

CLIVAR: CLIMATE & OCEAN

variability, predictability and change

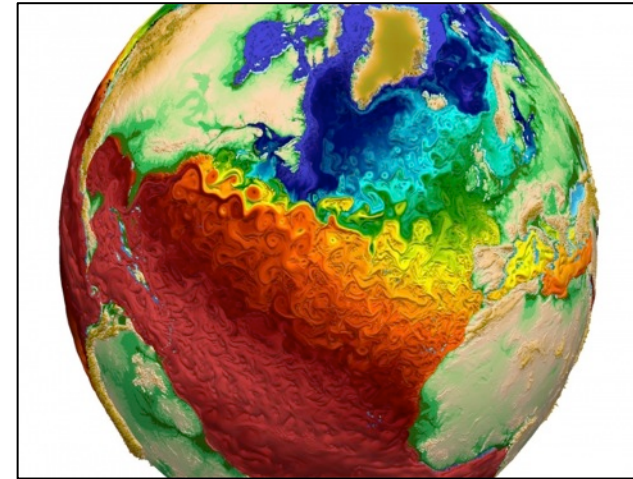
WCRP Core Project on the
Ocean-Atmosphere System

**Detlef Stammer (SSG co-chair;
jointly with Annalisa Bracco)**



CLIVAR: CLIMATE & OCEAN variability, predictability and change

- Describe and understand the dynamics of the coupled ocean-atmosphere system,
- Identify processes responsible for climate variability, change and predictability,
- through the collection and analysis of observations and the development and application of models of the coupled climate system.



Credit: Los Alamos National Laboratory



- This year CLIVAR has its 20 year anniversary.
- It was established **20 years ago** as one of the core-projects of the World Climate Research Programme, building on WOCE and TOGA,
- The CLIVAR legacy includes the
 - **implementation and development of major multinational observing networks** in all the ocean basins;
 - the development of **ocean-climate models, initialized decadal climate predictions**
 - the development of **ocean and climate re-analyses**, bridging observations and modeling through data assimilation.

CLIVAR Scientific Steering Group (SSG) past Co Chairs 1995-2015



Arnold Gordon
USA



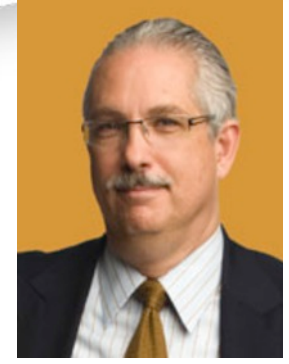
Allyn Clarke
Canada



Juergen Willebrand
Germany



Kevin Trenberth
USA



Tony Busalacchi
USA



Tim Palmer
UK



Jim Hurrell
USA



Martin Visbeck
Germany



Lisa Goddard
USA

New CLIVAR Science

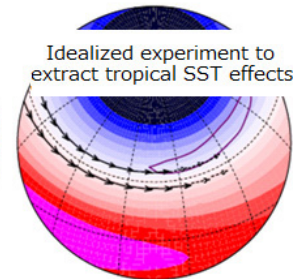
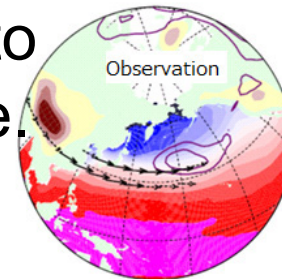
Motivating Science Questions:

- Which ocean and coupled climate processes are critical for global and regional climate variability?
- How predictable is the climate on different time and space scales?
- What are the ocean constraints on climate sensitivity, air-sea exchange and Earth's energy budget?
- What are the regional impacts of the changing climate: sea level, ocean heat content, cryosphere and water cycle?
- What is the ocean's role in CO₂ uptake?

New CLIVAR Science Plan will be released in 2016

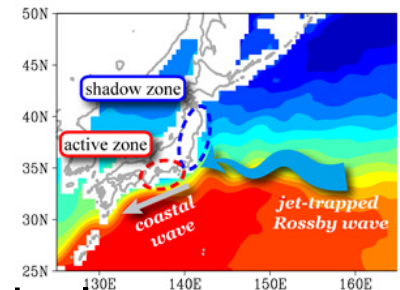
The role of the ocean in the climate system

- Climate dynamics provides the phenomenological understanding and context that can be used to characterize regional to hemispheric climate variability and change.



- To be studied:

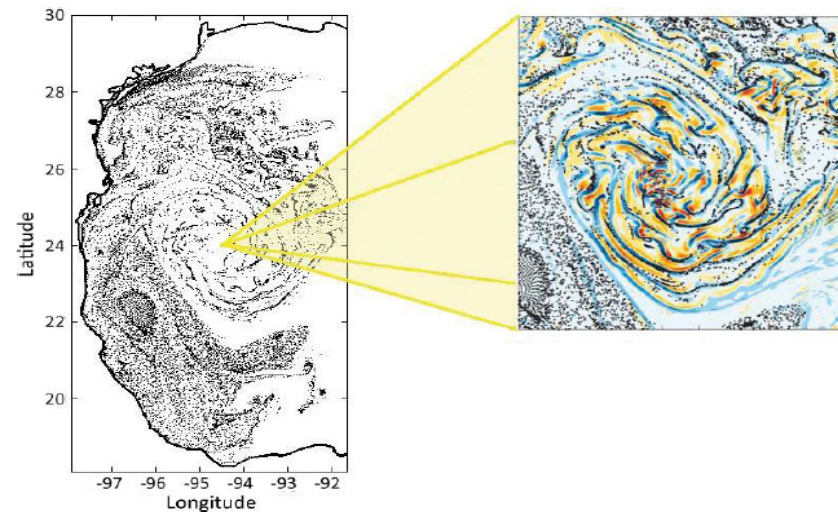
- Climate feedbacks and regional modes of coupled variability
- The ocean's role in climate variability at different timescales
- The ocean's role in carbon uptake and biogeochemical cycles



Source: Minobe

Critical Climate Processes

- Ocean and climate processes responsible for climate variability on seasonal, interannual, decadal, and centennial time scales
- Boundary currents, frontal structures, coastal processes and upwelling systems
- Ocean energetics, tides, meso-submesoscale eddies, waves, and mixing.



Climate predictability

- Intra-seasonal to Interannual Variability, Predictability and Prediction
- Decadal Variability, Predictability and Prediction (multi-decadal variability and detection/attribution of changes)
- Extreme Weather and Climate and Ocean Extremes



Science Plan Timeline

FEBRUARY 15 2016 writing assignments due

FEBRUARY 22 OSM CLIVAR Town Hall in New Orleans
(meeting of editorial team)

MARCH 15 First draft to SSG and Panel/RF Chairs for
comments (due April 15th)

APRIL 30- MAY 10, 2016 editorial team w/ ICPO creates
new draft

MAY 10, 2016 - new draft posted on CLIVAR website and
widely distributed (including WCRP, sister programmes) for
comment/input

Science Plan Timeline

MAY/JUNE, 2016 - further refinement of Plan

MID/END JULY, 2016 - new draft (ICPO w/ editorial team) prepared and published on CLIVAR website and advertised on CLIVAR OSC site

SEPTEMBER 2016- OSC - town hall for community input, comment

OCT/NOV- revisions to Plan based on OSC, produce camera-ready copy

DECEMBER 2016 - "final" Plan published

Enabling Capabilities

International cooperation is critical to grow the infrastructure that underpins all CLIVAR science:

- Climate and Ocean Process and Sustained Observations
- Global, Regionally Enhanced and Process Models
- Ocean Data, Synthesis and Assessment
- Capacity Development and Knowledge Exchange

How CLIVAR works

CLIVAR is implemented through Panels that serve the needs of the international CLIVAR community.

Regional ocean basin Panels:

- + Atlantic,
- + Pacific,
- + Indian and
- + Southern Ocean

- **Four global Panels:**

- + Ocean Model Development Panel,
- + Global Synthesis and Observations Panel,
- + Climate Dynamics Panel, and
- + **CLIVAR-GEWEX Monsoons Panel.**

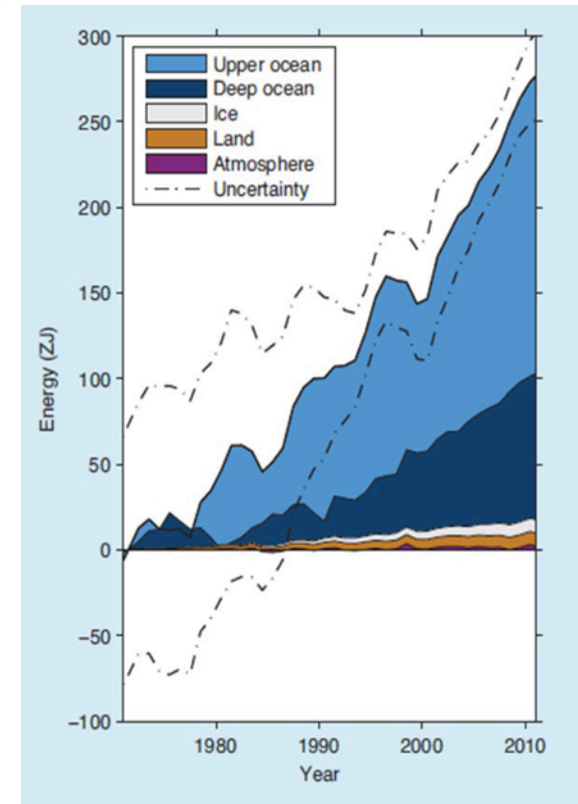
Research Foci

Research Foci (RF): launched in 2015, focused limited-lifetime initiatives on topics of high priority in the climate research community, that would benefit from enhanced international coordination.

- Decadal Climate Variability & Predictability
- **Planetary Heat Balance & Ocean Heat Storage (with GEWEX)**
- ENSO in a Changing Climate
- Eastern Boundary Current Systems
- Regional Sea Level Change & Coastal Impacts

Ocean role in warming climate

- Ocean constraints on climate sensitivity, air-sea exchange and Earth's energy budget
- Regional impacts of the changing climate: sea level, ocean heat content, cryosphere and water cycle
- The changing ocean's role in CO₂ uptake



CLIVAR Open Science Conference



“Charting the course for climate and ocean research”

18-25 September 2016, Qingdao, China

<http://www.clivar2016.org/>



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Programme Overview



September 2016

17th -18th, 24th : **CLIVAR Panel Meetings**

18th, 24th-25th : **Early Career Scientists Symposium**


19th-23rd : **Open Science Conference**

24th, 25th : **CLIVAR SSG Meeting**

Sep 19th: OSC (in QNLM)

CLIVAR 2016 Main Open Science Conference		
Monday , Sep 19th		
AM	7:30 Registration & 9:00 Transport to QNLM	Shuttle bus from hotel to QNLM
	10:00 Opening Session	Speech from Mayor of Qingdao,
	11:00 Photo and Coffee/tea break	provided by QNLM
	11:30 Keynote 1	Speaker: <i>Thomas Stocker</i>
	12:15 Lunch	in QNLM cafeteria
PM	14:00 Plenary Session 1-Ocean Role in Climate	Speakers and topics: Monika Rhein: Energy Laurent Bopp: Carbon Ray Schmitt: Water
	15:30 Coffee/tea	provided by QNLM
	16:00 Parallel 1.1- Energy	<i>Chairs: Karina von Schuckman, Jonathan Gregory</i>
	16:00 Parallel 1.2 - Carbon	<i>Chairs: Pedro Monteiro, Curtis Deutsch</i>
	16:00 Parallel 1.3 - Water	<i>Chairs: Paul Durak, Sonia Seneviratne</i>
	17:30 Transport to hotel	Shuttle bus from QNLM to hotel
Evening	19:00-21:00 Icebreaker Reception	in Hyatt

CLIVAR 2016 Main Open Science Conference (20-23 Sep, 2016)

	DAY 2	DAY 3	DAY 4	DAY 5
	Tuesday 20-Sep	Wednesday 21-Sept	Thursday 22-Sept	Friday 23-Sept
AM	9:00 Plenary Session 2	9:00 Plenary Session 3	9:00 Plenary Session 4	9:00 Plenary Session 5
	Climate Variability and Predictability <i>Harry Hendon: Intraseasonal to Interannual</i> <i>Rowan Sutton: Decadal</i> <i>Kim Cobb: Centennial to Millennial</i>	Understanding Ocean and Climate Processes <i>Raffaele Ferrari: Mixing and Stirring</i> <i>John Marshall: Ocean and Climate Dynamics</i> <i>Weidong Yu: Upwelling and Frontal Zones</i>	The Ocean in a Warmer World <i>Clara Deser: Climate Modes</i> <i>Anny Cazenave: Sea Level</i> <i>Fan Wang: Boundary Currents</i>	Climate Information and Sustainable Development <i>Chair: Martin Visbeck</i> <i>Keynotes: Jane Lubchenco</i> <i>Corinne Le Quere</i> <i>Arame Tall</i>
	10:30 Coffee/tea break	10:30 Coffee/tea break	10:30 Coffee/tea break	10:30 Coffee/tea break
	11:00 Poster Session 1	11:00 Poster Session 3	11:00 Poster Session 5	11:00 Plenary Session 6- Future of Climate and Ocean Science <i>Chair: Annalisa Bracco</i> <i>Keynotes: Valerie Masson- Delmotte,</i> <i>Matt Collins, Nicolas Gruber</i>
	12:00 Lunch	12:00 Lunch	12:00 Lunch	12:30-13:00 Closing Ceremony
	PM	14:00 Parallel 2.1 - Intraseasonal to Interannual <i>Chairs: Aida Diongue, Rodney G. Martinez</i>	14:00 Parallel 3.1- Mixing& Stirring <i>Chairs: Marina Levy, Baylor Fox Kemper</i>	14:00 Parallel 4.1 – Modes <i>Chairs: Krishna AchutaRao, Eric Guilyardi</i>
14:00 Parallel 2.2 – Decadal <i>Chairs: Paco Doblaz Reyes, Yochanan Kushnir</i>		14:00 Parallel 3.2 - Ocean and Climate Dynamics <i>Chairs: Shoshiro Minobe, Matthew England</i>	14:00 Parallel 4.2 - Sea Level <i>Chairs: Aimee Slangen, Benoit Meysignac</i>	
14:00 Parallel 2.3 – Centennial <i>Chairs: Pascale Braconnot, Axel Timmermann</i>		14:00 Parallel 3.3 – Upwelling <i>Chairs: Enrique Curchitser, Mauricio Mata</i>	14:00 Parallel 4.3 - Boundary Current Systems <i>Chairs: Sabrina Speich, Toshio Suga</i>	
15:30 Coffee/tea		15:30 Coffee/tea	15:30 Coffee/tea	
16:00 Poster Session 2		16:00 Poster Session 4	16:00 Poster Session 6	SSG and Panel /RF meetings (Fri, Sat and Sun)
17:00-17:40 Keynote 2 <i>Magdalena Balmaseda</i>		17:00-17:40 Keynote 3 <i>Jennifer MacKinnon</i>	17:00-17:40 Keynote 4 <i>Wenju Cai</i>	
19:30-20:30 Or 18:00-19:00 Townhalls 1,2,3	19:30-20:30 Or 18:00-19:00 Townhalls 1,2,3	19:00-21:00 Banquet		

Early Career Scientist Symposium (ECSS)

The Early Career Scientists Symposium (ECSS) is a 3-day programme designed by, and for, early career scientists.

A unique opportunity for young scientists to interact and exchange ideas with their peers and senior scientists.

The ECSS will include career development workshops, while building lasting relationships and collaborations with colleagues from different countries.

	CLIVAR2016 Early Career Scientist Symposium	CLIVAR2016 Early Career Scientist Symposium	CLIVAR2016 Early Career Scientist Symposium
AM	DAY 1	DAY 2	DAY 3
	Sunday	Saturday	Sunday
	18-Sep	24-Sep	25-Sep
	FIO Registration	FIO	FIO
	Opening session	Plenary session: International Climate Projects	Workshop: Effective science communication
	Introduction to the OSC		
	Coffee/tea break	Coffee/tea break	Coffee/tea break
	Meet-and-greet session, Poster discussions	Plenary session: "Current Hot Research Topics in Climate Science"	Workshop: Editorial tips and training
Lunch	Lunch	Closure	
PM	Panel discussion: "Bridging the Gap: Cultural Differences in Critical Science Themes"	Interactive workshop: The future of climate science Workshop presentations and panel discussion	
	Coffee/tea	Coffee/tea	
	Informal panel discussions: interactive discussion with senior scientists	Workshop presentations and panel discussion	
Evening			



CLIVAR OSC TIMELINE - 2016



Abstract Submission Open

- ✓ Abstract and poster cluster submission
- ✓ Funding requests
- ✓ Early Career Scientists Symposium (ECSS) application



Submission Close

Funding selection notification



CLIVAR Conference

- ✓ 17th -18th : CLIVAR Panel meetings
- ✓ 18th, 24th-25th: ECSS
- ✓ 19th-23rd: Open Science Conference



GEWEX-CLIVAR Discussion

Key Linkages:

➤ Joint Monsoon Panel

- joint governance and membership (links to GLASS and GHP)
- Enhanced GEWEX-CLIVAR collaboration in RHPs

➤ Decadal Climate Variability RF:

➤ Climate Dynamics Panel

Large-scale phenomena, processes, and mechanisms of coupled climate variability/modes, teleconnections and change on seasonal to centennial time-scales.

- (i) storm tracks, jet streams and weather systems,
- (ii) processes for mid-latitude air-sea interaction and
- (iii) modes of climate variability and their relevance fo regional climate change

➤ Surface Fluxes

Constraining the global and regional ocean heat balances.

➤ Sea Level: Conference in NY, July 2017

GEWEX-CLIVAR Discussion

Water Cycle and Water Availability:

- Conference in Hamburg (Oct. 2015) underpins the ocean as being a very important element in the global water cycle.
- Calls for joint CLIVAR/GEWEX effort wrs water cycle.
- GC on water availability should have strong links to CLIVAR.

GEWEX-CLIVAR Discussion

Surface Fluxes: constraining the global and regional **ocean heat and freshwater balances**.

- GEWEX representatives in CLIVAR RF on Consistency between planetary heat balance and ocean heat storage.
- Creation of an inventory, classification and discrimination of existing products (eg via a joint website)
- determination of accuracy of state variables from in situ measurements, satellites and NWP
- new or improved parameterizations (synergy of turbulence closure and radiative transfer)
- development of space-time scaling of fluxes over ocean and land
- improved ocean precipitation estimates
- towards new globally-balanced atmospheric states for ocean GCM climate simulations (eg OMDP Coordinated Ocean-ice Reference Experiments, guidance on GDAP integrated products for forcing and validating ocean climate models).

GEWEX-CLIVAR Discussion

Any other follow ups from the The Hague meeting?

Joint CLIVAR-GEWEX SSG in DC early 2017?