

# CLIVAR: CLIMATE & OCEAN variability, predictability and change

WCRP Core Project on the  
Ocean-Atmosphere System

ICRC-CORDEX 2019

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# Mission and Scientific Priority of CLIVAR



CLIVAR's mission is to understand the dynamics, interaction, and predictability of the climate system with emphasis on ocean-atmosphere interactions.

## Scientific priorities of CLIVAR:

1. Mechanisms of climate variability and change that require further investigation with the ultimate goal of better constraining the fluxes of energy and carbon in the climate system;
2. Ocean processes that modulate climate variability and change for which open questions remain;
3. Climate predictability challenges over a broad range of space and time scales.

# Organization Chart

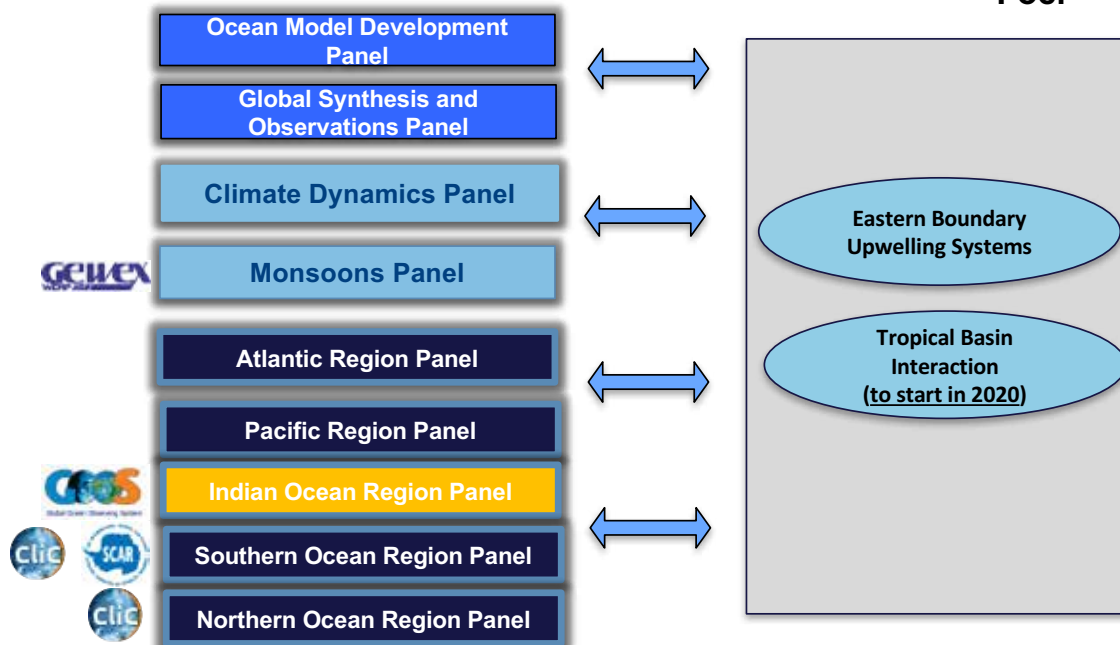
## CLIVAR Organization

Scientific Steering Group

ICPO

### Core Panel

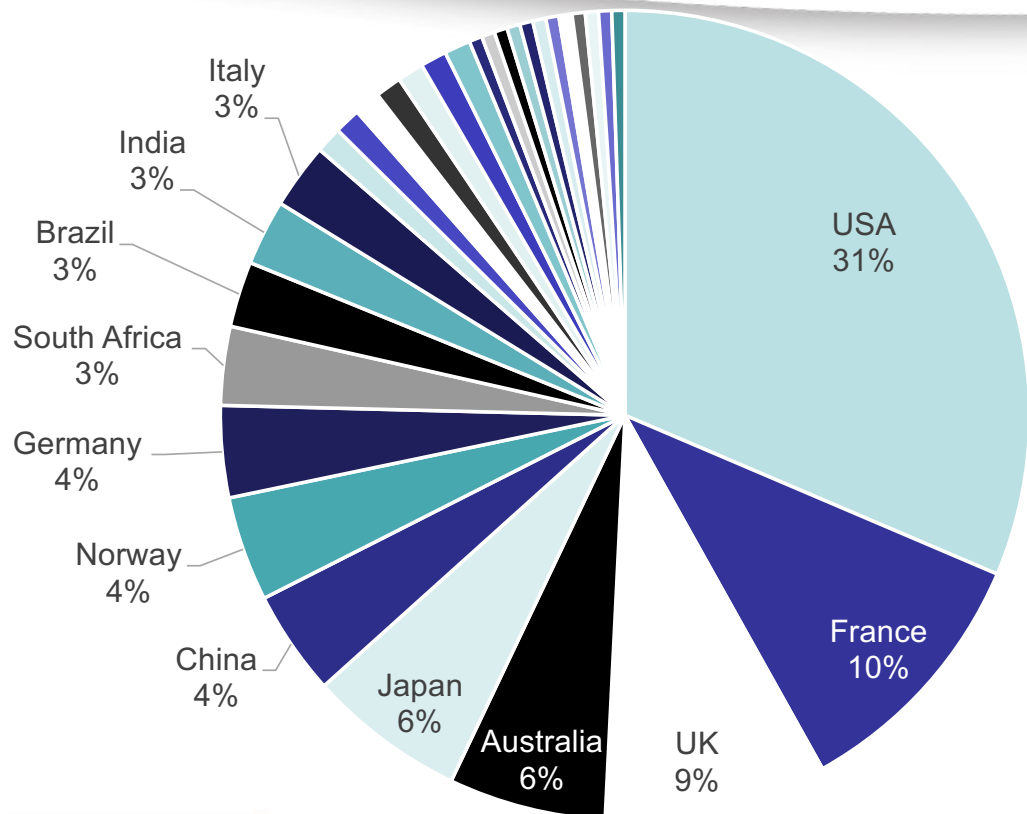
### Research Foci



- The **CLIVAR SSG** provides overall guidance for CLIVAR activities, in concert with WCRP objectives, and establishes **CLIVAR Panels and Working Groups** and their term of reference.
- **Research Foci** address urgent and actionable research challenges. RF have a limited life-time (3-5 yrs)
- The **Sea Level Grand Challenge** is cross-cutting between CLIVAR & WCRP, and includes modeling & observations

Regional sea-level change & coastal impacts

# Geographical distributions of CLIVAR Members



USA	60	Senegal	2
France	20	Spain	2
UK	17	Sweden	2
Australia	12	Belgium	1
Japan	12	Cameroonian	1
China	8	Denmark	1
Norway	8	Finland	1
Germany	7	Indonesia	1
South Africa	6	Israel	1
Brazil	5	Korea	1
India	5	New Zealand	1
Italy	5	Peru	1
Argentina	2	Russia	1
Canada	2	Netherlands	1
Chile	2	Uruguay	1
ROK	2		
			<b>Total 191</b>

# CLIVAR Science Plan 2019-2028

## Identified scientific priorities

- **Mechanisms** of climate variability and change that require further investigation with the ultimate goal of better constraining the fluxes of energy and carbon in the climate system
- Ocean **processes** that modulate climate variability and change for which open questions remain
- Climate **predictability** challenges that exist over a broad range of space and time scales

## Where we are going: CLIVAR Future

Overarching goal: ***Building a society resilient to environmental changes***

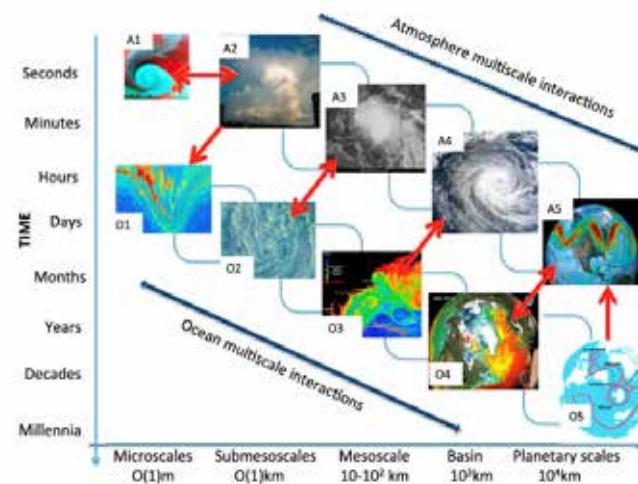
What is needed (I):

- Expanding on a climate risk concept (**uncertainty**)
- Providing **regional climate information and seamless predictions across timescales**
- Understanding mechanisms and consequences of climate variability and change, globally and **regionally**

# Where we are going: CLIVAR Future

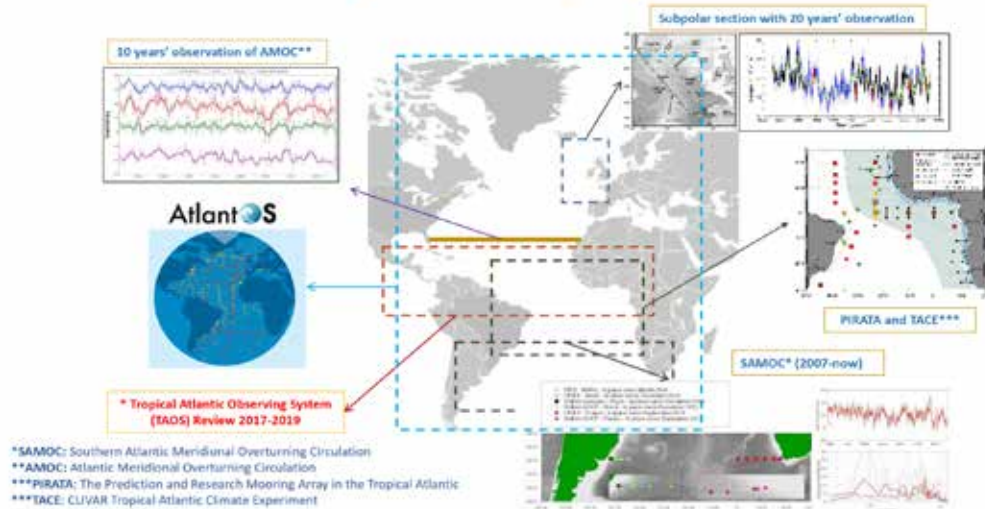
What is needed (II):

- Establishing a **multi-scale approach** in space and time to climate science, and to mitigation/adaptation
- Increasing awareness: what is settled, what is not yet understood, and why we **NEED** fundamental climate science after COP21

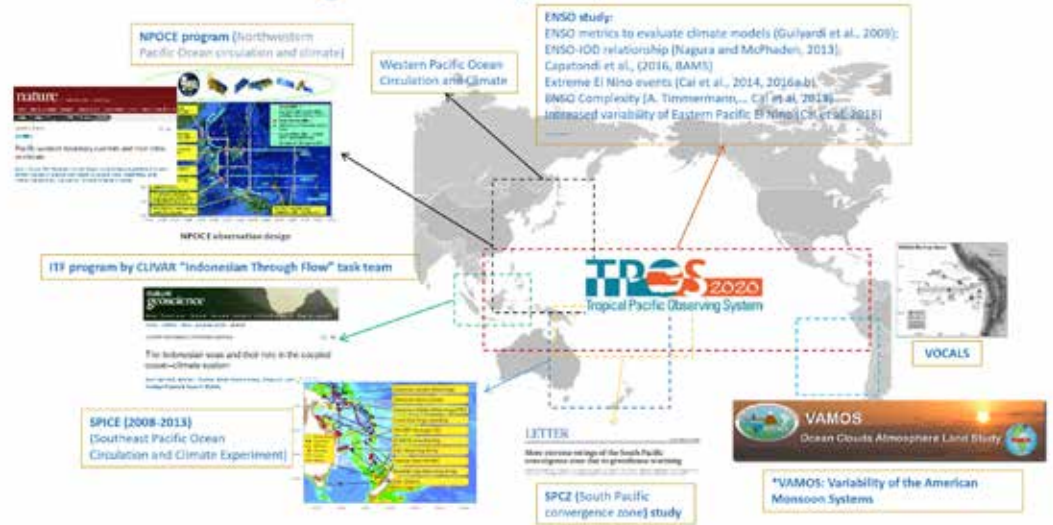


Stammer, Bracco, Braconnot, Brasseur, Griffies, & Hawkins, E. (2018). Earth's Future, 6. <https://doi.org/10.1029/2018EF000979>

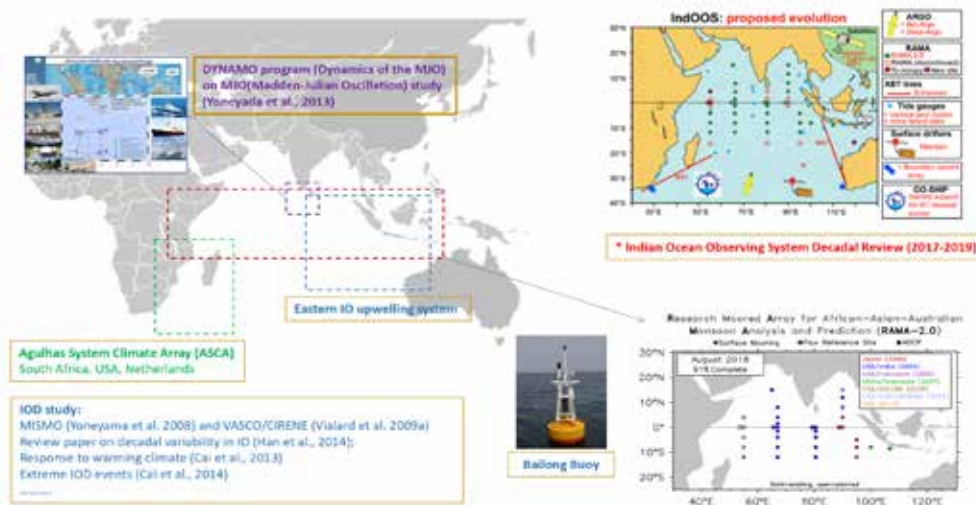
## CLIVAR Atlantic Region Panel (ARP)



## CLIVAR Pacific Region Panel (PRP)



## CLIVAR/IOC-GOOS Indian Ocean Panel (IORP)



## CLIVAR/CIIC Northern Oceans Region Panel (NORP)

1. Developing new tools and methods to observe the Arctic Ocean and neighbouring seas and their climate impacts: further design of buoy and radiosonde in the Arctic (**MOSAIC**).



2. Standardizing and archiving observations of the Arctic Ocean and the coupling with other components of the climate system.

## CLIVAR/CIIC/SCAR Southern Ocean Region Panel (SORP)



- ✓ Coordination with SOOS (national planning, ship planning, and data management)
- ✓ SORP national reports.

**Download the National reports on Activities in the Southern Ocean:**  
 2015: China  
 2016: Belgium, Brazil, Canada, China, France, Italy, Japan, New Zealand, Russia, South Africa  
 2017: Argentina, Belgium, Canada, China, France, Italy, Japan, New Zealand, Russia, South Africa



CLIVAR Endorsed Project





## New “Research Foci” (RF)

**“Tropical basin interaction” (TBI). To start in Spring 2020.**

Main goal: to elucidate the complex two-way interaction between the tropical basins and to quantify its role in climate prediction. Focus on seasonal to multi-annual variability and predictability

## Major activity planned for 2021: Workshop "Towards a sustainable Global Ocean Observing System

- (1) Discuss current **societal and scientific drivers** of regional observing systems.
- (2) Discuss challenges/outcomes of reviewing/designing regional observing systems for the next decade, including (i) transition to more **multidisciplinary observing systems**, (ii) need for regional-scale forecasting and expansion into the **coastal zone**, (iii) lobbying for **resources, capacity-building**, and developing partnerships, (iv) **data** archiving, and **sharing**.
- (3) Discuss how panels can best **contribute to the UN's International Decade of Ocean Science for Sustainable Development, 2021-2030**



## Major activities in Aug. 2018 - Aug. 2019

- IV International Conference on El Niño Southern Oscillation: ENSO in a warmer Climate, 16-18 October 2018. Guayaquil – Ecuador
- 2018 Pre-AGU Workshop on Greenland Freshwater Fluxes, 9 December, 2018, Washington DC, USA (co-hosted by CLIVAR OMDP, CLIVAR/CLIC NORP, ISMIP6)
- Stormtracks 2018 workshop: Alternative perspectives on storm tracks in a changing climate. Stockholm, Sweden. 27-31 August 2018. (CDP)
- Workshop on Sources and Sinks of Ocean Mesoscale Eddy Energy, and 5th Session of CLIVAR OMDP, 11-15 March 2019, Tallahassee, USA
- US CLIVAR/CLIVAR Joint Workshop on Atmospheric Convection and Air-Sea Interactions over the Tropical Oceans, 7-9 May 2019, Boulder, USA
- ICTP-CLIVAR Summer School on Oceanic Eastern Boundary Upwelling Systems, 15-19 July 2019, Trieste, Italy

## Planned activities for next 12 months

- CLIVAR PRP/PICES WG-40 Joint Meeting on Climate and Ecosystem Predictability, 19 October 2019, Victoria, Canada
- Workshop on WCRP Grand Challenge on Regional Sea Level Change and Coastal Impacts and Climate Service, 12-13 November, 2019, Orléans, France
- CLIVAR-FIO Summer School on Ocean Macroturbulence and Its Role in Earth's Climate, June 2020, Qingdao, China
- CLIVAR NORP Workshop on “Role of Freshwater in Polar Ocean Climate Change and Global Linkages”, USA, Spring, 2019 (Venue is pending)
- A one day joint SORP/SOOS side meeting alongside the SCAR OSC, Hobart, Tasmania, Australia, during 31 July to 11 August 2020
- Three SORP/NORP joint sessions on ‘Sea ice, ocean and climate connections in the Northern oceans and the Southern Ocean’ in the international glaciological society - sea ice symposium, Winnipeg, Canada, 19-23 August, 2019

# CLIVAR Input for WCRP core projects integrated activities

**Third Pole Environment (TPE):** Pacific Regional Panel, Indian Ocean Regional Panel, Climate Dynamics Panel

**ANDEX:** Pacific Regional Panel, Climate Dynamics Panel

**GREENLAND:** Atlantic Regional Panel, Northern Ocean Regional Panel, Climate Dynamics Panel, Ocean Model Development Panel

**Within the WCRP family, CLIVAR/OMDP would also encourage closer connection with WGSIP, to work on initialized predictions, both seasonal (up-to 1 or 2 years) as well as decadal. Another emerging area is liaison with S2S activities, which are also planning to start looking at the validation of subseasonal prediction of ocean variables**