

Summary of POS panel activities, 2005-2006
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The Phenomena, Observations, and Synthesis (POS) panel has identified Decadal Climate Variability and Predictability as a key theme for CLIVAR. The theme implicitly integrates POS activities and naturally bridges to the other panels.

In the last year the POS panel has identified the following three emerging areas in which rapid progress can be made, have the potential for strong and vigorous leadership and which can engage the agencies.

1. Ocean observations/synthesis and predictability

Estimating the current state of the ocean, the status of the MOC, the path of the Gulf Stream, the extent of the warm pool, etc, etc, requires combining the developing global ocean observing capability with ocean data assimilation systems and 'projecting' them out in to the future. There would be major and immediate applications of ocean predictability to fisheries and marine ecosystems. Moreover, the ocean state provides initial conditions for decadal forecasts; ocean predictability is also a pre-requisite for atmospheric predictability on decadal timescales (see 2. below)

The basic elements are in place (ocean obs, models and synthesis methodologies) and moving them on to an operational footing must be a high priority for the next five + years. However, the global instrumental record dates back only to about 1992 (the start of WOCE) and is in perpetual danger of being significantly reduced in scope at any time. A science focus on decadal ocean predictability could help secure the observational base on which everything depends. These issues were the focus of a meeting sponsored by NASA/POS in February, 2006.

2. Decadal variability and predictability

A multi-faceted program is proposed with a focus on decadal climate variability of the coupled system and the separation of anthropogenic trends from natural variability. Leveraging off the substantial investment already made in (i) ocean observations and synthesis methods and (ii) the development of IPCC-class coupled climate models, global prototype predictability systems would be set up and used to make projections about the evolution of the 'slow' components of the climate system, such as the MOC, AMO, PDV, ice cover etc. This was the focus of a meeting at GFDL in June 2006.

A research program on basic dynamics and science questions related to the decadal predictability of the coupled system and on analyzing the predictions, needs to be implemented at the national labs and in academia, with links to the international community.

The required coupled (IPCC-class) models already exist at national laboratories. Initial decadal predictability studies are underway at GFDL.

3. Weather and climate extremes:

Drought, especially prolonged multi-year drought, has tremendous societal and economic impacts on the United States, and many other countries throughout the world. Drought has emerged as a CLIVAR focus, and a working group is being constituted. A physical understanding of the causes of long-term drought in a number of regions around the world is emerging. There are, however, still major uncertainties about the relative roles of the different ocean basins, the strength of the land-atmosphere feedbacks, the role of deep soil moisture, the nature of long term SST variability, the impact of global change, as well as fundamental issues about predictability of drought on these long time scales.

The working group will help focus modeling and observational studies to address these issues: activities that span across a number of major modeling groups, universities, and programs including US CLIVAR and GEWEX. It will also help focus enabling activities such as the development of improved long-term reanalyzes of all components of the Earth System.

Siegfried Schubert is leading the effort, on behalf of the POS and PPAI panels.

The above three thrusts are not independent of one-another: 1. enables 2., 2. provides the context for 3. They could lead to routine capabilities for making projections for the state of the MOC, sea level, arctic ice cover, hurricane activity, regional droughts and ecosystem changes.

Specific actions by POS August 2005-2006

The above areas have begun to come in to focus over the past year, informed by the following meetings which the POS panel helped to organize and set up:

- meeting at MIT on ocean observation and synthesis, February, 2006, sponsored by NASA. This has helped define 1. above.
- meeting at GFDL on decadal climate prediction in June, 2006, sponsored by NOAA (with Ants Leetma, Tom Delworth and Tony Rosati). This is helping to define 2. above.
- working group to be set up on drought, sponsored by US Clivar

These three areas also have strong links to international Clivar.

In addition Sarah Gillie sent a letter on behalf of POS to the 'Decadal survey' outlining satellite observation requirements for US Clivar.

Interaction with agency goals and program managers

The following program managers/lab directors were invited to and attended one or other of the meetings listed above:

Eric Lindstrom, Don Anderson (NASA), Jim Todd, Stan Wilson, Ants Leetma (NOAA), Dave Legler (Clivar).

There has been an evolving dialogue between Clivar and these agencies and program managers, which has led us to identify the three foci above. They strongly map on to agency goals.

In addition, Sumant Nigam represented the POS panel at the recent CCSM community meeting.

Greatest successes to date of the POS panel:

- (i) helping organize the GFDL workshop focusing on Decadal Climate Variability. An implementation plan for decadal climate prediction is in preparation.
- (ii) planning of the Drought working group in collaboration with the PPAI panel.