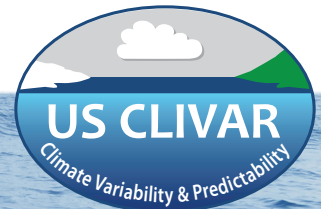


# US CLIVAR Overview

Mike Patterson  
Project Office Director



# U.S. CLIVAR

Interagency Group

Scientific Steering  
Committee

Project Office

# Interagency Group

Comprised of US funding agency program managers who meet regularly to coordinate implementation of research activities in support of US CLIVAR goals.



NASA Physical Oceanography (Eric Lindstrom)  
NASA Modeling, Analysis & Prediction Program (David Considine)



NOAA Climate Variability & Predictability (Sandy Lucas, Jim Todd)  
NOAA Modeling, Analysis, Pred. & Proj. (Annarita Mariotti, Dan Barrie)  
NOAA Climate Observations (David Legler)



NSF Physical Oceanography (Eric Itsweire)  
NSF Climate & Atmospheric Dynamics (Eric DeWeaver, Anjuli Bamzai)



DOE Global & Regional Modeling (Renu Joseph)  
DOE Earth System Modeling (Dorothy Koch)



ONR Physical Oceanography (Scott Harper)  
ONR Earth System Prediction Capability (Daniel Eleuterio)

# Scientific Steering Committee (SSC)

Provides overall scientific and programmatic guidance to ensure that US CLIVAR progresses toward achieving its science goals.

- Establishes Science Plans
- Develops and updates implementation strategy to prioritize and sequence activities
- Comments on agency implementation
- Identifies scientific gaps and promotes balance
- Coordinates with international CLIVAR and other USGCRP elements
- Provides oversight and guidance to working groups and science teams
- Oversees the US CLIVAR Project Office

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Members include chair + 2 co-chairs (appointed by IAG) and the co-chairs of 3 Panels.

Bob Weller, Chair  
Arun Kumar, Co-chair  
Janet Sprintall, Co-chair  
Bruce Anderson, PPAI Panel  
Tom Farrar, PSMI Panel

Gregg Garfin, PPAI Panel  
Gad Levy, PSMI Panel  
Dimitris Menemenlis, POS Panel  
Yan Xue, POS Panel

# Project Office

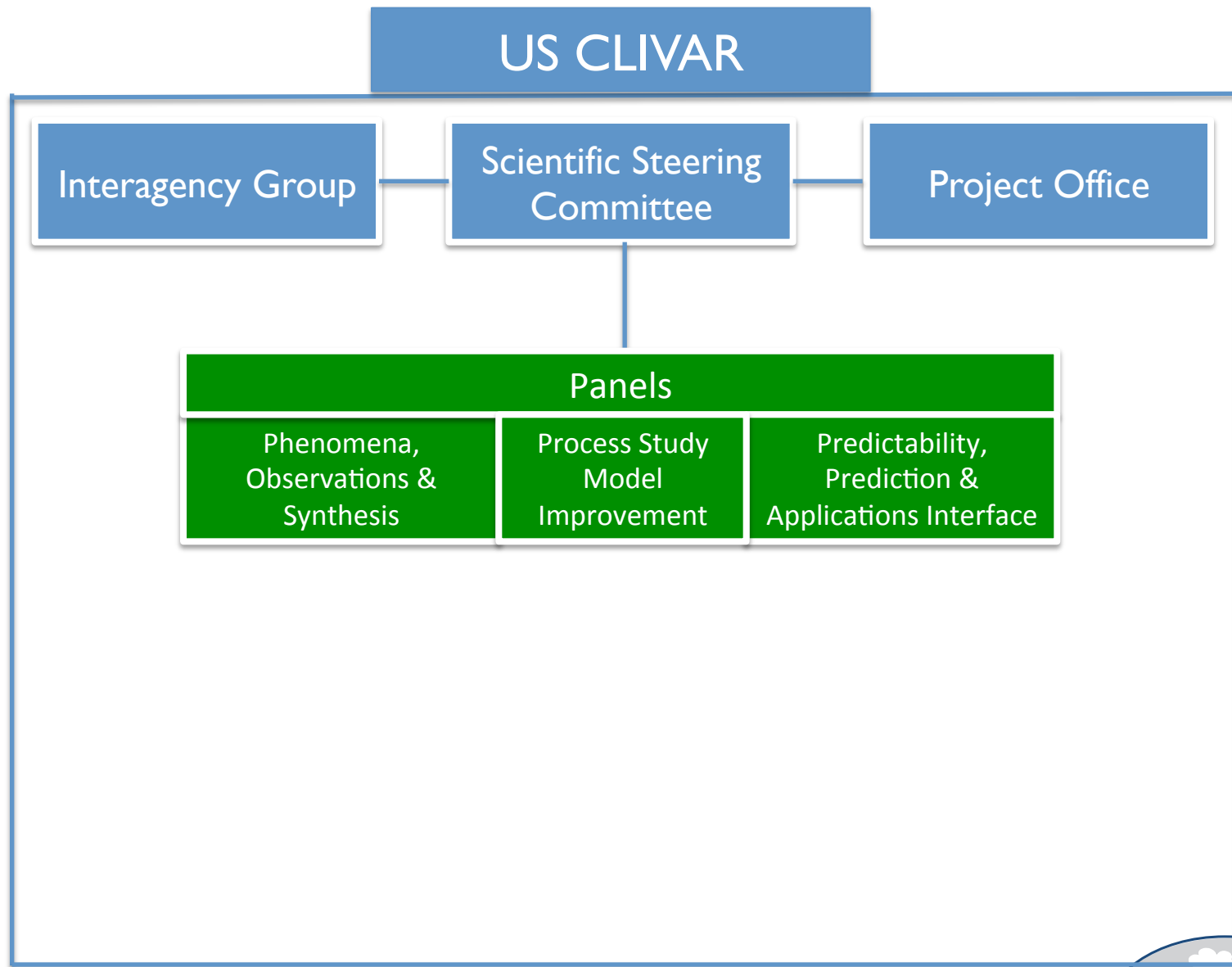
Responsible for ensuring all scientific and programmatic coordination is completed as guided by the U.S. CLIVAR SSC and supported by IAG

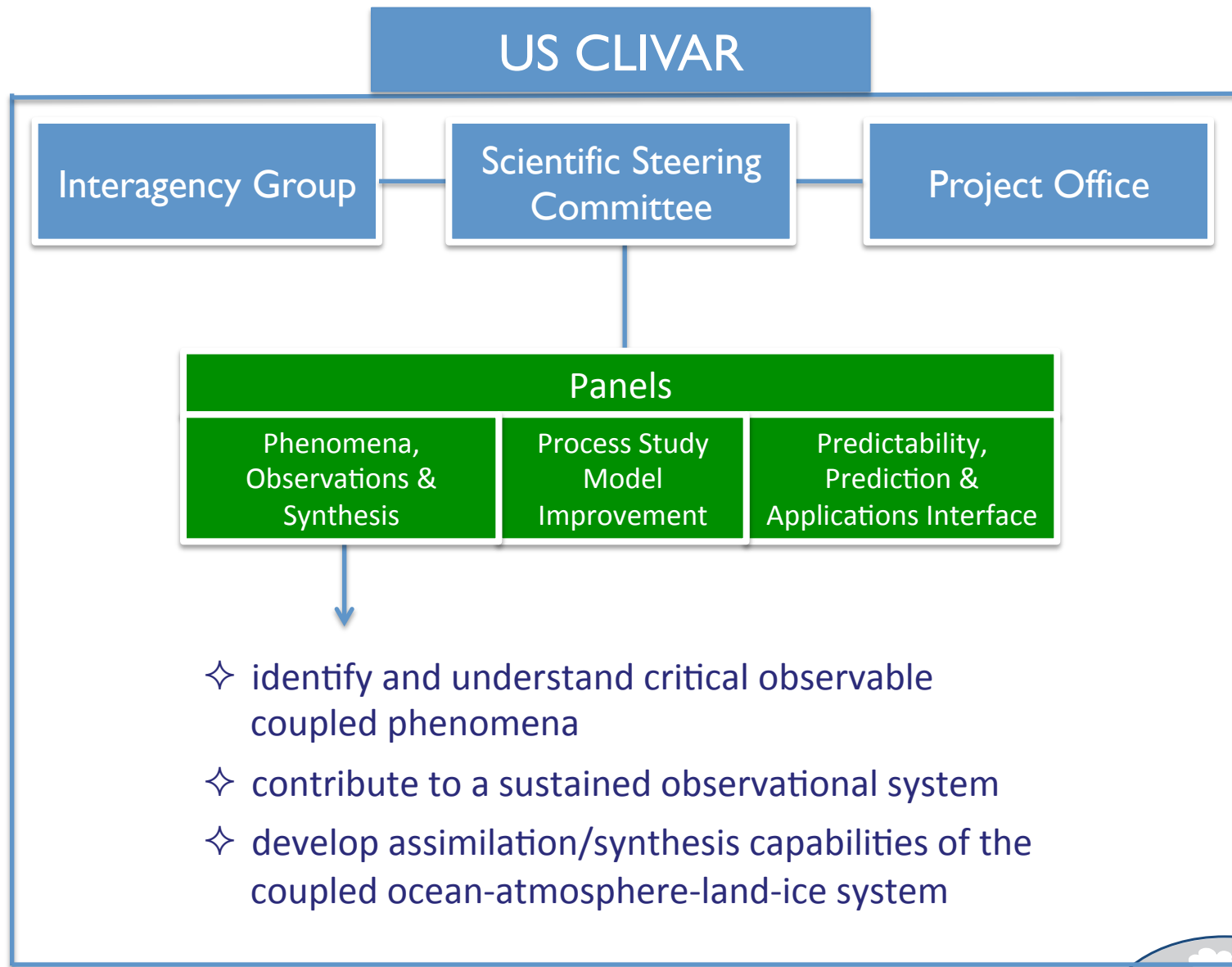
- Manage science planning
- Arrange and support meetings of IAG, SSC, Panels, WGs, Teams
- Organize summits, workshops, colloquia, meetings, briefings
- Establish new and support existing WGs and Science Teams
- Support travel and reporting of US members of International CLIVAR Panels
- Promote communication through website, reports, newsletters, news-grams
- Liaise with other programs (e.g., OCB, US GEWEX, IARPC/SEARCH, USGCRP)

Funded by NASA, NOAA, NSF, and DOE through annual award to UCAR

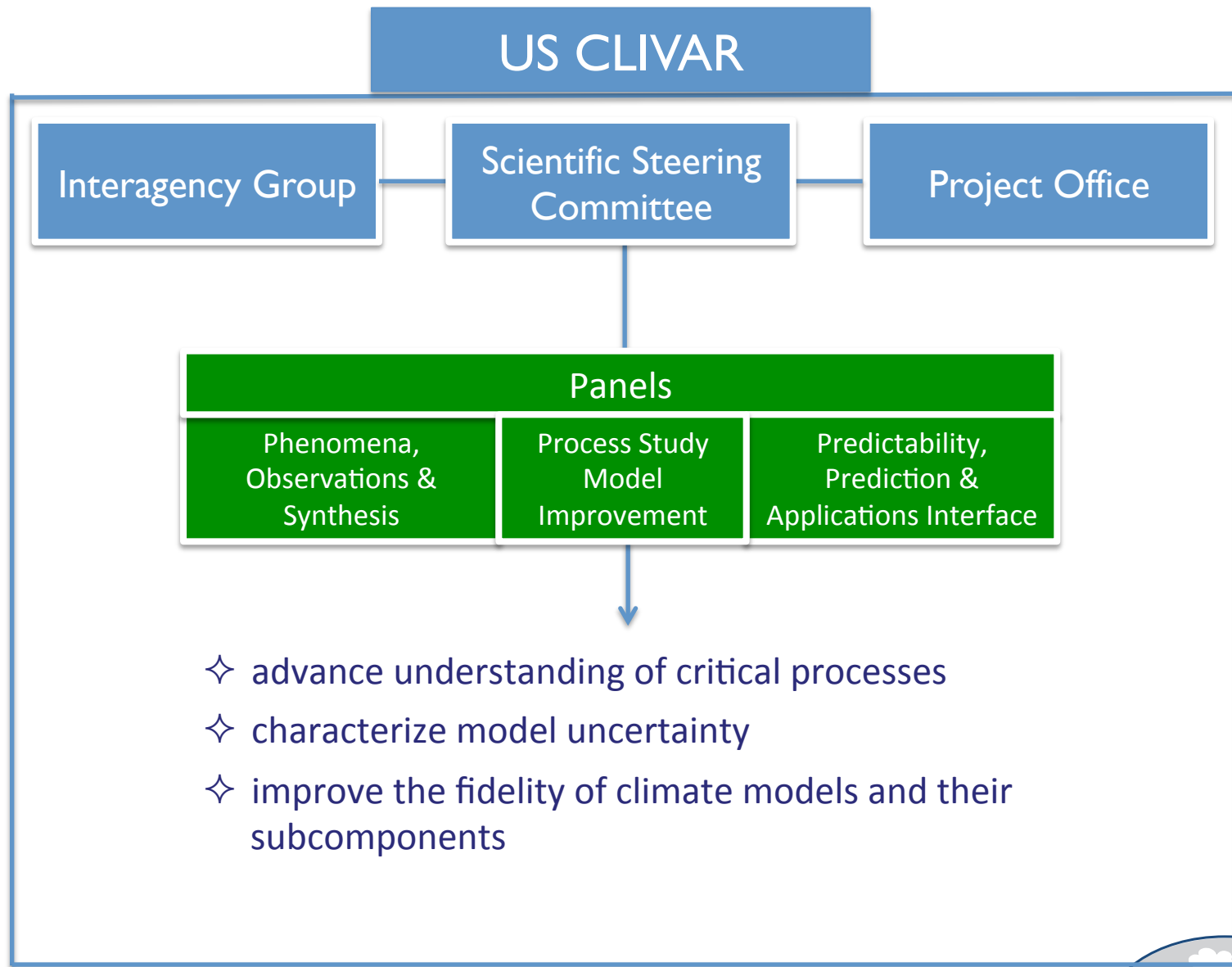
Staffed by Mike Patterson & Kristan Uhlenbrock in DC;  
Jill Reisdorf (Project Coordination) and Tania Sizer (Web Developer) in  
Boulder

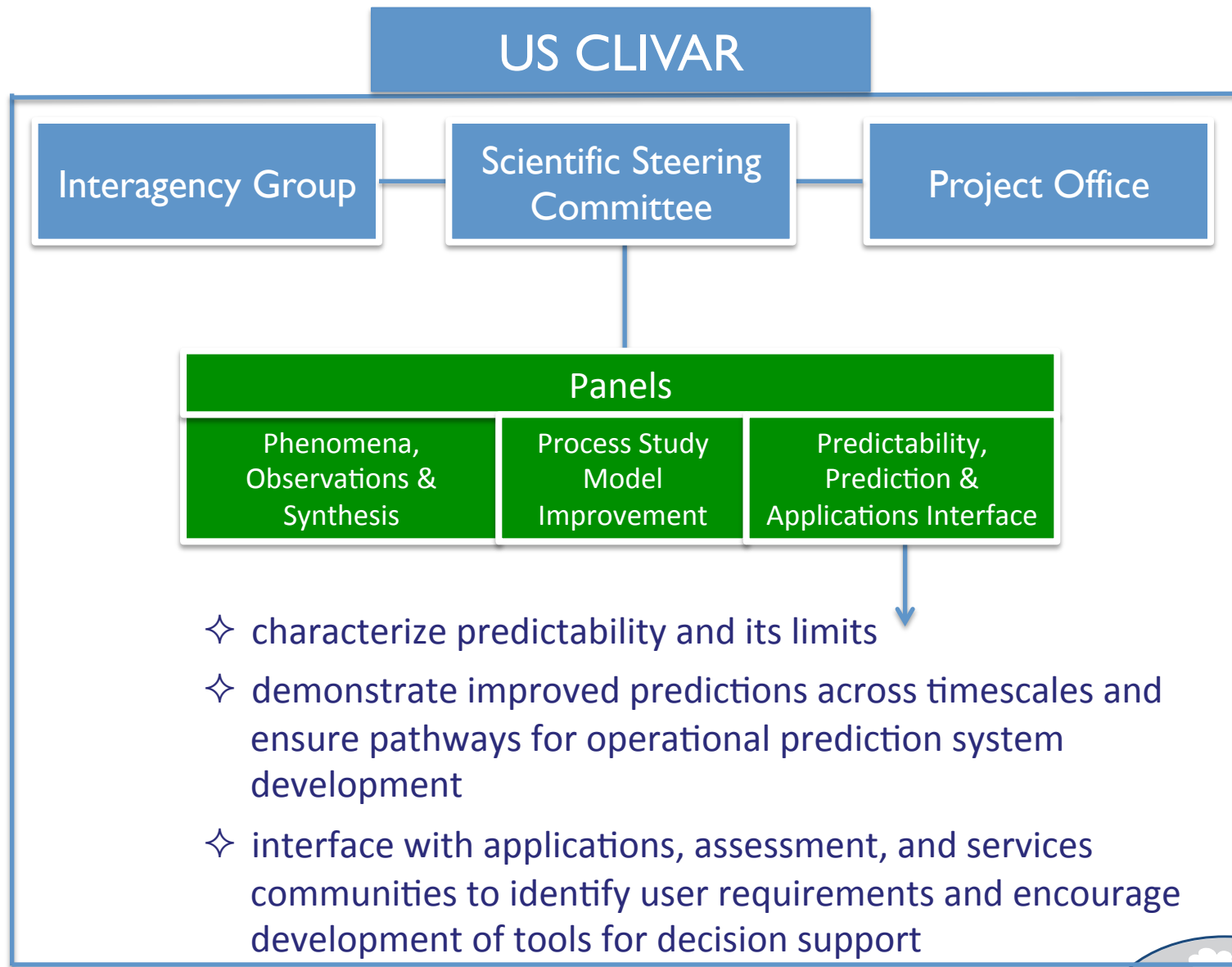


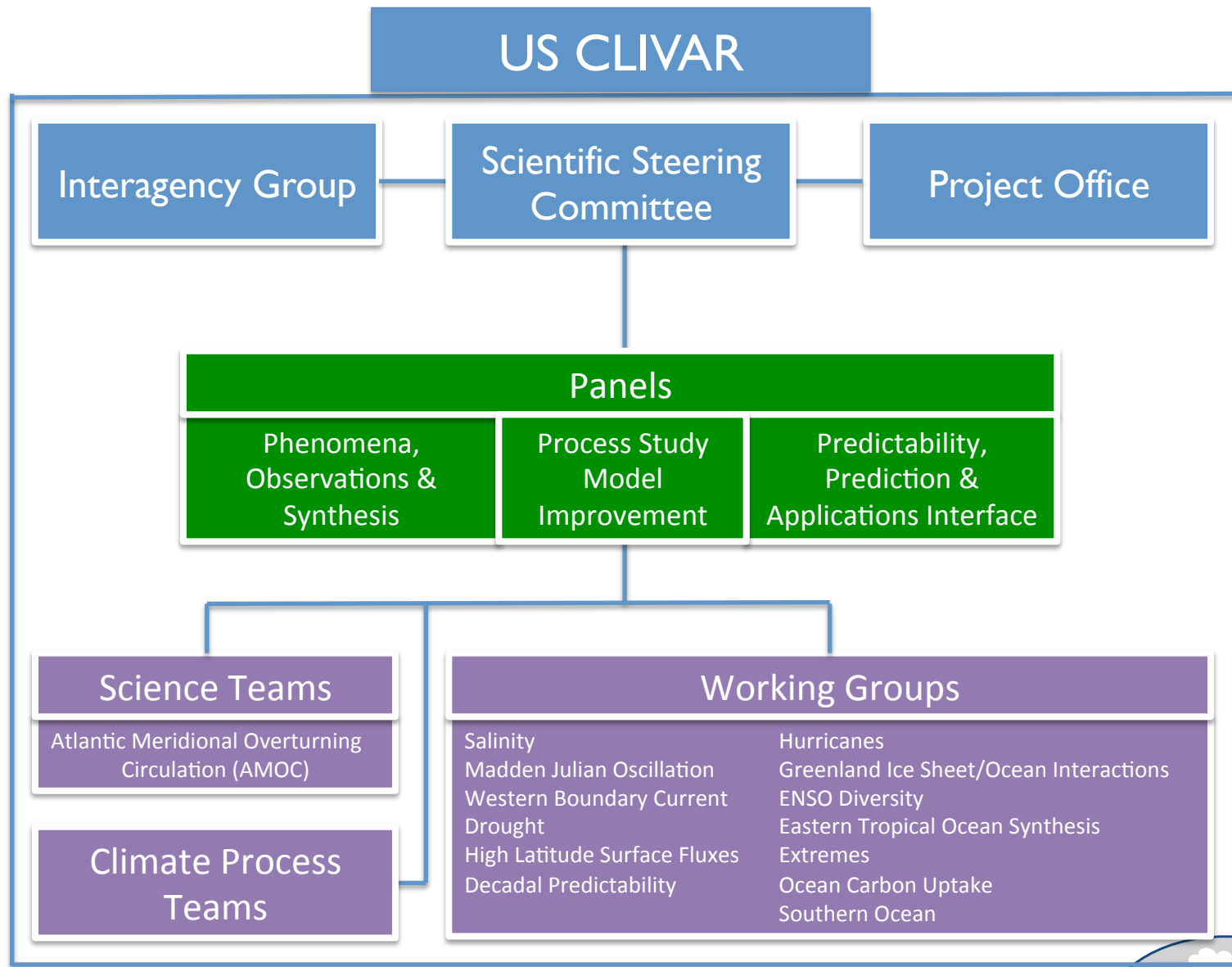






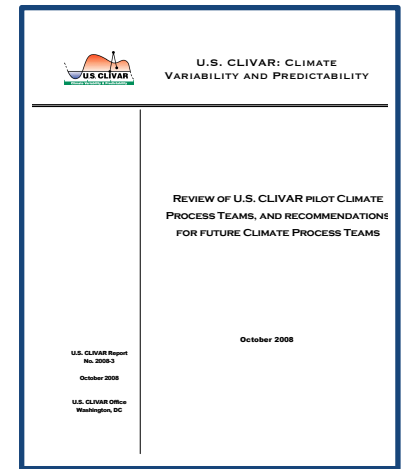






# Climate Process Teams

- Agency-funded projects assembling observationalists, theoreticians, process and GCM modelers working closely together to improve parameterizations of a particular process in one or more IPCC-class models
- Three pilots in 2003
  - Low-Latitude Cloud Feedbacks on Climate Sensitivity
  - Ocean Eddy Mixed Layer Interactions
  - Gravity Current Entrainment
- CPT Review in 2008
- Four new CPTs established in 2010
  - Internal Wave-Driven Mixing in Global Ocean Models (Completing 2015)
  - Cloud Parameterization and Aerosol Indirect Effects (Completing 2015)
  - Ocean Mixing Processes Associated with High Spatial Heterogeneity in Sea Ice (Completing 2014)
  - Stratocumulus to Cumulus Transition (Completed 2013)



# Working Groups

Limited-lifetime (2-3 years) action-oriented groups of volunteer scientists (typically ~8-12 core members) to:

- Expedite coordination and implementation of focused activities for the benefit of the broader scientific community.
  - Assess existing or developing new data and modeling products
  - Lead analyses or syntheses of current state of understanding
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  - Assess existing or developing new data and modeling products
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  - Develop scientific and implementation recommendations
- Foster wider support of and participation in activities addressing critical scientific challenges and/or CLIVAR needs (e.g., Research Challenges)
- Facilitate joint activities between U.S. CLIVAR and other national and/or international programs (e.g., with OCB)
- Serve as a basis for follow-on community activities nationally and internationally (e.g., Salinity, Drought, MJO WGs)



# Working Groups

Salinity	2005-2007
Madden-Julian Oscillation (MJO)	2006-2008
Drought	2006-2008
Western Boundary Current	2007-2009
High Latitude Surface Flux	2008-2012
Decadal Predictability	2009-2012

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Greenland Ice Sheet-Ocean Interactions	2010-2014
Hurricane	2011-2014
ENSO Diversity	2012-2014
Eastern Tropical Ocean Synthesis	2012-2014
Extremes	2012-2014
Ocean Carbon Uptake (Joint with OCB)	2012-2015
Southern Ocean (Joint with OCB)	2012-2015



# Science Team

## Atlantic Meridional Overturning Circulation

- Established as Ocean S&T Priority in 2007
- Science Team formed 2008
- Supported by NSF, NOAA, NASA, & DOE
- Now comprised of 60+ funded project PIs
- Organized into four Task Teams
  - Observations
  - State, Variability, Change
  - Mechanisms and Predictability
  - Impacts on Climate and Ecosystems
- Annual PI meeting to share science and plan future activities
- Annual report summarizing individual projects progress, collective program advances, and near-term priorities



# Science Teams

## Purpose:

- Advance research on specific US CLIVAR priority topic – phenomenological focus
- Enable synthesis beyond individual PI-led projects
- Provide forum for development and collaboration in the US
- Promote research within broader community
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- Established for ~10+ years
- Meet annually to share progress and identify needs
- Develop annual report
- Inform US CLIVAR of progress and plans at Summits

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- Multiple agency interest in research foci
- Critical mass of funded projects
- Clear advantages for progress through collaboration and synthesis

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### vs. Working Group

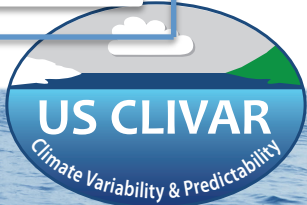
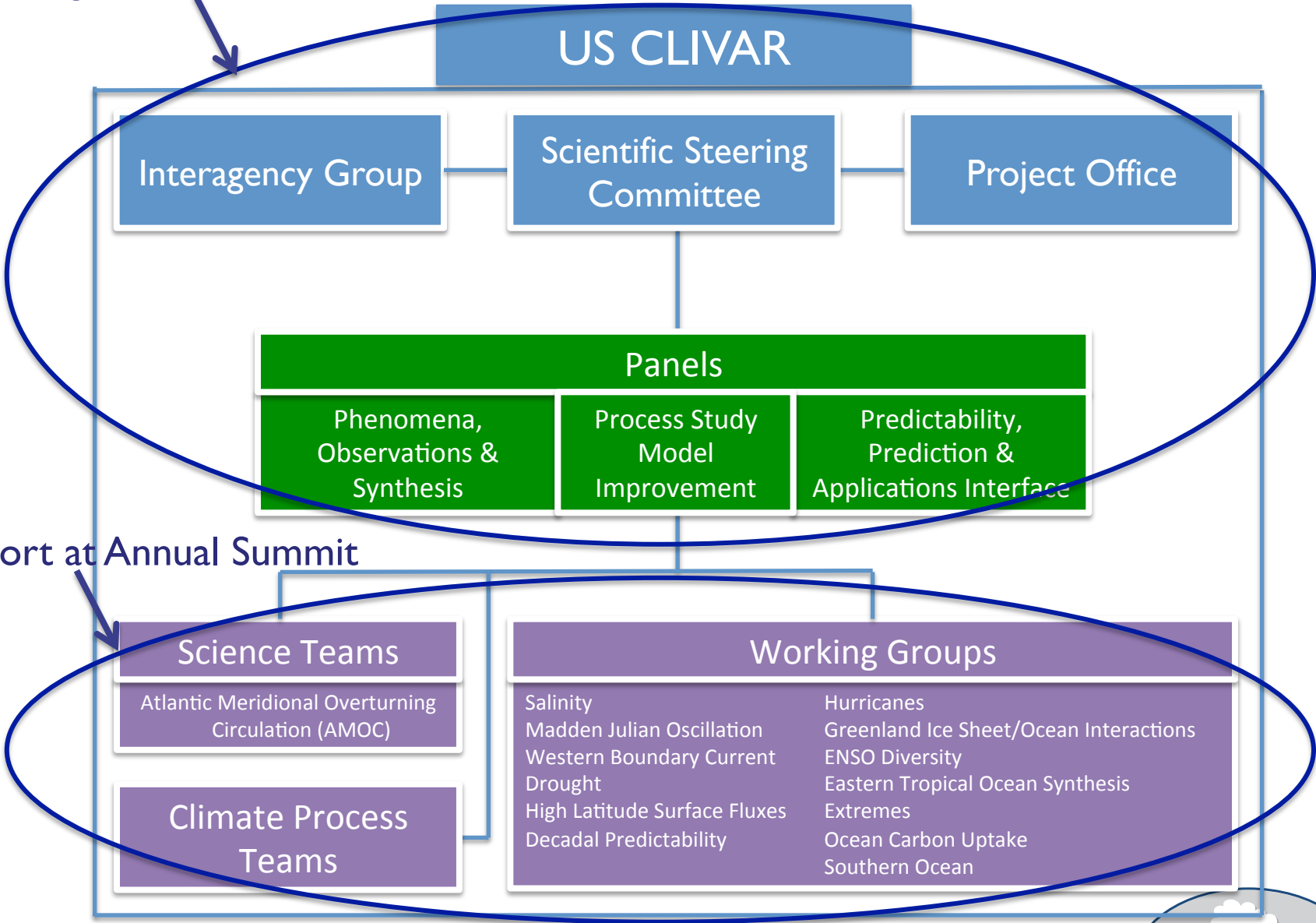
- Limited # of Experts
- Short, 2-3 years
- Frequent telecons, one workshop
- No annual report; workshop report
- Inform Summit

## Criteria for agencies to establish new Science Team:

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Meet Together at Annual Summit

Report at Annual Summit





# Core Climate Science Contribution to USGCRP



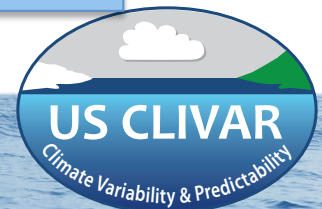
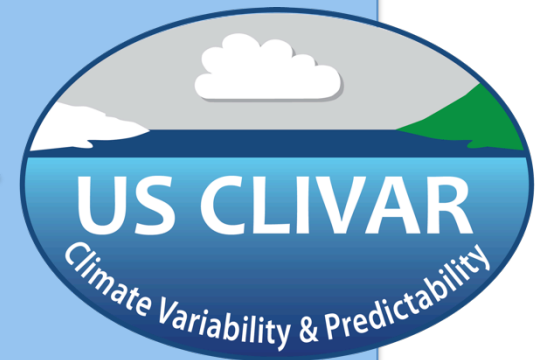


# US Contribution to International CLIVAR



## Core Capabilities

- Improving the atmosphere and ocean component of Earth System Models.
- Implementing innovative process and sustained ocean observations.
- Facilitate free and open access to climate and ocean data, synthesis and information.
- Support regional and global networks of climate and ocean scientists.
- Facilitate knowledge exchange and user feedback.
- Support education, capacity building, and outreach.

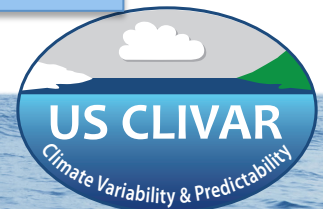
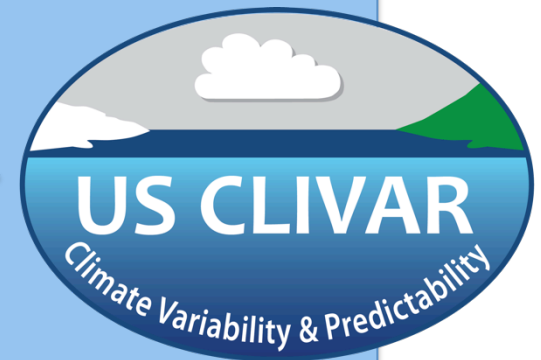


# US Contribution to International CLIVAR



## Focused & Integrated Research Opportunities

- Predictability of monsoon systems
- **Decadal climate variability and predictability**
- Biophysical interactions and dynamics of upwelling systems
- Dynamics of regional sea level variability
- **Prediction and attribution of extreme events**
- ENSO in a warmer climate
- Ocean heat storage
- ...



# US CLIVAR Program Updates

- Science Plan
  - Edited based on public review comments
  - Published December 2013
  - Promoted through Town Halls at AGU & Ocean Sciences; NRC Ocean Studies Board
- Support of AMOC Science Team and 7 Working Groups
  - Joint US AMOC/UK RAPID International AMOC Meeting
  - NCAR ASP Student Colloquium on Carbon & Climate
  - Workshop on Large Scale Meteorological Patterns Associated with Temperature & Precipitation Extremes
  - Reports and newsletters for ENSO Diversity, Greenland Ice Sheet/Ocean Interactions, Hurricane, Extremes WGs
- Coordination of US participation in process studies
  - DIMES, DYNAMO, SPURS
- Implementation of CPTs
  - Stage 2 for (a) Internal-Wave Driven Mixing and (b) Cloud Parameterization & Aerosol Indirect Effects
  - Completion of (c) Ocean Mixing/Sea Ice and (d) Stratocumulus-to-Cumulus

# US CLIVAR Program Updates

## US CLIVAR Workshops and Meetings

- US AMOC—UK RAPID International AMOC Science Conference, July 16-19, 2013, Baltimore, MD
- NCAR ASP Workshop on Carbon-Climate Connections, August 6-10, 2013, Boulder, CO
- Extremes Workshop, August 20-22 2013, Berkeley, CA
- US CLIVAR SSC Meeting, April 7-8, 2014, Washington, DC
- Eastern Tropical Ocean Synthesis WG Meeting, May 15-16, 2014, Miami, FL
- US CLIVAR Summit, July 9-11, 2014, Denver, CO

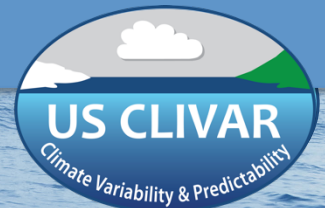
## US CLIVAR Agency Sponsorship of International CLIVAR & Related Workshops

- WCRP-ACPC Africa Climate Conference, October 15-18, 2013 Arusha, Tanzania (**NSF**)
- WGOMD High-Resolution Ocean Climate Modeling Workshop, April 7-9, 2014, Kiel, Germany (**ONR**)
- WCRP-ICTP Summer School on Extremes, July 21-August 1, 2014, Trieste, Italy (**NOAA**)
- South Atlantic Meridional Overturning Circulation Workshop, December 1-5, 2014, Buenos Aires, Argentina (**NOAA, DoE**)
- Intl. Global Drought Information System Workshop, 11-13 December 11-13, 2014, Pasadena, CA (**NOAA**)
- Intl. Symposium on Gas Transfer at Water Surface, May 18-21, 2015 in Seattle, WA (**NASA**)

2014 US CLIVAR Summit

July 8-11

Denver, Colorado



# Thank You

**[www.usclivar.org](http://www.usclivar.org)**

**[@usclivar.org](https://twitter.com/usclivar.org) on twitter**