

## Climate Dynamics Panel

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### Panel overview

The main aim of the Climate Dynamics Panel is to advance our basic understanding of atmosphere-ocean climate dynamics using observations and models and to determine the role of climate dynamics in shaping climate variability and change on seasonal to centennial time scales. Specific activities will, in the first instance, be organized around three areas; (i) the organisation of storms, blocks and jet streams on seasonal and longer time scales, (ii) ocean basin to ocean basin and tropical-extratropical teleconnections and (iii) the development of predictive theories of climate dynamics involving non-linear interactions between the dynamics and physics of the atmosphere and ocean.

Key methodological approaches employed to address these objectives are (i) high-resolution atmosphere-only and coupled models, (ii) the use of stripped-down or simplified dynamical models of the atmosphere and ocean e.g. aqua-planet configurations with mixed-layer oceans, and (iii) 'pacemaker' type experiments where e.g. SSTs in an ocean basin are relaxed towards observed values and the response of the coupled climate system outside that region is assessed.

**Membership Update:** Sarah Kang (Ulsan National Institute of Science and Technology) and Aixue Hu (NCAR) joined the panel in 2018. Rowan Sutton (NCAS, University of Reading) finished his term.

### Achievements for 2017-18

#### Workshops and Meetings

- ICTP Summer School on Theory, Mechanisms and Hierarchical Modelling of Climate Dynamics: Multiple Equilibria in the Climate System. 25 June-5 July 2018. Bordoni, Kang, Xie speakers.
- Stormtracks 2018 workshop: Alternative perspectives on storm tracks in a changing climate. Stockholm, 27-31 August 2018. Kaspi main organiser. Meeting materials available here - <https://tinyurl.com/yb4rhka2h>

#### Scientific results from activities

- Preparation of review paper on inter-basin teleconnections (Cai, lead, Keenlyside co-author) and book chapter on the same topic (Keenlyside).
- Minobe has joined the US CLIVAR group on large ensembles.

### **Scientific capacity building and career support**

- Submission of large (€6 million) Horizon 2020 proposal on basic dynamics of storm tracks (Collins lead, Kaspi, Bordoni, Minobe involved).
- Zolina attended the Northern Ocean Regional Panel meeting on 15-16 June 2018 in Davos, Switzerland.
- Minobe became the chair of Japan CLIVAR sub-committee of Science Council of Japan in May 2018.
- Some members attended the S2S and S2D meeting in Boulder, CO, Sep 2018 (Barreiro, Keenlyside).
- Barreiro has been selected to be a Lead Author of IPCC WG1 AR6 and attended the first lead author meeting. Collins continues to lead a chapter in the IPCC Special Report on Oceans and Cryosphere in a Changing Climate.

### **Plans for 2019 and beyond**

#### **Workshops and Meetings**

- AGU 2018 Session: A093-. Role of Ocean-Atmosphere Interaction in Regional Climate Variability and Change (Minobe, Collins, Xie, Zolina co-conveners).
- Proposal for an Aspen Global Change Institute Workshop on Changing patterns of climate: Understanding Uncertainties (Keenlyside, Xie, Kang, Collins). The next panel meeting will be attached to this if the proposal is acceptable.
- SPARC General Assembly in Oct 2018. The remit of DynVar is to be revised with focus on extremes (Manzini).
- SPARC/CMIP6 DynVarMIP workshop on the atmospheric circulation in a changing climate, 22-25 October 2019, Universidad Complutense de Madrid, Spain (Manzini).
- Meeting on American Monsoons in 2019 be held in Sao Paulo, Brazil (Barreiro)
- Joint US and UK AMOC meeting (Hu).
- Discussion on possible panel-led summer school on the role of climate dynamics in regional climate change.
- Potential workshop (led by ARP) on North Atlantic climate model biases (Keenlyside).

#### **Articles published in 2017/18 as part of panel activities (if any)**

- Collins, M., Minobe, S., Barreiro, M., Bordoni, S., Kaspi, Y., Kumano-Yoshida, A., Keenlyside, N., Manzini, E., O'Reilly, C., Sutton, R., Xie, S.-P. and Zolina, O. Climate Dynamics and Regional Climate Change. *Nature Climate Change*, 8(2), 101-108, 2018.
- A paper on "The benefits of global high-resolution for climate simulation: process-understanding and the enabling of stakeholder decisions at the regional scale" is in press for the November issue of *BAMS*. Minobe is co-author.
- A chapter on "South and North American Monsoons: characteristics, life cycle, variability, modelling and prediction" to be published in book "The Multi-Scale Global Monsoon System" in 2019. Barreiro is co-author.

## **Budget and other needs for 2019**

~\$5,000 for next panel meeting (application below)

### **Annex A**

#### **Proforma for CLIVAR Panel requests**

#### **for SSG approval for meetings**

1. **Panel or Working Group:** Climate Dynamics
2. **Title of meeting or workshop:** One day panel meeting associated with Aspen Global Change workshop on Changing patterns of climate: Understanding Uncertainties
3. **Proposed venue:** Aspen
4. **Proposed dates:** Summer 2019
5. **Proposed attendees, including likely number:** All panel members (12)
6. **Rationale, motivation and justification, including: relevance to CLIVAR science & WCRP Grand Challenges, and any cross-panel/research foci links and interactions involved:** The Aspen workshop addresses one of the key scientific topics of the panel on regional patterns of climate change. The scope has been discussed with the WCRP Grand Challenge on Clouds, Circulation and Climate (Ted Shepherd) and we would plan to invite some of that group to the workshop. John Fyfe (NOPR) is also a co-convenor.
7. **Specific objectives and key agenda items:** Planning panel activities, cross-panel interactions with WCRP Grand Challenge, further outcomes from the workshop
8. **Anticipated outcomes (deliverables):** Plans for future activities, possible perspectives article arising from the workshop
9. **Format:** One day round table
10. **Science Organizing Committee (if relevant)**
11. **Local Organizing Committee (if relevant)**
12. **Proposed funding sources and anticipated funding requested from WCRP:** ~\$5,000 to support travel costs for some panel members and for room hire. It is anticipated that many members can support their own travel.