The National Multi-Model Ensemble for Seasonal Forecasting

November 17, 2021
Forecasting the Water Year

- **Fall (September/October/November)**
  - Antecedent Conditions
  - Precipitation Onset
  - Temperature Anomaly
  - Soil Moisture State with Snowpack Initiation
- **Winter (December/January/February)**
  - Wet/Dry
  - Notable Anomalies
- **Spring (March/April/May)**
  - Late-Season Bailout or Early Shutoff?
  - Peak Snowpack Melt Timing and Magnitude

Think about how NMME or other forecasts feed information into this framework
Talk Takeaways

- What is an ensemble and why use it?
- Sources of climate variability
- WY 2022 Outlook with some links to sources
What is the NMME and what is an ensemble?

• NMME – **National Multi-Model Ensemble** is a collection of dynamic models predicting the earth system evolution out to 6 months.

• An ensemble is a group which in forecasting is the group average prediction which has been shown to have more predictive power than any individual model.
Temperature and Precipitation Prediction

https://www.cpc.ncep.noaa.gov/products/NMME/seasanom.shtml

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<th>Three-month mean spatial anomalies</th>
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Anomalies with Skill Masks Applied
Ensemble Prediction
Atmosphere Conditions October 2021

Mid-Atmosphere Pressure

Jet Stream


Graphics from ENSO Diagnostic Discussion of 11/1/2021
Madden Julian Oscillation

- Sub-seasonal variability
- Tropical Convective Energy and its movement influence extratropical outcomes
- Mapped as phase and strength
Polar Conditions Northern Hemisphere

https://www.nohrsc.noaa.gov/nh_snowcover/
Land Surface Conditions October 2021

https://www.drought.gov/topics/vegetation#data-maps-tools
NMME - Outlooks

DJF Temperature

DJF Precipitation
NMME – Outlooks with Skill Mask

DJF Temperature

DJF Precipitation
Summary Thoughts

• NMME is a baseline experimental comparison for seasonal prediction
• An ensemble outperforms individual model simulations in most cases
• Land/Ocean/Ice/Atmosphere relationships are changing as the world warms
• Models help to form expectations, but are not perfect predictors
• Understanding physical processes and their interactions are key to successful seasonal forecasting
Questions?

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