

## 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. Although climate dynamics can encompass a very wide range of topics, a certain degree of focus is necessary for the panel to be effective, and what we focus on needs to be considered in relation to the other panels' activities in CLIVAR. Our work to date has been 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. Although COVID-19 is a major constraint on the Panel's activities, the Panel is doing its best to promote these research areas.

### Membership Update

Five new members joined in 2020,: Rhys Parfitt (FSU, USA), Natalie Burls (GMU, USA), Bolan Gan (OUC,China), Ramiro Ignacio Saurral(UBA, Argentina), Alexey Karpechko (FMI, Finland), and a few members will join in 2021.

Noel Keenlyside (UiB, Norway) will continue to serve the panel as a co-chair.

Three members (including a co-chair) renewed their term for one more year at the end of 2019 will rotate off this year: Shoshiro Minobe (Hokkaido University, Japan), Yohai Kaspi (Weizmann Institute of Science, Israel), Simona Bordoni (Caltech, USA)

### Achievements for 2019-2020

#### Online Panel Meetings

The panel regularly organize the online meeting, six times in 2020 so far, to discuss the panel business and updates of scientific studies, especially the reports from the new members.

#### Workshops and meeting

- **Ocean Sciences Meeting 2020**, Minobe co-convended a session on *Extratropical air-sea interaction and extreme events*, in collaboration with the RF TBI, Keenlyside co-convended a session on *Impacts of Interbasin Interaction on Climate Variability and Extreme Events*
- **EGU 2020, virtual meeting**, Keenlyside co-convended a session on *Tropical & Subtropical Ocean Circulation, Equatorial to Mid-Latitude Air-Sea Interactions* (joint activity with Atlantic Region Panel)
- **JpGU 2020, virtual meeting**, Minobe co-convended a session at the *Large Ensemble Modeling Approaches as Tools for Climate and Impacts Research*, as a collaboration with US Large Ensembles working group; Keenlyside co-convended a session on 3.

*Atlantic climate variability, and its global impacts and predictability* (joint activity with Atlantic Region Panel)

- **AGU fall meeting 2020**, Minobe, Hu, Karpechko and Parfitt convened a session [A014 - Advancing predictive understanding of climate variability and change associated with air-sea interactions and interbasin connections](#); Hu co-convened a session [GC010 - Dynamics of Oceanic Mesoscale Eddies from Regional to Global Scales Under a Changing Climate](#); Keenlyside co-convened a session [OS028 - Tropical Interbasin Interaction: Processes, Pathways, and Predictability](#) (joint activity with RF TBI), Burls co-convened a session [GC129 & GC117. Large-Scale Atmosphere–Ocean Dynamics of Climate Variability and Climate Change](#)
- Minobe attended the final meeting of PRIMAVERA, EU HighResMIP project, virtual, May 2020, as an external board member representing CLIVAR.
- Kang organized and Burls presented at the Cloud Feedback Model Intercomparison Project (CFMIP) 2020 Virtual meeting <http://www.cgd.ucar.edu/events/2020/CFMIP/>
- Keenlyside organised of online TRIATLAS/Tropical Atlantic Variability/PIRATA conference, 12-14th May, 2020

#### Scientific results from activities

- Minobe continues being a member of US-CLIVAR large ensembles working group and US-CLIVAR air-sea interaction working group.
- Keenlyside co-chair of RF TBI, and became member of WRCP Grand Challenge on Near-term prediction

#### Scientific capacity building and career support

- Keenlyside organized the Nansen Tutu TRIATLAS Summer School on Ocean, Climate, and Marine Ecosystems, Cape Town, South Africa, 14-21, January, 2020

#### Knowledge exchange

- Minobe is leading the research topic “North Pacific Climate and Ecosystem Predictability on Seasonal to Decadal Timescales” in Frontiers in Marine Science, as a main activity of PICES-CLIVAR working group “Climate and Ecosystem Predictability”.

#### **Plans for 2021 and beyond**

- In 2021 June or July, the panel is planned to have a joint WS with hotspot2, a Japanese big project for mid-latitude air sea interaction and the panel will have a panel meeting attached to that workshop. In this project, Minobe is a package leader and Dr. Nonaka in JAMSTEC is the leader of the project.
- CDP is contributing to organizing the WCRP-CLIVAR workshop on Climate Interactions among the Tropical Basins (Online), 24-26 Feb 2020.
- Planned CLIVAR workshop on Towards providing more reliable regional climate change projections has been postponed to 2021, and will probably take place as a virtual event.

#### **Articles published in 2019/20 as part of panel activities (if any)**

Deser et al. 2020, Insights from Earth system model initial-condition large ensembles and future prospects. *Nature Climate Change*, 10, doi.org/10.1038/S41558-020-0731-2 (Minobe)

**Keenlyside, N.**, Y. Kosaka, N. Vignaud, A. Robertson, Y. Wang, D. Dommenges, J.-J. Luo, and D. Matei (2019), Basin Interactions and Predictability, in *Interacting Climates of Ocean Basins: Observations, Mechanisms, Predictability, and Impacts*, edited by C. R. Mechoso, Cambridge University Press.

### **Budget and other needs for 2021**

We would like to ask support of 5000CHF from CLIVAR for the panel meeting, which will be held in June 2021 in Japan, jointly with the CDP-hotspot2 workshop. We hope that the meeting will be in-face. Although there is uncertainty associated with COVID-19, we believe that there is a good chance of in-face meeting, as Japan will accept international travellers for Tokyo Olympic in July 2021.

**Aim for a total length of ~2 pages, more is fine, but not necessary**

## Annex A

### Proforma for CLIVAR Panel requests for SSG approval for meetings

***Note: If your group has approved funds in 2020 that were not used because of Covid19, and you propose to use them in 2021, they should be included again in this request, in addition to any new request.***

- 1. Panel name:** Climate Dynamics
- 2. Title of meeting or workshop:** Tentatively mid-latitude air-sea interaction and associated predictability for regional climate variability and change
- 3. Proposed venue (Or indicate if online):** Sapporo, Japan
- 4. Proposed dates:** June 12-15, 2021
- 5. Proposed attendees, including likely number:** Attendees will mainly come from Japan ranging from graduate students to established researchers, and hotspot2 project will invite some international researchers.
- 6. Rationale, motivation and justification, including: relevance to CLIVAR science & WCRP Grand Challenges, and any cross-panel/research foci links and interactions involved:**

As explained in the next item, this workshop, which is based on common interests between the panel and hotspot2 project, is also useful for WCRP lighthouse activity, "Explaining and Predicting Earth System Change". Also some expected attendees come from different activities including the WCRP lighthouse activity nominee, Shoshiro Minobe, Pacific Regional Panel member Yu Kosaka and Yukiko Imada, Tropical basin interaction RF co-chair Ingo Richter and its member Hiroki Tokinaga along with Climate dynamics panel members. Furthermore, the main topic, mid-latitude air-sea interaction, is also the main theme of the US CLIVAR air-sea interaction working group, and a co-chair from that US-CLIVAR working group will be invited.

- 7. Specific objectives and key agenda items:**

Mid-latitude air-sea interaction, which is the one of the three major research areas of the panel and the main research theme of the hotspot2, have attracted the attention of the research community. In particular, how it is related to regional climate variability and change and how it influences on predictability of various timescale need further research. Such research should be based on better understanding of the climate dynamics including identifying similarities and differences of dynamics operating different regions and timescales. This workshop aims to facilitate mid-latitude air-sea interaction research, by exchanging latest results and by identifying future directions.

- 8. Anticipated outcomes (deliverables):** The workshop report will be published in an appropriate
- 9. Format:** Workshop will consist of oral and poster presentations.

**10. Science Organizing Committee (if relevant):** TBD but will include Noel Keenlyside, Shoshiro Minobe and Masami Nonaka (JAMSTEC, Japan), who is the leader of the hotspot2.

**11. Local Organizing Committee (if relevant):** TBD

**12. Proposed funding sources and anticipated funding requested from WCRP:** We would like to ask support of 5000CHF from CLIVAR for the panel meeting. Of course, this is a part of funding that is used for travel of CDP members for the panel meeting, and a few members can be supported by hotspot2 project.