

U.S. CLIVAR Overview

July 9, 2013

Annapolis, Maryland

Mike Patterson, Director
U.S. CLIVAR Project Office



Mission

To foster understanding and prediction of climate variability and change on intraseasonal-to-centennial timescales, through observations and modeling with emphasis on the role of the ocean and its interaction with other elements of the Earth system, and to serve the climate community and society through the coordination and facilitation of research on outstanding climate questions.

-from draft Science Plan



U.S. CLIVAR

Interagency Group

Scientific Steering
Committee

Project Office

Interagency Group (IAG)

Comprised of U.S. funding agency program managers who meet regularly to coordinate implementation of research activities in support of U.S. 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)



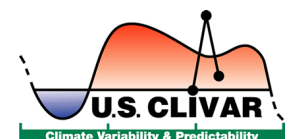
NSF Physical Oceanography (Eric Itsweire)
NSF Climate & Atmospheric Dynamics (Eric DeWeaver, Anjuli Bamzai)



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 U.S. 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 U.S. 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

Lisa Goddard, Outgoing Chair

Arun Kumar, Co-chair and PPAI Panel

Jay McCreary, Co-chair

Janet Sprintall, Co-chair

Bruce Anderson, PPAI Panel

Mike Bosilovich, POS Panel

Tom Farrar, PSMI Panel

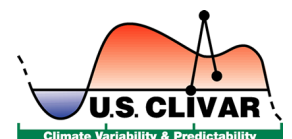
Baylor Fox-Kemper, PSMI Panel

Dimitris Menemenlis, POS Panel



Project Office

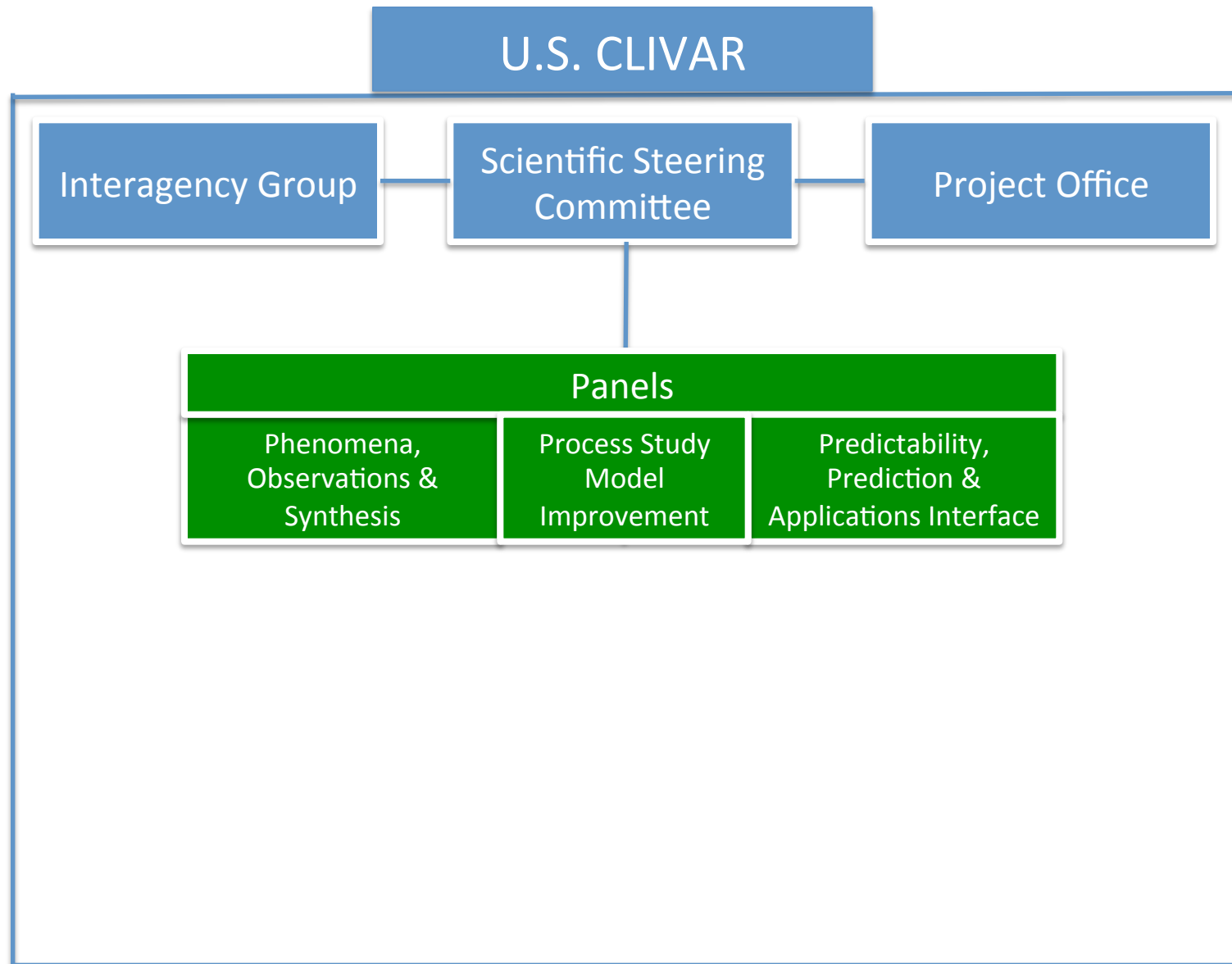
- Responsible for ensuring all scientific and programmatic coordination is completed as guided by the U.S. CLIVAR SSC and supported by IAG
 - Manage science planning
 - Arrange and support meetings of IAG, SSC, Panels, WGs, Teams
 - Organize summits, workshops, colloquia, meetings, briefings
 - Establish new and support existing WGs and Science Teams
 - Support travel and reporting of U.S. members of International CLIVAR Panels
 - Promote communication through website, reports, newsletters, news-grams
 - Liaise with other programs (e.g., OCB, GEWEX, IARPC/SEARCH, USGCRP)

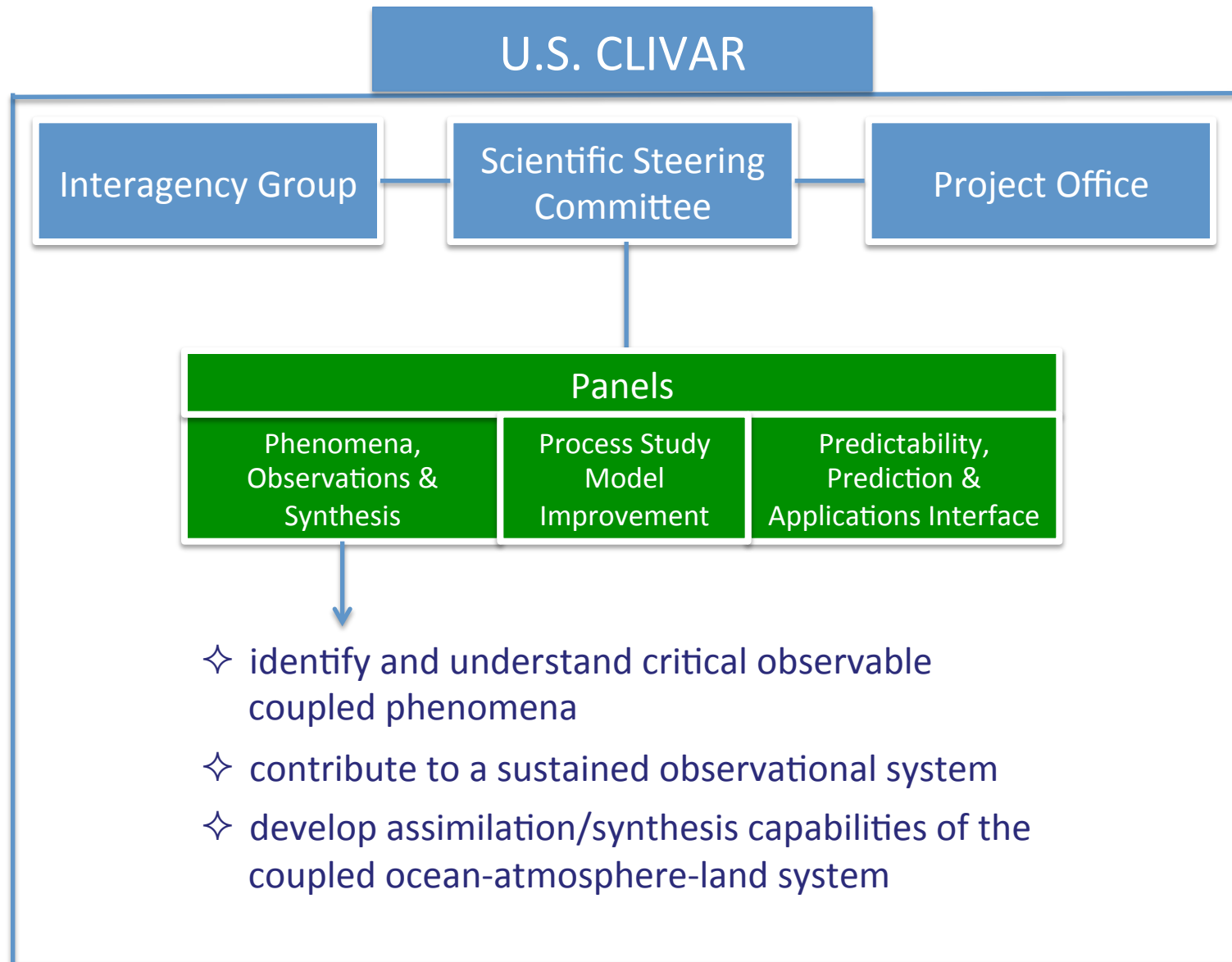


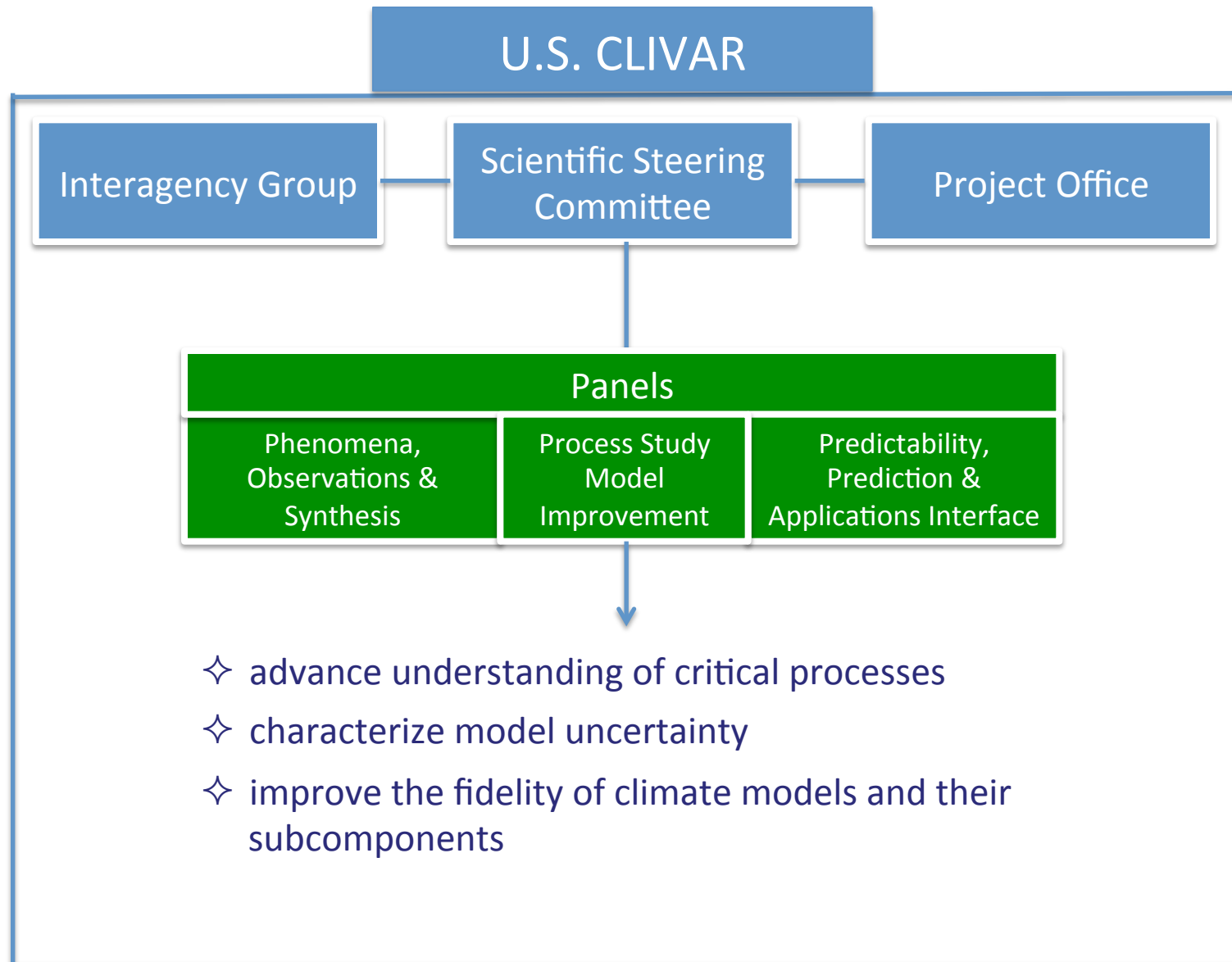
Project Office

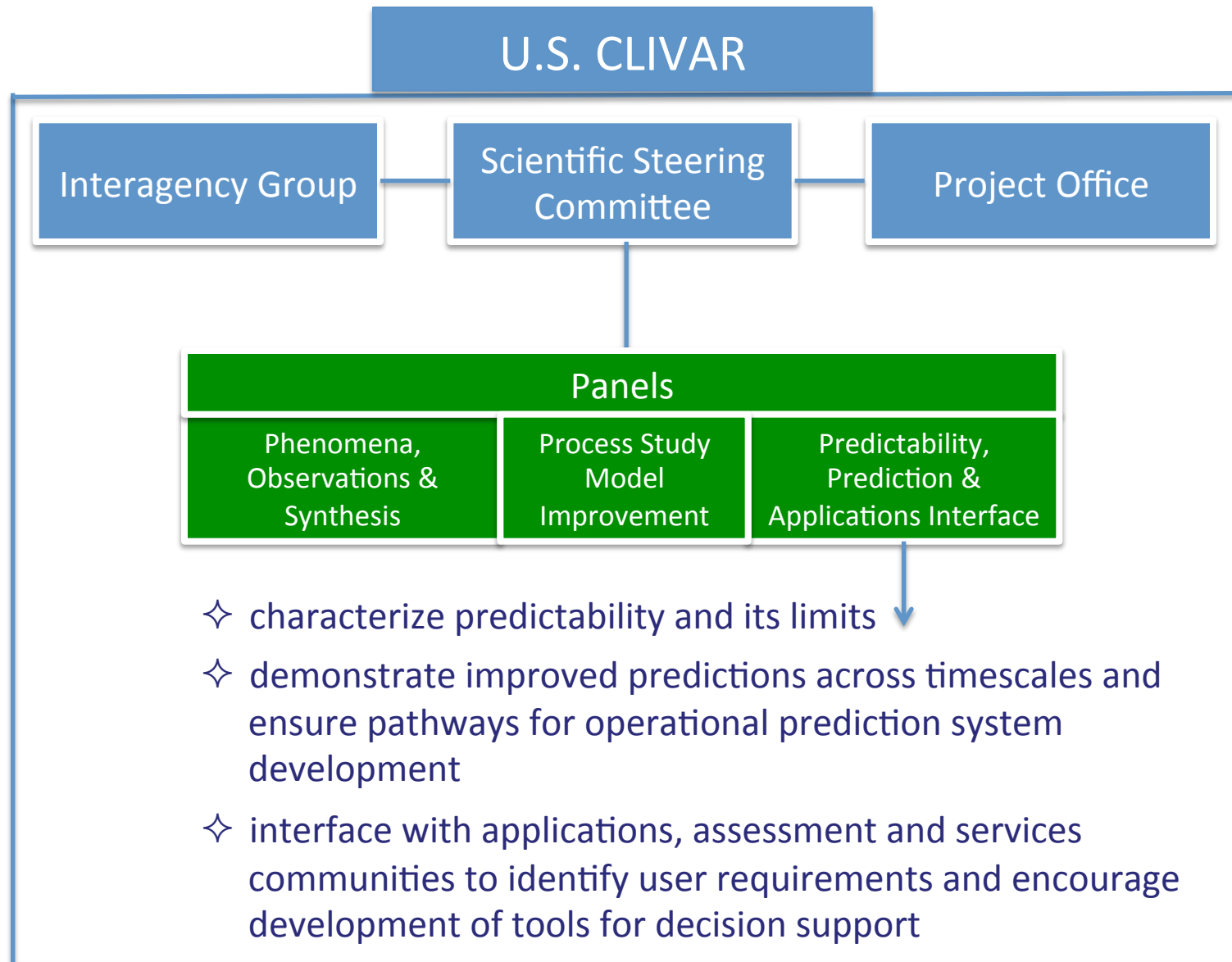
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 - Liaise with other programs (e.g., OCB, GEWEX, IARPC/SEARCH, USGCRP)
- Funded by NASA, NOAA, NSF and DOE through annual award to UCAR
- Staffed by Mike Patterson & Jennifer Mays in DC;
Jill Reisdorf (Project Coordination) and Tania Sizer (Web Developer) in Boulder

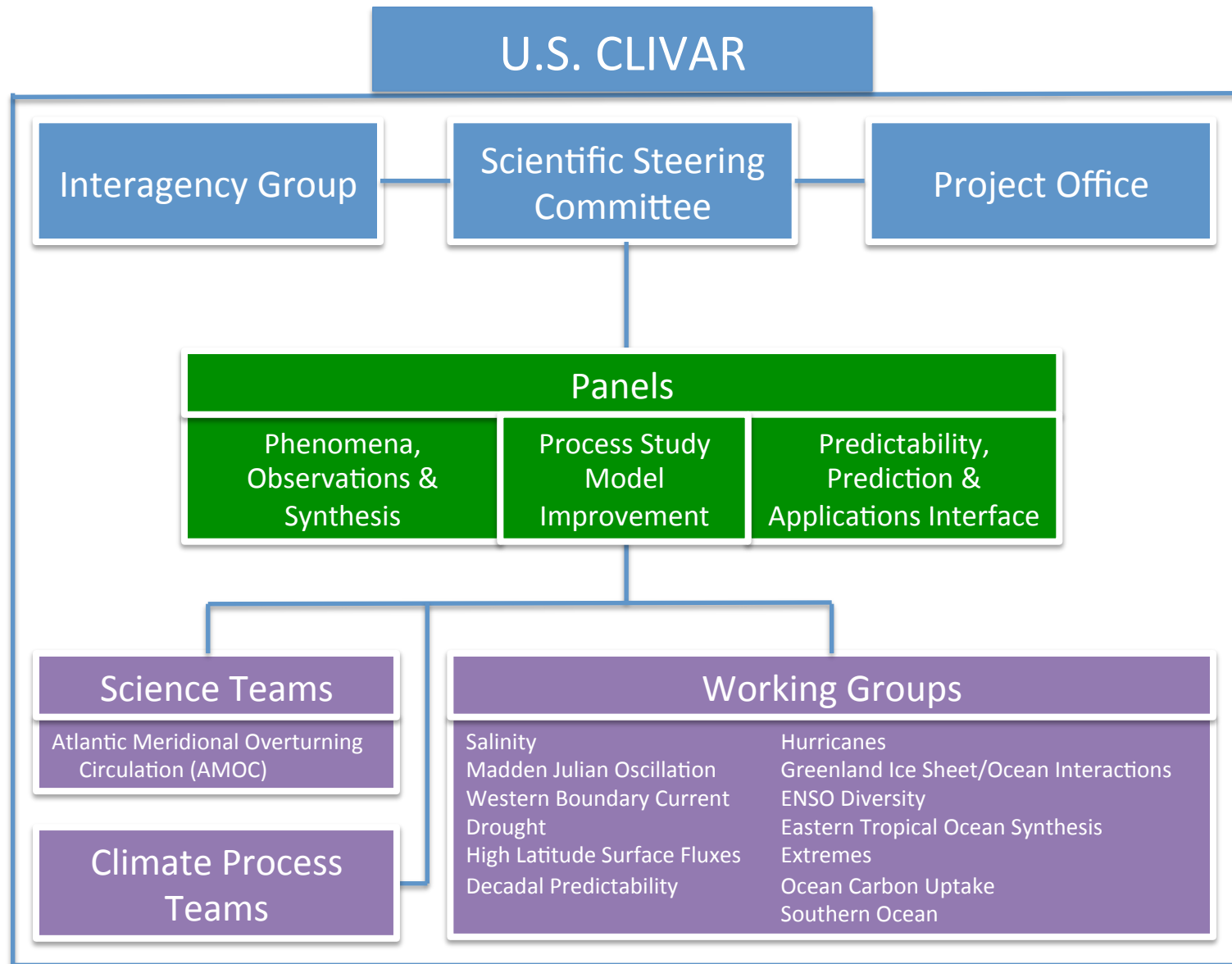






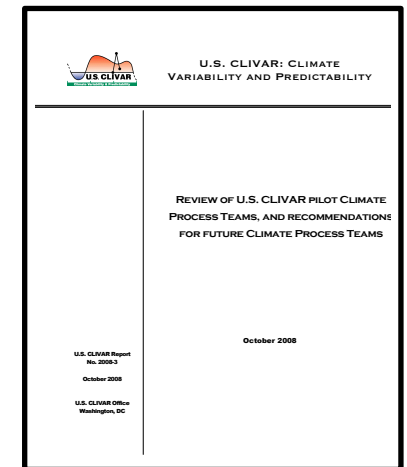






Climate Process Teams

- 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
 - Ocean Mixing Processes Associated with High Spatial Heterogeneity in Sea Ice (Completing 2013)
 - Cloud Parameterization and Aerosol Indirect Effects
 - Stratocumulus to Cumulus Transition (Completing 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
 - Develop scientific and implementation recommendations

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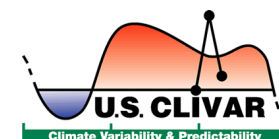
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 - Develop scientific and implementation recommendations
- Foster wider support of and participation in activities addressing critical scientific challenges and/or CLIVAR needs (e.g., Research Challenges)
- Facilitate joint activities between U.S. 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

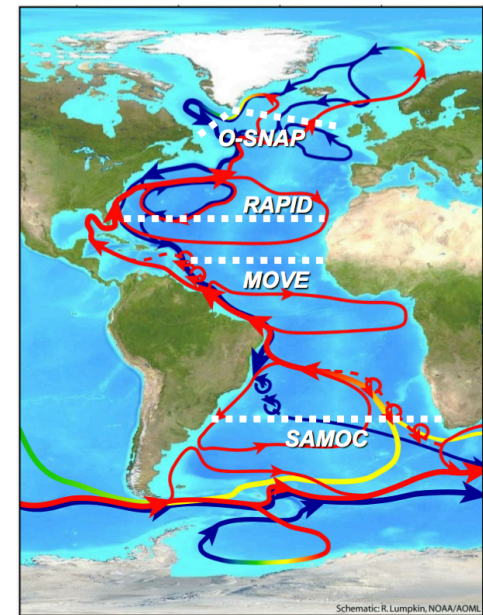
Greenland Ice Sheet-Ocean Interactions	2010-2013
Hurricane	2011-2013
ENSO Diversity	2012-2013
Eastern Tropical Ocean Synthesis	2012-2014
Extremes	2012-2014
Ocean Carbon Uptake (Joint with OCB)	2012-2015
Southern Ocean (Joint with OCB)	2012-2015



Science Teams

Atlantic Meridional Overturning Circulation

- Established as Ocean S&T Priority in 2007
- Supported by NASA, NSF, NOAA & DOE
- Comprised of 50+ 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:

- Enable synthesis beyond individual PI-led projects
- Provide forum for development and collaboration in the U.S.
- Refine science goals on specific U.S. CLIVAR priority topic
- Promote research within broader community
- Serve as inter-program focal point

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Characteristics:

- Comprised of PIs on agency-funded projects
- Established for ~10+ years
- Meet annually to share progress and identify needs
- Develop annual report
- Inform U.S. CLIVAR of progress and plans at Summits



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Criteria for agencies to establish new Science Team:

- U.S. CLIVAR research priority
- 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

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Report at Annual Summit



Core Climate Research Contribution to USGCRP

U.S. Global Change
Research Program



10-Year Strategic Plan Goals

1. Advance Science
2. Inform Decisions
3. Conduct Sustained Assessments
4. Communicate and Educate



U.S. CLIVAR



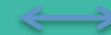
Core U.S. Contribution to International CLIVAR

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
- ...



U.S. CLIVAR

U.S. CLIVAR Program Updates

- Draft Science Plan
 - Public review completing
 - On track for publishing by end of year
- Support of AMOC Science Team and 9 Working Groups
 - Annual AMOC Report; BAMS articles for Decadal Predictability, High-Lat Surface Fluxes, Greenland Ice Sheet
- Coordination of U.S. participation in four process studies
 - DIMES, DYNAMO, SPURS, IASCLIP
- Implementation of CPTs
 - Stage 2 approved for Internal-Wave Driven Mixing (Ocean) and Cloud Parameterization & Aerosol Indirect Effects (Atmos)
 - Completing Ocean Mixing/Sea Ice (Ocean) and Stratocum to Cumulus Transition (Atmos)
- Completion of 27 Coupled Model Evaluation Projects (CMEP)
 - Publications posted on U.S. CLIVAR site



U.S. CLIVAR Program Updates

- Coordination of U.S. participation in process studies
 - DIMES – Total of eight UK and US cruises in the Drake Passage since 2009 and deployment of 180 floats have measured high-res hydrography, currents, turbulent dissipation and eddy processes of the ACC. Diapycnal and isopycnal analyses underway.
 - DYNAMO – completed six month extended observing period in Indian Ocean in March 2012, successfully captured 2+ MJO events, post-field dataset development 90% complete, PI meeting in March 2013 generated recommendations for synthesis data sets and CPT.
 - SPURS – completed initial field phase to study salinity budget in Subtropical N. Atlantic Gyre on RV Knorr September-October 2012 deploying moorings, floats and gliders and conducting surveys. Analyses underway.
 - IASCLIP – new modeling projects supported by NOAA, interagency briefing last July engaged commitments by NCEP and NODC.



U.S. CLIVAR Program Updates

U.S. CLIVAR Workshops and Meetings

- U.S. AMOC Science Team Meeting, August , 2012, Boulder, CO
- Town Hall and Five Working Group Meetings @ AGU, December 4-8, 2012, San Francisco, CA
- ENSO Diversity Workshop, February 6-8, Boulder, CO
- Greenland Ice Sheet—Ocean Interactions Workshop, June 4-7, Beverly, MA
- Hurricane Workshop, June 5-7, Princeton, NJ
- U.S. CLIVAR Summit, July 9-11, Annapolis, MD
- U.S. AMOC—U.K. RAPID International Science Conference, July 16-19, Baltimore, MD
- NCAR ASP Workshop on Carbon-Climate Connections, August 6-10, Boulder, CO
- Extremes Workshop, August 20-22 2013, Berkeley, CA

U.S. CLIVAR Agency Sponsorship of International CLIVAR Workshops

- GSOP Workshop on Ocean Synthesis and Air-Sea Flux Evaluation, Nov 26-30, 2012, Woods Hole, MA **(NASA, NOAA)**
- CLIVAR Workshop on Sea Level Rise, Ocean-Ice Shelf Interactions, and Ice Sheets, Feb 18-20, 2012, Hobart, Australia **(NASA, DoE)**
- WCRP International Workshop on Seasonal to Decadal Prediction, May 13-16, 2013 Toulouse, France **(NOAA)**
- GSOP Workshop on Global Ocean Sub-Surface Climate Data, June 12-14 2013, Hobart, Australia **(NOAA)**
- WCRP-ACPC Africa Climate Conference, October 15-18, 2013 Arusha, Tanzania **(NSF)**

