US CLIVAR Decadal Prediction Working Group

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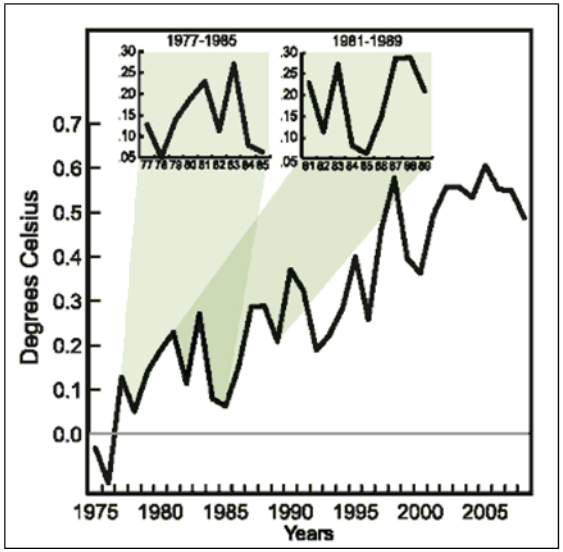
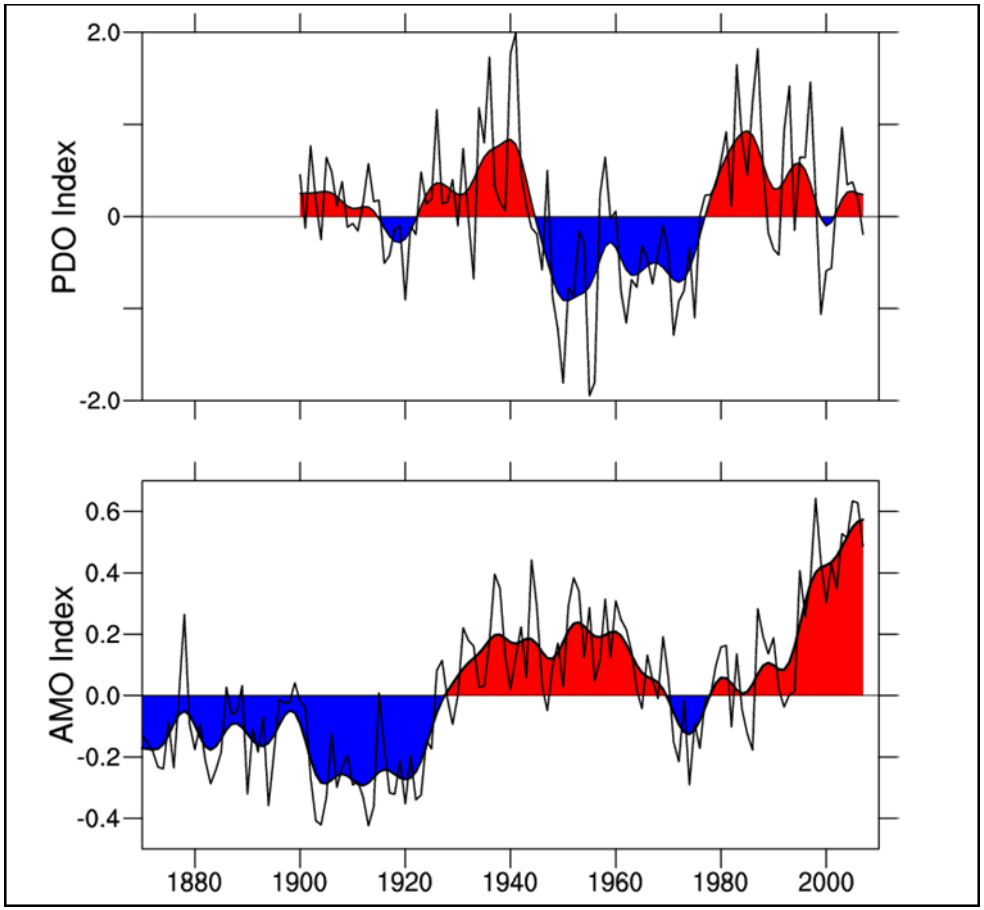
Background to the DPWG

- **There is considerable low-frequency variability (with societal consequences) in the Earth system, and which**
- **Can temporarily *mask* or *enhance* externally forced variability**





Background to the DPWG

- **To further the understanding of some of the issues related to the (decadal) prediction of the LF natural variability, e.g.,**
  - **what is the decomposition of low-frequency variability into the externally forced and natural components?**
  - **what are the prospects of decadal predictability as an initial value problem?**
  - **how much skill of initialized decadal predictions may improve on other baseline methods? etc.**
- **A Decadal Predictability Working Group (DPWG) was approved in January, 2009, under the US CLIVAR**

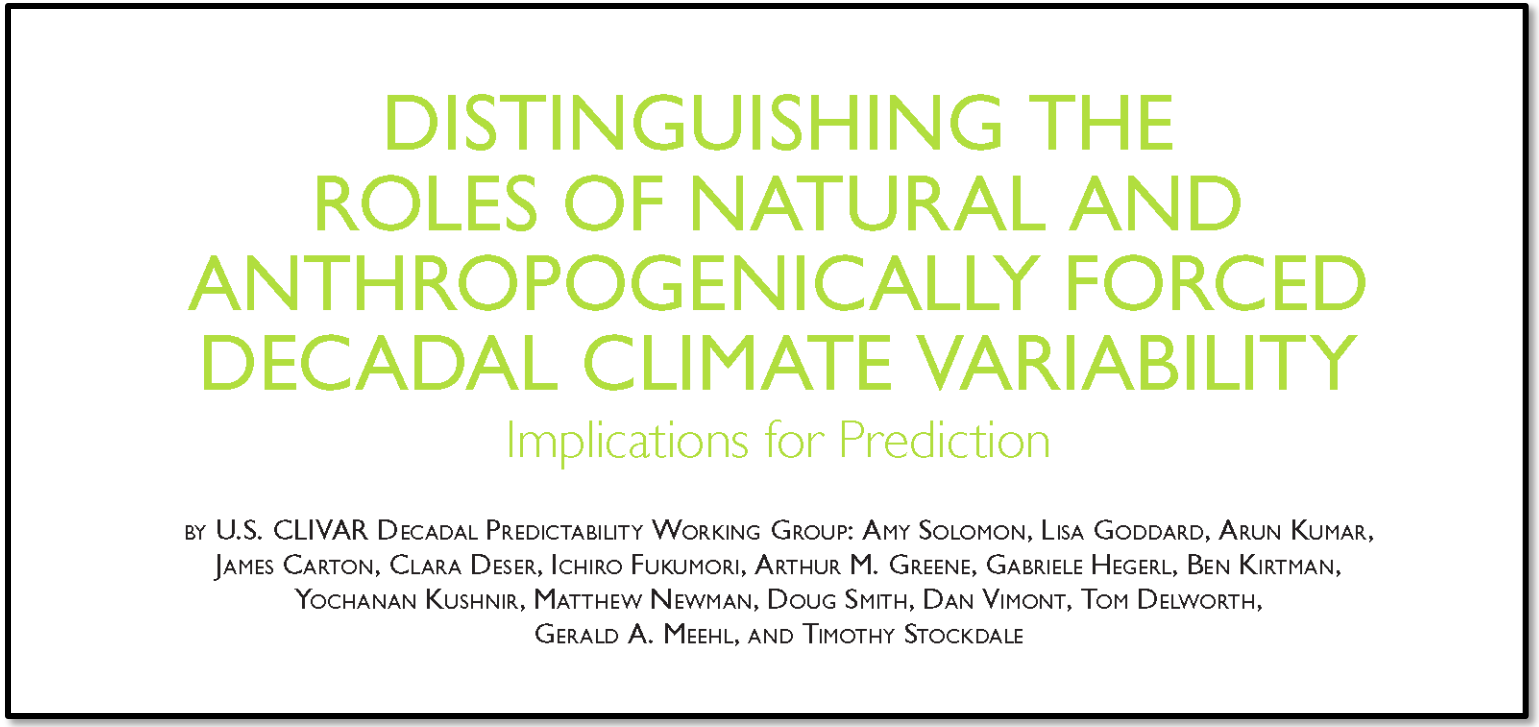
Background to the DPWG

- **Objective 1: Define a framework to distinguish natural variability from anthropogenically forced variability on decadal time scale for the purpose of assessing predictability of decadal-scale climate variations**

- **Objective 2: Develop a set of metrics that can be used to assess and validate initialized decadal climate predictions and simulations**

DPWG - Accomplishments

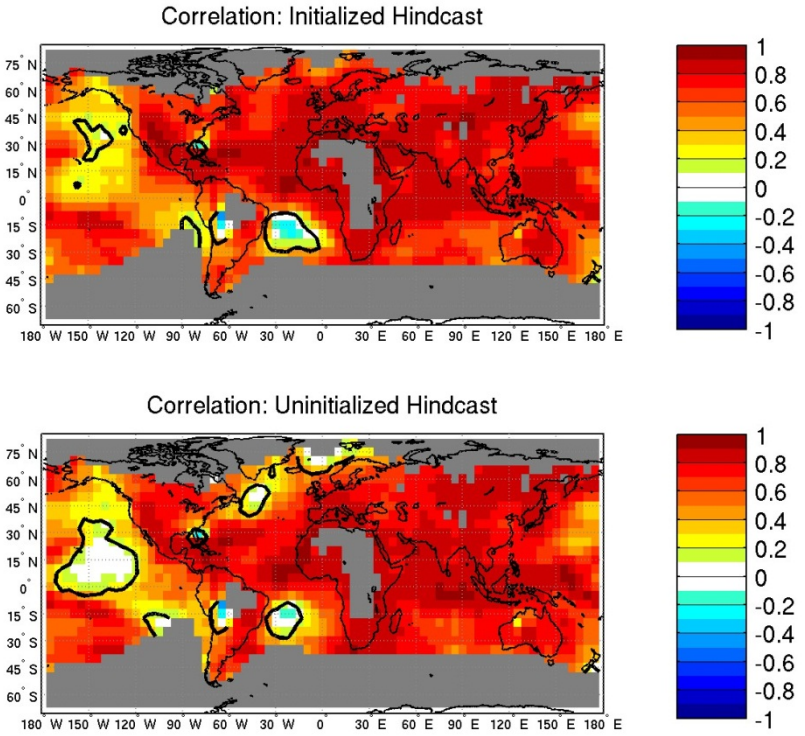
- **First paper related to "objective 1" of the DPWG has been published in BAMS**

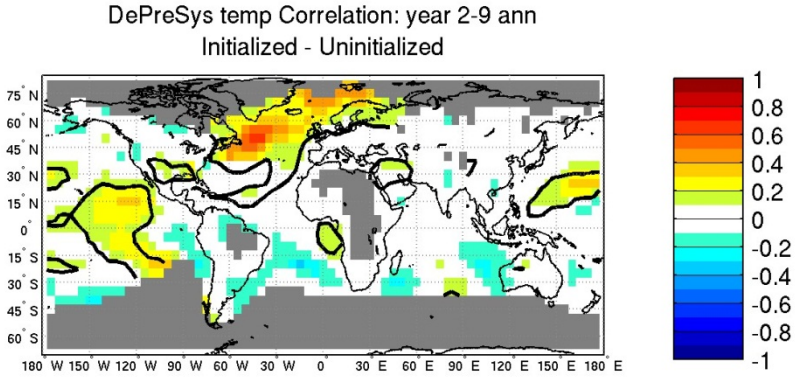


DPWG - Accomplishments

- **A Manuscript related to the objective 2 is under review in Climate Dynamics**
  - **Goddard et al., 2012: A Verification Framework for Interannual-to-Decadal Predictions Experiments**
- **Establishment of the IRI data library and hindcast skill assessment**
- **Active participation in various workshops related to decadal variability (e.g., WCRP OSC; Aspen; CMIP5 assessment workshop…)**
- **Recommended Call for the small grants program on the analysis of CMIP5 simulations**
- **Participation in the AR5 chapter on short-term prediction of climate**
- **Recommendations to the WCRP/WGCM panel on design and evaluation of decadal prediction runs in CMIP5**

Assessment of Prediction Skill



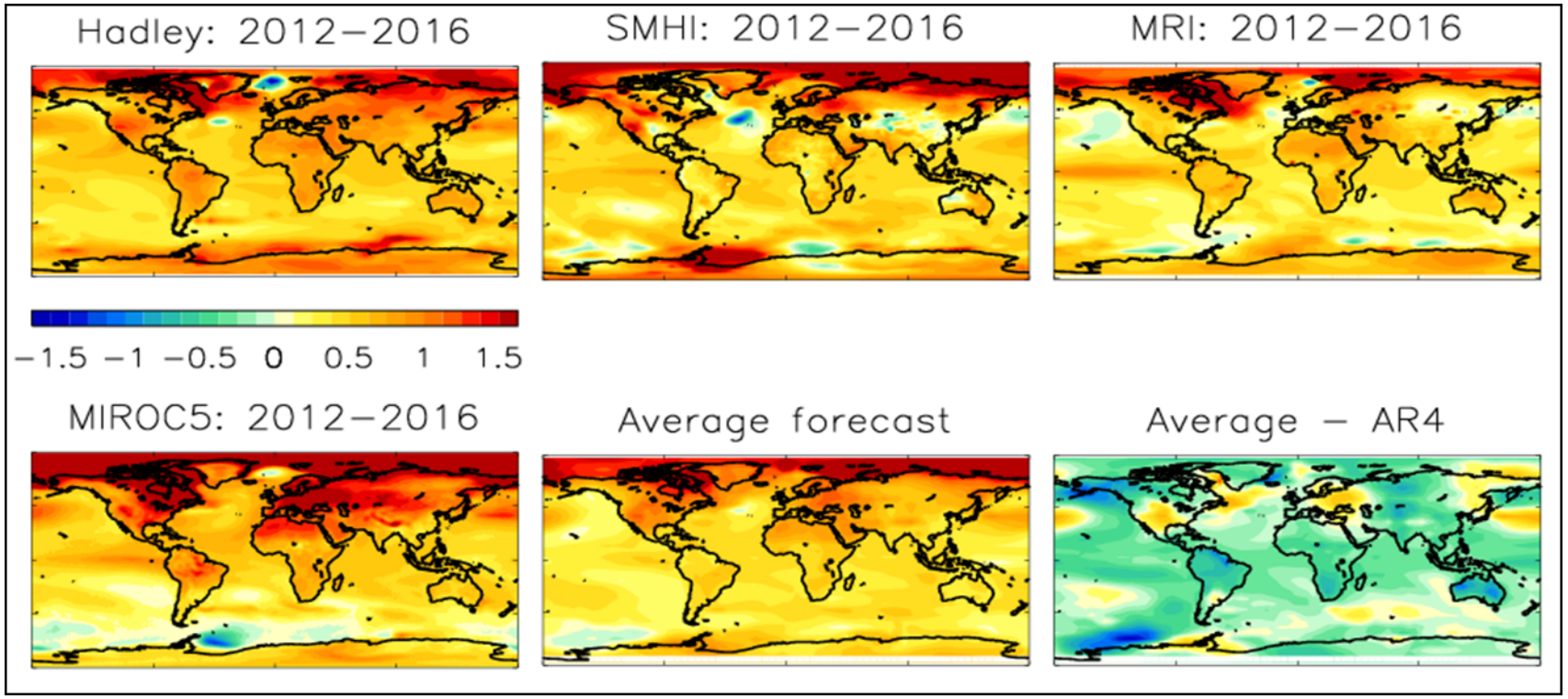


Other Related Activities

- **CMIP5 decadal prediction runs are coming online**
- **Earth System Grid (ESG) – Data from 14 models**
  - **HadCM3; CanCM4; MRI-CGCM3; MIROC5 (2);**
  - **IPSL; CNRM; MPI; BCC; NCEP; GFDL;**
  - **FGOAL; EC-EARTH; GEOS-5**
- **Analysis of skill of decadal predictions using CMIP5 archive**

Experimental Decadal Prediction

- **Experimental real-time ongoing decadal predictions based on once a year exchange of data (organized by Doug Smith)**



Future Evolution of DPWG

- **CMIP-WGCM-WGSIP Decadal Climate Prediction Panel (DCPP)**
  - **Provided recommendations on the submission of decadal runs to the CMIP5**

- **Possibility of developing a "Task Force" to map out decadal variability and predictability activities across CLIVAR, linking with US CLIVAR decadal working group and WGCM/WGSIP DCPP**

Some Recent Papers

- **Kim et al., 2012:** Evaluation of short-term climate change prediction in multi-model CMIP5 decadal hindcasts, *GRL*
  - **Assessment of decadal prediction in CMIP5**
- **van Oldenberg et al., 2012:** Evaluation of short-term climate change prediction in multi-model CMIP5 decadal hindcasts, *Climate Dynamics*
- **Doblas-Reyes et al., 2011:** Decadal climate prediction with the European Centre for Medium–Range Weather Forecasts coupled forecast system: Impact of ocean observations. *GRL*
- **Branstrator et al**., 2011/2012
  - **A series of papers on assessment of decadal predictability (*J. Climate; GRL*)**
- **Goddard et al., 2012:** Two time scales for the price one (almost). *BAMS*

Decadal Predictions : Some Issues

- **Science issues**
  - **Validating model estimates of decadal predictability**
  - **What are sources of decadal predictability & prediction skill**
- **Technical issues**
  - **Initialization and ensemble generation**
  - **Bias correction**
  - **Ensemble Size vs Number of Predictions**
  - **Verification and evaluations**
  - **Managing expectations**

Meehl et al., 2012: Decadal Climate Prediction: An Update from the Trenches, *BAMS, submitted.*