Day 1

aka.

Arctic – Mid-latitude Smackdown

Q1: What are the critical gaps limiting progress?

- Limited data; need better models (also in Academies report)

- Need better specification of the issue. Specify the hypotheses. Avoid hand waving. For example, define terms like Arctic Amplification.

- We might be fooled by randomness. Need longer datasets in order evaluate whether trends are random or not (i.e. 20th century reanalysis).

- Lack of testable hypothesis and rigor in examining processes (i.e. take in account the multivariate structure of the noise).

- Don't fully understand the potential impacts of tropical convection, Rossby waves, and moisture fluxes on the Arctic.

- Need to better understand how much of extra-Arctic variability originates in the Arctic from hi-lat processes.

- Don't fully understand the role of clouds and radiation in the Arctic

- Instead of exclusively using non-operational R&D models, need to be able to effectively use NWS weather and climate models to test these hypothesis and design idealized experiments to extract what part of prediction is forced vs. natural variability.

Q2: Are there specific high priority problems where near term progress is feasible?

- Better understand dynamics behind negative AO states.

- Focus on the basic dynamics of how the sea ice is affecting the overlying atmosphere

- Different results with range of models that have varying ensemble sizes. Generate larger ensembles of large climate simulations with different models; also test different initial conditions and parameterizations.

- Now have many seasonal forecast systems (especially dynamical models) to tease out the linkages

- Model sensitivity experiments are often uncoordinated. Do other models yield the same conclusion? Start to evaluate consistency. Takes a lot of computer time. High resolution will be important.

- Need better understanding of impact on weather timescales, so should use higher resolution weather models

- Current ad hoc data collection. Can we share data from model runs in one place, accessible to all?

- Historical sea ice data is in different locations. Can we we collect it in one place, so we can extend the statistical analysis?

Q3: Are there common challenges, cutting across several processes?

- Common sets of data for analysis and lots of eyes focused on them
- Bring together the observations and modeling of a problem together (i.e. can we collectively agree on a common period of assessment?)
- *Many* different casual chains have been proposed to link sea ice/AA to mid-latitude patterns. Process-based diagnostics and focused model studies are needed to test each link. Possibly, a climate process team.
- Focus on regional connections between mid-lat & Arctic (not necessarily a zonal connection)
- Better estimates of prediction & predictability – allows you to isolate what you want to focus on.

OTHER POINTS OF CONVERSATION

- NCEP Climate Forecast System (CFS) – designed for operations (reliable, 24/7, etc.) hinders experiments. Re-engineer operationalized code. Buggy. Sustained effort required.

- Recommendation: Bring NCEP ops to a place where they can better interact with R&D efforts. Use NCAR – CESM program as a model (i.e. once yearly training sessions, learn to run the code & set up experiments).

Present Status, Linkages

- Academies Study was low consensus, see slides
- Terminology was inconsistently used