- **Complete DCVP contribution to CLIVAR Science Plan.**
- In attending CLIVAR SSG meeting at Qingdao we learned of other CLIVAR Panels interest in pursuing research in line with DCVP RF objectives we therefore propose here to hold discussion with the Panels in order to plan joint research activities. This includes the Atlantic and Pacific Implementation Panels and the Climate Dynamics Panel. This line of activity remains to be pursued.
- Continue participation in the WCRP planning of the international workshop in September 2018 and represent DCVP work in that meeting.
- Begin to analyze results from the DCPD Component C experiments.

### **Articles published in 2016/17 as part of RF activities (if any)**

Cassou, C., Y. Kushnir, E. Hawkins, A. Pirani, F. Kucharski, I.-S. Kang, and N. Caltabiano, 2017: Decadal Climate Variability and Predictability: Challenges and opportunities. *Bull. Amer. Meteorol. Soc.*, on-line, doi: 10.1175/BAMS-D-16-0286.1.

Caltabiano, N. and von Gunten, L., Editors and Kushnir, Y., C. Cassou and St George, S., Guest Editors, 2017: *CLIVAR Exchanges/PAGES Magazine joint issue on Decadal Climate Variability*, CLIVAR IPOCO and PAGES IPO publication, 74 pp, doi: 10.22498/pages.25.1.

### **Relevant Other Article (co-authored by members of WG)**

Boer, G. J., D. M. Smith, C. Cassou, F. Doblas-Reyes, G. Danabasoglu, B. Kirtman, Y. Kushnir, M. Kimoto, G. A. Meehl, and R. Msadek, 2016: The Decadal Climate Prediction Project (DCPP) contribution to CMIP6. *Geosci Model Dev*, **9**, 3751-3777, doi: 10.5194/gmd-9-3751-2016.

Karspeck, A., D. Stammer, A. Köhl, G. Danabasoglu, M. Balmaseda, D. Smith, Y. Fujii, S. Zhang, B. Giese, and H. Tsujino, 2017: Comparison of the Atlantic meridional overturning circulation between 1960 and 2007 in six ocean reanalysis products. *Clim. Dyn.*, **49**, 957-982, doi: 10.1007/s00382-015-2787-7.

Newman, M., M. A. Alexander, T. R. Ault, K. M. Cobb, C. Deser, E. Di Lorenzo, N. J. Mantua, A. J. Miller, S. Minobe, and H. Nakamura, 2016: The Pacific decadal oscillation, revisited. *Journal of Climate*, **29**, 4399-4427, doi: 10.1175/JCLI-D-15-0508.1.

Ruprich-Robert, Y., R. Msadek, F. Castruccio, S. Yeager, T. Delworth, and G. Danabasoglu, 2017: Assessing the Climate Impacts of the Observed Atlantic Multidecadal Variability Using the GFDL CM2.1 and NCAR CESM1 Global Coupled Models. *J. Climate*, **30**, 2785-2810, doi: 10.1175/jcli-d-16-0127.1.

**Budget and other needs for 2018**

We request support on the order of \$5000 to support travel of participants for the 2<sup>nd</sup> Session of DCVP RF, which will be held jointly with the WCRP International workshops on subseasonal to decadal prediction in September of 2018.

## Annex A

### Proforma for CLIVAR Research Focus requests for SSG approval for meetings

1. **Panel or Working Group:** DCVP RF
2. **Title of meeting or workshop:** 2<sup>nd</sup> Session of DCVP
3. **Proposed venue:** Boulder, CO, USA
4. **Proposed dates:** 21-22 September 2018
5. **Proposed attendees, including likely number:** DCVP members + invited guests (15-20 participants)
6. **Rationale, motivation and justification, including: relevance to CLIVAR science & WCRP Grand Challenges, and any cross-panel/research foci links and interactions involved:**
7. **Specific objectives and key agenda items:**
8. **Anticipated outcomes (deliverables):**
9. **Format:** 2-day meeting, jointly with the WCRP Workshops on S2S and S2D
10. **Science Organizing Committee (if relevant)**
11. **Local Organizing Committee (if relevant)**
12. **Proposed funding sources and anticipated funding requested from WCRP:**