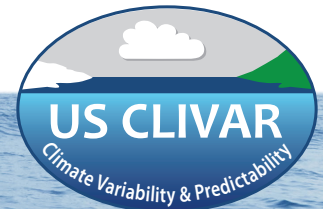


# 2014 US CLIVAR Summit Meeting Objectives and Outcomes

Bob Weller, SSC Chair



# Meeting Objectives

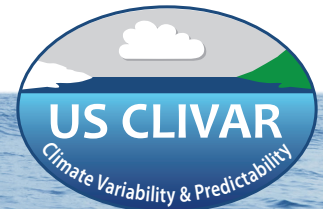
- **Context** – Update on US and International programs and plans
- **Implementation Planning** – Identify action items to advance new Science Plan goals and research challenges
- **Panel Business** – Review progress and identify gaps and opportunities
- **Cross-Panel Interaction** – Foster dialogue among panels on interfacial topics
- **Special Science Sessions** – Engage discussion of timely research topics:
  - ENSO monitoring, analysis, prediction
  - Connecting climate science and services by exploring application needs

# Two Core Research Topics

1. The looming ENSO, which is drawing much attention but also makes one wonder what the steps are to reduce the uncertainties in our predictive capabilities, extending lead time for the forecast. In light of the recent TPOS meeting at SIO and the state of the equatorial Pacific observing system one also wonders if we are worse off in predictive capability due to its present state.
2. The more global, three-dimensional context of the ocean, ranging from the slowing down of the surface warming, thought by some to reflect stronger Pacific trade winds and more heat entering the deep ocean by Ekman pumping, to growing evidence for warming at depth, to wondering what changes are going on at mid-depths and how and when these changes feedback on or impact the equatorial oceans. We have much more data now with a decade of Argo, more recent repeat hydrography, and sustained time series. With these data can we move forward toward more data integrative investigations of the three-dimensional ocean circulation?

# Agenda

- **Tues, July 8 (Introduction)**
  - US CLIVAR Overview
  - Special Session on ENSO Monitoring, Analysis, and Prediction Challenges
- **Wed, July 9 (Reports)**
  - US CLIVAR Science Plan and Next Steps for Implementation
  - International CLIVAR Update
  - US Agency Engagement
  - Science Team and Working Group Updates
  - Special Session on Connecting Predictions, Applications, and Decision-Making
  - Summit Networking Event
- **Thurs, July 10 (Panel Business)**
  - Charge to Panels
  - Panel Breakouts
  - Cross-Panel Sessions
- **Fri, July 11 (Implementation Actions)**
  - Panel Summaries and Action Items
  - SSC Meeting



# Panel Breakouts

## Phenomena, Observations, and Synthesis (POS)

- Evaluation of Ocean Phenomena, Observations & Synthesis
- Utilization of Ocean Observations & Synthesis
- Automatic Differential Tools
- Need for Sustained and Improved Ocean Observations & Synthesis

## Process Study and Model Improvement (PSMI)

- Process Study Reviews
- Climate Process Team (CPT) Reviews
- Big Picture View & Future Foci

## Predictability, Predictions, and Applications Interface (PPAI)

- Benchmarking Predictions and Predictability Limits
- Implementing Strategies for Connecting Predictions, Applications, and Decision-Making
- Future Foci

# Phenomena, Observations, and Synthesis (POS) Panel Breakout

- Evaluation of Ocean Phenomena, Observations & Synthesis
  - Real-time multiple ocean reanalyses
  - Obs4MIPS and ana4MIPS
- Utilization of Ocean Observations & Synthesis
  - ENSO diversity and impacts
  - Pacific Ocean decadal variability and ecosystem response
  - Deep ocean remote sensing
  - Warming hiatus
  - Polar climate
- Automatic Differential Tools
- Need for Sustained and Improved Ocean Observations & Synthesis
  - Atlantic expansions
  - Air-sea interaction and mixed layer studies
  - Water cycle and extremes studies



# Process Study and Model Improvement (PSMI) Panel Breakout

- Process Study Reviews
  - Oral Reports: ASIRI, DYNAMO, SPURS 1&2, DIMES, Arctic Sea State & MIZ
  - Written Reports: IASCLIP, OSNAP & N. Atlantic/Arctic, SAMOC, SOCRATES, eastern tropical Atlantic
  - Best practices revisited
- Climate Process Team (CPT) Reviews
  - Internal wave driven mixing
  - Ocean mixing and sea ice
  - Cloud parameterization and aerosol indirect effects
  - Stratocumulus to cumulus transition
  - Lessons learned and future CPT priorities
- Big Picture View
- Future Foci

# Predictability, Prediction, and Applications Interface (PPAI) Panel Breakout

- Benchmarking Predictions and Predictability Limits
  - “Science-limited” targets offering promise for improved predictability
  - Best practices for quantifying improvements
  - Communicating improvements and limitations
- Implementing Strategies for Connecting Predictions, Applications, and Decision-Making
  - Identify and prioritize scientific, programmatic, and administrative strategies and action items needed to make progress in connecting predictions, applications, and decision making efforts
- Future Foci

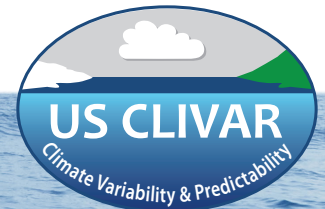


# Joint Panel Sessions

- **POS and PSMI:** Diagnostic Tools and Metrics for Intercomparison of Reanalyses & Utilization of Innovation, Increments, & Residuals
  - Definitions and examples
  - Challenges in evaluating lower-dimensional features
  - Metrics based on fuzzy similarities between lower-dimensional features
- **PSMI and PPAI:** Modeling Metrics for Quantifying Predictions and Predictability Limits
  - Metrics for quantifying improvements in predictions, projections, and hindcasts
  - “Science-limited” metrics and “noise-limited” metrics
  - Predictable metrics that span prediction/applications gap
- **PPAI and POS:** Observation and Synthesis Requirements for Predictability and Prediction Studies
  - Observational regions, fields, times providing improvement to predictability
  - Observational regions and fields helping quantify improvements in and constraints to predictions and projections
  - Guidance on observations to improve predictive understanding and outcomes

# Anticipated Outcomes

- Evaluation of status, gaps, & opportunities to address program goals and research challenges



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- Evaluation of status, gaps, & opportunities to address program goals and research challenges
- Improved understanding of physical climate information production and addressing needs of applications and services
- Identification of strategies for assessing improvements in models/parameterizations, analyses/reanalyses, and predictability/prediction
- Specific recommendations & action items regarding
  - Observing and analyses systems, process study practices, Climate Process Team lessons learned, predictability and prediction studies, and approaches to developing the applications and services interface
  - Implementation activities – Working Groups, Science Teams, and workshops to organize community on emerging topics, esp. to address research challenges