

# GEWEX – CLIVAR

And Links to Others

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# WCRP Mission

- The World Climate Research Programme (WCRP) is the premier, world-wide organisation established to improve the understanding of climate and its prediction
- Goal: to facilitate analysis and prediction of Earth system variability & change for use in an increasing range of practical applications of direct relevance, benefit and value to society

# GEWEX Mission

To reproduce and predict, by means of suitable models, the variations of the global hydrological regime, its impact on atmospheric and surface dynamics, and variations in regional hydrological processes and water resources and their response to changes in the environment, such as the increase in greenhouse gases.

GEWEX will provide an order of magnitude improvement in the ability to model global precipitation and evaporation, as well as accurate assessment of the sensitivity of atmospheric radiation and clouds to climate change.

# CLIVAR Mission

- To observe, simulate and predict Earth's climate system, with focus on ocean-atmosphere interactions, enabling better understanding of climate variability, predictability and change, to the benefit of society and the environment in which we live.

**Science <-> Applications**

# SCOPE

- Have a tool to know who is doing what, how, where and with whom
- Hence give SSG, Panel Chairs better overview on the interfacing with others (WCRP, programs and organisations)
- Requires active input
- Embed in reporting to SSG

# Why (show links)?

- WCRP Strategy
- Truly global water and energy cycle descriptions: hence not only GEWEX-CLIVAR but they should be in the drivers seat
- Make our inputs to others explicit (rather than implicit) -> Easier to broadcast the “message” to e.g. policymakers, funders

# Starting Point

## ➤ CLIVAR:

- What are the key variables/observables that link CLIVAR and GEWEX?
- Where do you see potential for new and/or enhanced joint activities with GEWEX?

## ➤ GEWEX:

- Posed same questions

# What are the key variables/observables that link CLIVAR and GEWEX

- Surface fluxes
- Boundary layer fluxes
- Precipitation
- Large-scale water and energy transports
- Soil moisture, snow, vegetation
- Clouds and radiation
- Convection
- SST
- SSS
- Sea Ice
- Runoff

# Where do you see potential for new and/or enhanced joint activities with GEWEX? I

- Prediction of drought from years to days with horizontal scales from continental to local is a great unifier.
- North America is a potential case study with its recent/ongoing drought
- prediction of a corresponding wet period from years to days with horizontal scales from continental to local
- Simulation and prediction of the global diurnal cycle over the ocean, land
- And in the deep ocean and soil layers as well as in the atmospheric boundary layer and troposphere
- Community comparisons of model simulations - global, regional, cloud resolving - of key CLIVAR/GEWEX variables
- Key joint activities would be investigation of the causes of variations of the ocean surface fluxes and transports and the heat content (the storage term on weather time scales) and development of better methods for evaluating global coupled models using these observations and the results of this joint analysis.
- Another joint analysis would be to combine the two viewpoints, atmosphere-land (GEWEX) and ocean (CLIVAR), in a diagnosis of the amount of freshwater input from the land using all the datasets and model experiments used to infer this. Tropical sub-seasonal variations (MJO) and the monsoons more than likely involve an aspect of atmosphere-ocean coupling and an aspect of cloud-radiation-precipitation feedback; a truly joint analysis that brings together the GEWEX data products with the CLIVAR models is ripe for exploitation now.

# Where do you see potential for new and/or enhanced joint activities with GEWEX? II

- The analysis of the global energy and water cycle (largely thought of as an atmospheric cycle but involving surface fluxes) needs to combine GEWEX and CLIVAR resources
- Ocean flux data for completing the global energy and water balance
- Understanding of how the large scale circulation modulates the monsoon circulations
- Joint GEWEX/CLIVAR studies of the atmospheric processes that lead to extremes
- Land data assimilation
- Fluxes from satellite data
- Interactive dynamic vegetation models for inclusion in climate models
- Ocean site data for CEOP archives and monsoon studies
- Studies of land use change and their influence on climate trends
- Orographic effects on precipitation
- A testbed for new parameterizations of land surface and cloud processes

# What to Expect from IGPO?

- We will keep asking for updates on interactions
- Embed reporting on Linkages with others in e.g. Reports to SSG (part of the report templates)
- Open to any suggestions on How to retrieve this information
  - Limit the amount of administration

**Thank You**

The image features a solid blue background. In the center, the words "Thank You" are written in a large, bold, sans-serif font with a vertical gradient from orange to yellow. Behind the text is a large, faint, semi-transparent graphic of a hand holding a pen, pointing upwards and to the right. At the bottom of the image, there are several concentric circles of varying sizes, resembling ripples in water, rendered in a lighter shade of blue.

# Project Office

## Present areas:

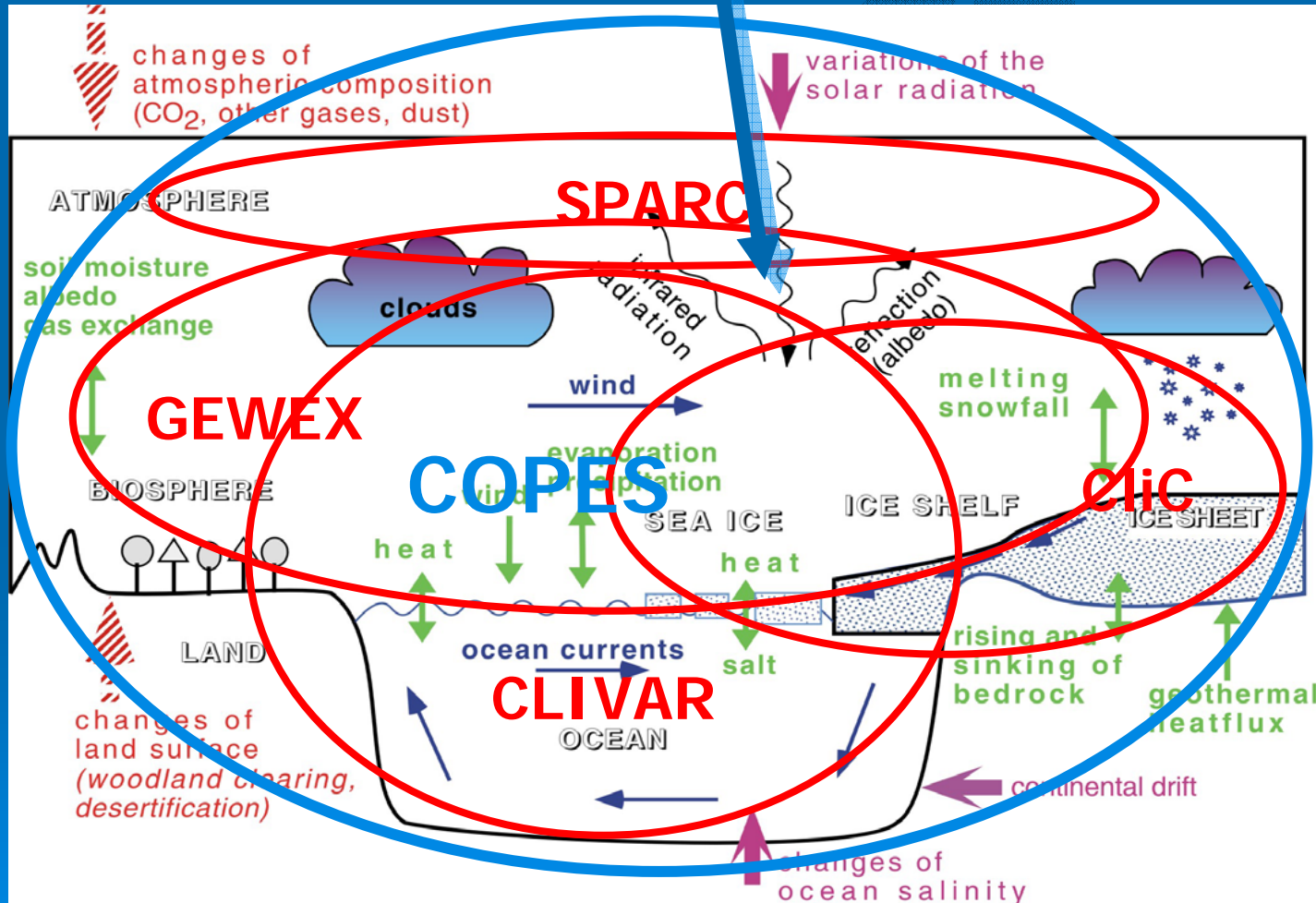
- Ocean flux data for completing the global energy and water balance
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- Joint GEWEX/CLIVAR studies of the atmospheric processes that lead to extremes
- Land data assimilation
- Fluxes from satellite data

## Future areas of study:

- Interactive dynamic vegetation models for inclusion in climate models
- Ocean site data for CEOP archives and monsoon studies
- Studies of land use change and their influence on climate trends
- Orographic effects on precipitation
- A testbed for new parameterizations of land surface and cloud processes

# Coordinated Observation and Prediction of the Earth System (2005-2015)

## COPES



# GHP

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## Where do you see potential for new and/or enhanced joint activities with GEWEX?

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# GRP

## Key variables/observables?

- Taking CLIVAR in terms of its own description (focused on oceans and model-based seasonal to century prediction), the key connection to our activities is the evaluations of ocean surface properties (SST, SSS), including sea ice (really CLIC), and determinations of the variations of the surface fluxes, transports and upper ocean content of heat and salt (freshwater). The CLIVAR community has a pretty good handle on SST (the first truly global surveys of SSS will come from SMOS and AQUARIUS) and on the transports and contents (based largely on in situ, especially ARGO and buoy arrays, but now incorporating satellite altimeter/scatterometer results). GEWEX has a good handle on the surface fluxes of heat, water and momentum (microwave/scatterometers, precipitation and radiation from many satellites) that constrain the latter two. Another key common variable is runoff or freshwater supply from land to water; this is especially important in the Arctic including its effects on sea ice formation (again CLIC). A key point is that the GEWEX analysis of observations has been driving towards resolving all important scales of variability from diurnal to decadal, particularly those characterizing atmospheric circulations, whereas ocean analyses have focused on somewhat longer to decadal scales more typical of the ocean circulation.

## Contributions of GRP activities to stated CLIVAR goals:

- (1) understand processes responsible for climate variability and extend range of predictions = the surface fluxes, precipitation and radiation... ie, the energy and water exchanges between the ocean and atmosphere, all contribute directly to these goals.
- (2) extend the record of climate variability = the GRP's effort to complete the observation-based description of the global energy and water cycle variations over the past two decades is a direct contribution.
- (3) understand, predict and detect anthropogenic effects = survey of aerosols and quantification of their effects as well as cloud feedbacks on the radiation budget are direct contributions.

## Potential joint activities?

- Key joint activities would be investigation of the causes of variations of the ocean surface fluxes and transports and the heat content (the storage term on weather time scales) and development of better methods for evaluating global coupled models using these observations and the results of this joint analysis. Another joint analysis would be to combine the two viewpoints, atmosphere-land (GEWEX) and ocean (CLIVAR), in a diagnosis of the amount of freshwater input from the land using all the datasets and model experiments used to infer this. Tropical subseasonal variations (MJO) and the monsoons more than likely involve an aspect of atmosphere-ocean coupling and an aspect of cloud-radiation-precipitation feedback; a truly joint analysis that brings together the GEWEX data products with the CLIVAR models is ripe for exploitation now. The analysis of the global energy and water cycle (largely thought of as an atmospheric cycle but involving surface fluxes) needs to combine GEWEX and CLIVAR resources.