Assessment of CLIVAR science for applications

- Interest in an “Applications Process Team,” or other targetted applications activities, in particular
  - collaborating with the research and operational communities that may use this knowledge for managing climate risks
- But -- need to know what science knowledge has come out of US CLIVAR to know what the opportunities are
  - “Assessment” of CLIVAR science at various stages of readiness
- “Applications” defined broadly – a continuum from next stages of research to operations (R2O)
  - Working list of these stages
- Note – readiness on the intermediaries side too – see Ray and Webb 2015 in Parris et al, 2015, “Climate in Context,” book on lessons learned from the RISA program, volume forthcoming this fall/winter from Wiley
Continuum of readiness of science for applications

Concept we’re using to organize this assessment

1) Scientific understanding advanced to a readiness for the next research steps aimed at predictable signals

2) Application of understanding of climate phenomena in collaboration with a boundary organization to understand how predictable signals may be translated into useable products
   1) NOAA RISAs, DOI Climate Science Centers, USDA Climate Hubs

3) Use of knowledge in risk framing for a decision process, or in a science synthesis
   1) the National Climate Assessment, ESA (pika, wolverine, polar bear), NEPA/EIS (“Appendix U”)

4) Transitioning science knowledge into operational products (e.g. R2O), such as intraseasonal climate prediction.
Strategies

- AGU and AMS sessions – still time to submit
- Will solicit input from Panels, WG & other CLIVAR groups,
- Questionnaire through US CLIVAR?
- Disseminate initial findings, white paper, webinars, look for what’s missing
- Report or BAMS, EOS article
Examples, submitted to AGU session

• Week 3-4 understanding developed from years of CLIVAR-related work
• PACE post-doc activities:
  – Application of Future Climate Scenarios for Natural Resource Management in Southwestern Colorado
  – Attribution of extreme events in the Western US
  – Medium-Range Weather Forecasts for Agriculture over the Greater Horn of Africa

• Results of working groups
  – MJO WG: capability and decision support gap between weather and seasonal forecasts
  – Extremes WG

• How IRI, CPC, other operational centers have incorporated CLIVAR-sponsored research into their operational and experimental products
• IPCC and National Climate Assessment (NCA)
Track 2: Focus on key societal questions/sensitivities: what are the science Qs?

- Many multi-year to 1-3 decade planning processes
  - Risk mitigation, e.g. do we build based on this info, or wait
  - Adaptation, building resilience for current and future extremes
  - See people trying to use GCM projections this way (graphic)

- Western drought attributed as ~1/2 natural temp variability: if/when might there be a natural cooler period in the western U.S.??

- Hiatus is a big conversation; major volcanic eruption, no – but if this happens, scientists should be able to say something

- Then, design science programs to address these questions
Top ~5 things climate scientists want ecologists to know

1) Give climate data/projections the same critical eye as ecological observations and model results

2) Choose observational datasets thoughtfully. All are different estimates of some "truth," and even a station obs may not be perfect.

3) Caveats about fine-scale downscaling:
   - Tradeoffs between spatial and temporal detail
   - Underlying observational dataset matters

4) Use a range of intentionally chosen possible futures, vs a single ensemble average or arbitrary projections.

5) Natural variability still matters
Spectrum of User Needs

Potentially predictable

Current Forecast Products
Synergies with Int’l CLIVAR DCVP

- Implications of slowdown/hiatus, or opposite
- Volcanic eruption?