

Decadal Prediction: Can it be skillful?

Abstract (Jerry)

1. Need for decadal predictions (Lisa) Rick, Claudia, Authur

Increasing demand from policy and industry; possibly more interest than in longer term; in the planning horizon for a lot of infrastructure, adaptation, vulnerability, ...

Climate services starting in various countries

NOAA, UKCIP, CSC

Event attribution - Gabi

Refer to SI experience (e.g. IRI)

Potential interest for chemistry/aerosols/pollution/short-lived species

Regional changes/extremes/extreme events - Gabi

Increase understanding of climate system

Prediction good way to validate models

What kind of information is needed, and what can be produced?

2. Background (Jerry) Ed H, Keith

Current state from AR4—commitment and forcing for decadal

Note two recent papers

Decadal lies at the boundary of initialized and forced response; predictions/projections

Keith cartoon

Decadal is at the intersection of SI and climate change communities

Hawkins revision of Cox and Stephenson;

Show sweet spot in uncertainty

Could we see significant predicted signals above noise on decadal timescale?

Potential predictability et al. - George

3. What decadal phenomena could potentially contribute to decadal prediction skill, and how well do models do simulating this decadal variability? (Ron)

CMIP3 models actually get similar to or greater than observed decadal SAT variability over land (Fig. 9.8 from AR4) - Gabi

Examples of PDO, IPO (Jerry), AMO, MOC (Gokhan), ozone recovery (David)
(heat content), solar (Jerry, Vikram), volcano
Published material
Link to impacts

Relationship between forcing and decadal modes of variability – MOC (Gokhan) , ENSO and mid-70's shift(Jerry)

4. Science and data issues (James)

a) Initialization (Detlef, Tony, Doug, Masa, Noel, Ben)

--towards a Coupled assimilation (Hadley, GFDL, Japan)

--SST (IFM)

--ocean reanalysis products GSOP, Pohlmann (anom)
(without massaging Kirtman; take out barotropic mode Tribbia/Gokhan)

-- hindcast with atmospheric forcing (Gent, MPI?)

--full values (GFDL, Kirtman, ECMWF) vs anomalies (Hadley, IFM, Kirtman, MPI)

--best ocean observed era - ARGO starting 2003 – Detlef/Tony
Salinity data for initial state
Heat content
XBT bias
Quality of data

--issue of initializing land and sea ice (and atmosphere)
Coupled
Reanalysis

b) ensemble generation (Strategy) - James

--perturb atmosphere initial state - use different atm days around start date or other, same ocean state

--perturb ocean initial state (e.g. singular vectors (Ed H)/optimal perturbations or another ocean analysis, OI)

--perturb both atm and ocn -

--perturb model physics- J

--multi-model ensemble - James

--ensemble assimilation – Tony/Masa

--Ensemble member size? – David, Masa

IC part of issue

Application

Signal/noise ratio

role of time slice/segment simulations for larger ensemble size

pro/cons

c) predictability vs. predictions

--refer to Boer predictability work shows a lot over oceans in Background section

--the need to build up sufficient hindcasts to assess skill – James/Doug

--for predictions and hindcasts, role of volcanoes (past and future) - Ben

d) Examples of decadal predictions – Doug and Noel

5. Prediction evaluation (Lisa) David, Gabi, Noel, Doug

--experience from detection/attribution

IC versus radiative forcing signals

Solar, volcano, anthropogenic

--multi-model evaluation techniques

-- SI experience (Barcelona workshop) – Lisa, Ben, Tim

6. Proposed coordinated experiment (Ron) Tim

Outline/summary

Refer to PCMDI web site and WCRP report

7. Conclusions (Jerry)

Future directions

7500 word limit for text

First draft by August 31
7-10 figures
Few tables