

## Decadal Prediction Experimental Design

### Questions about IC runs

- Goal: Predictions of the 1<sup>st</sup> kind plus boundary changes (radiative forcing)
- Initial value forecasts
- 2005 to 2040
- Is this a good period?
- Should we analyze separately / compare the first decade
- What would it take to convince ourselves/others that we have skill?
- Stockdale et al. paper

#### •Are the observations good enough to initialize models? What is needed?

- Assimilation step, how to project surface info down?
- SSTs (20<sup>th</sup> c)
- Sea level (93 on)
- XBTs period
- ARGO period
- Land, sea ice
- How much do inhomogeneities matter
  - ⇒ good enough to try

can we / should we share ICs / assimilated fields, are they good enough?  
Can we provide datasets for groups who don't want to do their own data;  
These should span uncertainty; and there should be some rules

#### •Role of hindcasts?

- How many hindcasts are needed?
- How long?
- Relative value of a long control versus many hindcasts
- How sensitive are hindcasts on ICs
- Proposal: ARGO period
- We also need longer experiments
- How far back in time – 1980/1960/1970?
- We should not have event driven hindcasts, but would need to know what Types of events are predictable
  - one might even be able to go back further, but maybe not coordinated
- soil moisture/sea ice

#### •Biases

- Are the models good enough?
  - Atmosphere and ocean normally focus of thought
  - What is role of other components/processes (land, sea ice, aerosols, etc.)?
  - Over what period do the ICs matter

- What is processes are predictable?
  - THC/MOC, warming commitment, others?
- Does it matter to where people live?
- How to verify predictions?
  - Develop metrics to measure skill?
  - Also for the ‘best observed’ slice
  - Metrics used within prediction community
  - Other metrics from user communities – these are done outside this group
  - SST would be a necessary index; which other indices – PDO –AMO
  - MOC, NAM/NAO, T averages over continents, precip?
- Attribution methods

Questions about all or other decadal prediction runs

What **timeslices** (present?) should be used

- Ensemble size?

- Forcings

–Solar, volcano, which forcings are important

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More questions

- How do we know a model’s sensitivity and transient climate response (**1%CO2 run and ctl needed?**)- when does its importance kick in?

Proposal: 100?? yrs ctl off today conditions + XX yrs 1% CO2 (70yrs?) only for groups that use a different model here – mandatory or suggested?

Can we get similar information from hindcast period? – not for sensitivity/heat uptake/TCR

How many ensemble members?

- What do we compare IC runs against** (see comparison right now against AR4 ensemble, do we need something other than concatenated 20thC runs/longterm future?)
- Would 1 run running 1960-2040 through help (would definitely help for attribution based prediction)

Practical questions

- How do we document forcings (TOA long/shortwave stored?)
- What variables will be saved
- What is minimum configuration

- can be decided later but needs to be decided soon!