POS Accomplishments

1) Panel helped to form and participated in CLIVAR working groups: MJO, Drought, Salinity and Western Boundary Current.

   The Drought WG engaged modeling centers (e.g. NCAR) to consider conducting numerical experiments.

   Final report from Salinity WG

2) DRICOMP

3) Encouraged Atlantic MOC workshops at GFDL (2006) and Miami (2007).

   Miami workshop on ocean observing system needs for the AMOC findings are documented in a report.

4) Participated in a review of, and then lobbied for support of, ocean state estimation (e.g. ECCO), in DC, May 2007.

   Discussed outlook: Coupled atmosphere/ocean/ice; High resolution state estimation; Paleoclimate; Model development(s); Production and applications

5) Developed prospectus for Working Group on Polar Issues.

6) Letter(s) to NASA advisory council and congressmen supporting the findings of the NRC Decadal Survey Report on future remote sensing missions).

2007 Science Article

Model Projections of an Imminent Transition to a More Arid Climate in Southwestern North America

Richard Seager,[1*] Mingfang Ting,[1] Isaac Held,[2,3] Yochanan Kushnir,[1] Jian Lu,[4] Gabriel Vecchi,[2] Huei-Ping Huang,[1] Nili Harnik,[5] Ants Leetmaa,[2] Ngar-Cheung Lau,[2,3] Cuihua Li,[1] Jennifer Velez,[1] Naomi Naik[1]

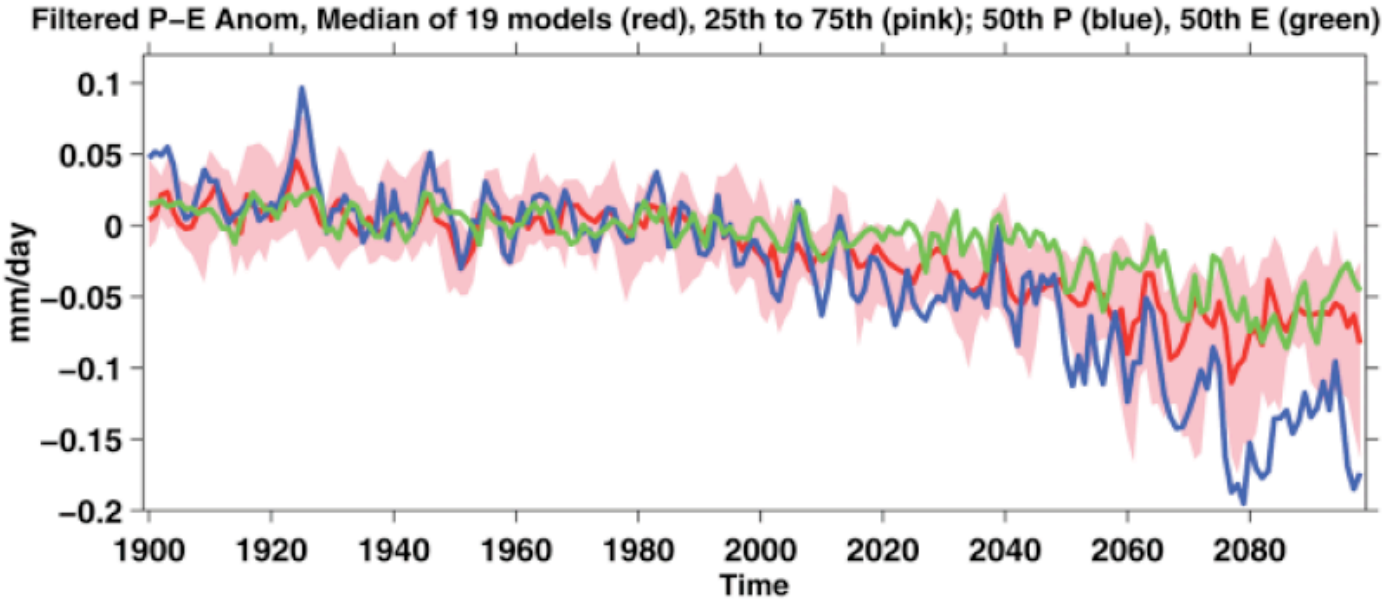
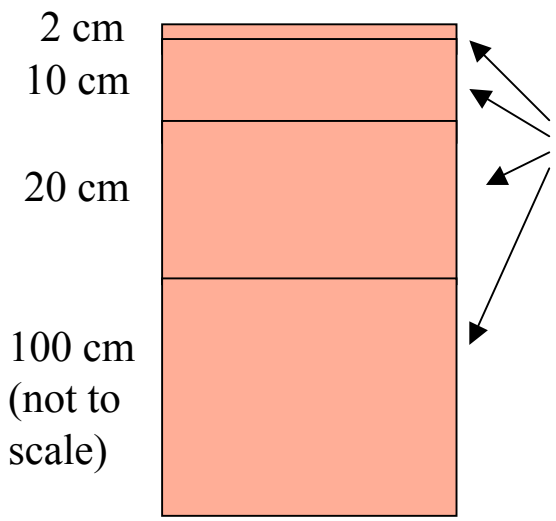


Fig. 1. Modeled changes in annual mean precipitation minus evaporation over the American Southwest (125°W to 95°W and 25°N to 40°N, land areas only), averaged over ensemble members for each of the 19 models. The historical period used known and estimated climate forcings, and the projections used the SResA1B emissions scenario.

Drought WG coordinated model runs:
Soil Moisture Experiment

Goal: To determine if the feedback of soil moisture on precipitation can amplify the magnitude of simulated droughts.

Overview of approach:
-- Repeat multi-decadal AMIP-type climate simulation (C20C or standard AMIP) imposing climatological seasonal cycles of soil moisture.



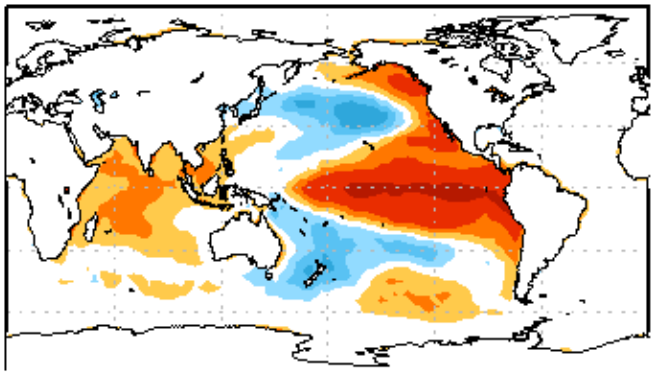
Step 1: From archives of C20C (preferably) or standard multi-decadal AMIP simulations, derive the climatological seasonal cycles of soil moisture content for each soil layer at each land point on the globe. Weekly resolution is great; monthly is probably adequate.

Step 2: Repeat the C20C or AMIP simulation. At each time step, throw out the simulated soil moisture states and replace them with states interpolated from the climatological values established in Step 1.

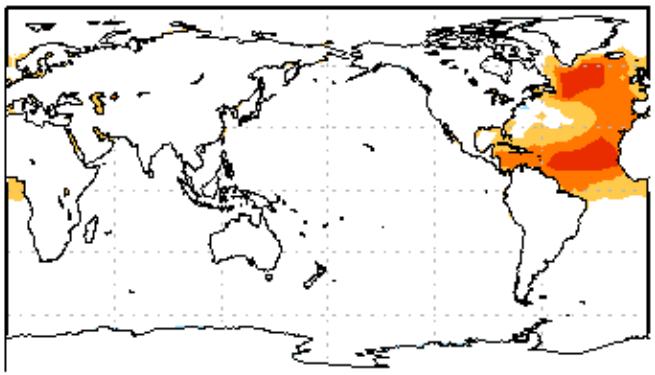
-- Compare precipitation variability (in particular, drought strength and occurrence) in this run with that in original run.

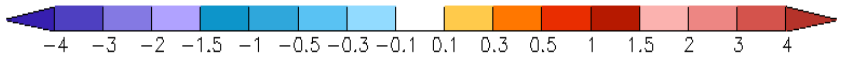
Drought WG coordinated model runs:
Idealized Experiments with Atl and Pac

Pac



Atl



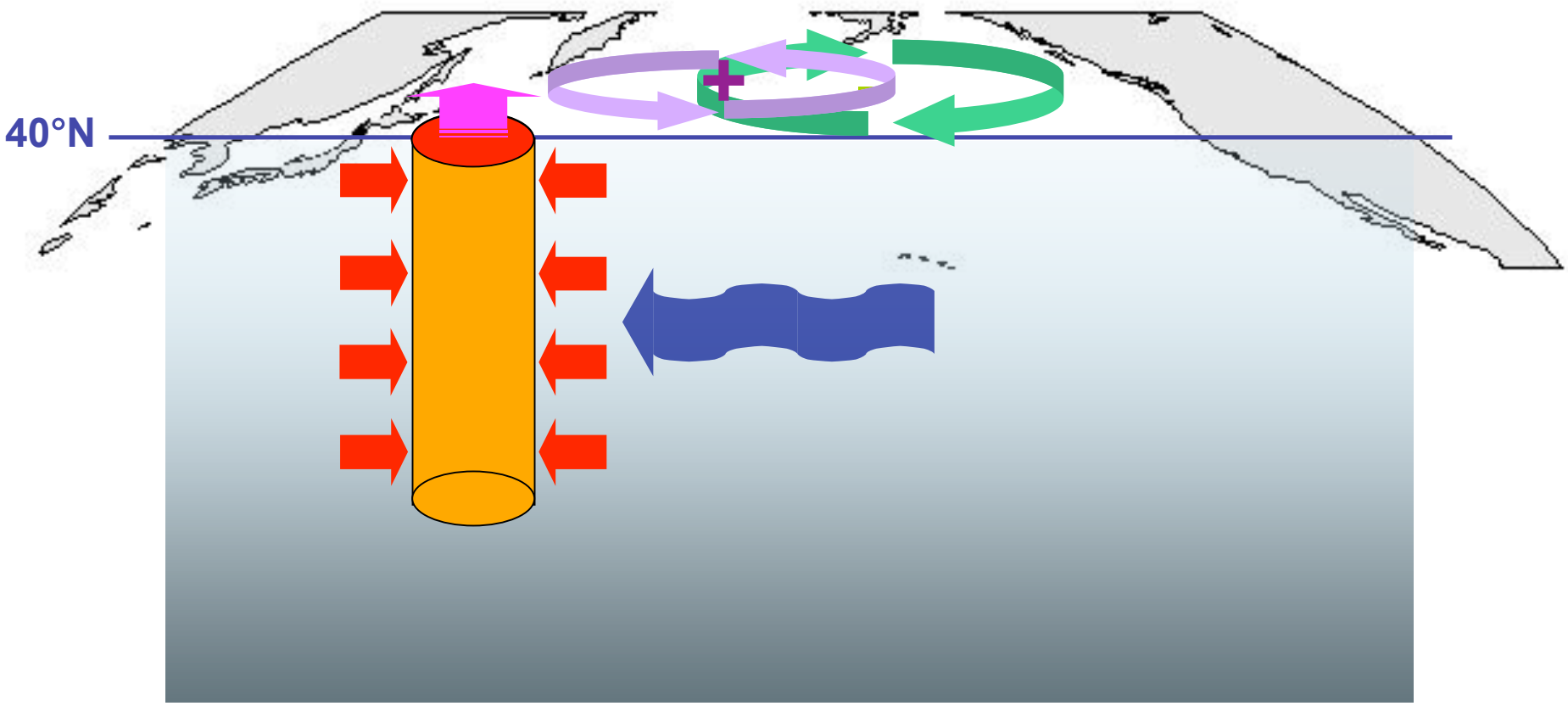


SST Forcing patterns (warm phase)

Pac \ Atl

	warm	neutral	cold
warm	ww	wn	cw
neutral	nw		nc
cold	wc	cn	cc

WBC: Pacific Ocean-Atmosphere Coupled Mode

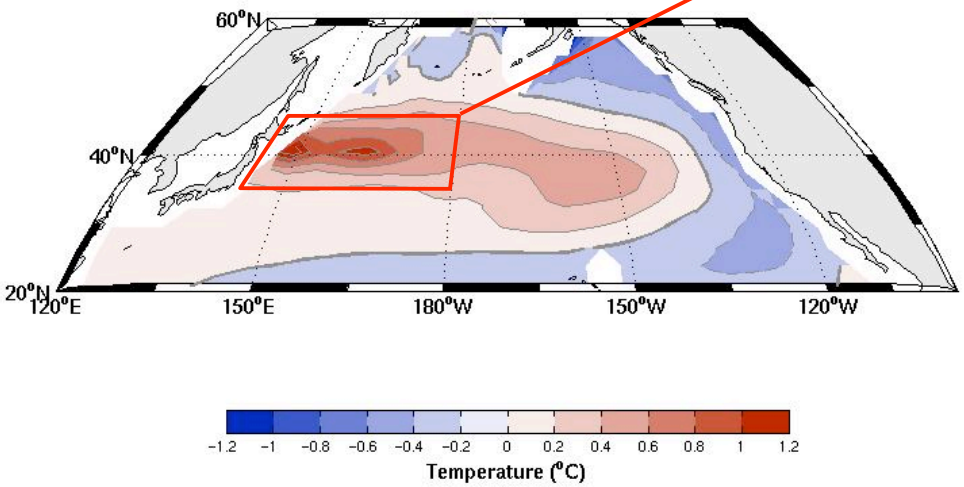


CCSM2: Kwon and Deser (2007, J. Climate)

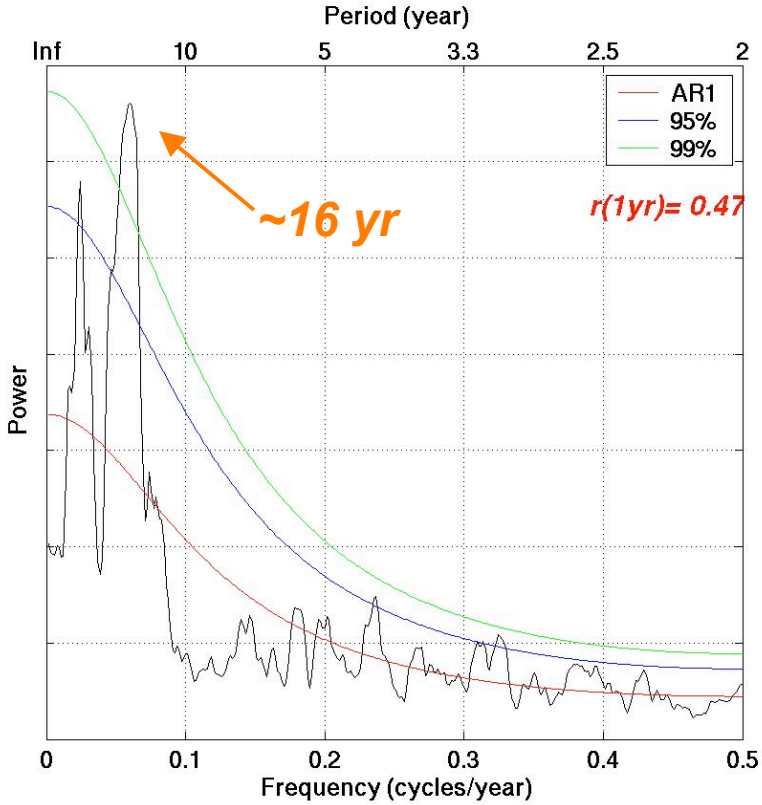
Obs: Qiu et al. (2007, J. Climate)

CCSM2 North Pacific Decadal Variability (CCSM2 control integration: Model Year 350-999)

Winter SST EOF 1 (21%)



Kuroshio Extension SST Index



Kwon and Deser (2007, J. Climate)

Atlantic Decadal Variability Workshop Findings

•Extensive observations of the ocean will be required globally for the foreseeable future for model initialization, forecast skill testing, and to reveal unsuspected elements of oceanic change. ***This includes existing and new observational systems.***

•Interagency/international coordination to weigh tradeoffs between research needs, potential longevity and costs of observing system elements ***and to find additional funding resources***.

• ***Attribution*** of signals rather than just the identification of signals.

Future work is needed in the following areas;

• Sustain the current observing system to preserve the continuity of long-term observations.

• Analysis of observations and model-data comparison studies are needed to characterize variability and evaluate datasets and models for predictability and generating nowcasts.

• Research focus on initialization by the observed state, simulation of observed signals, and the evaluation of predictability. Includes effects of projected changes in external forcing of the system, and the development of statistical prediction systems.

•Hypotheses and diagnostics to characterize/understand major signals especially decadal variations in the MOC. Studies of how these signals impact hurricanes, ecosystems, the carbon cycle, monsoons, droughts, etc.