ANALOGS FOR ARCTIC FORECASTING

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1. Seasonal scale dynamic climate models struggle at high latitude
2. Analog outlooks system developed using NCEP/NCAR Reanalysis (R1)
3. Temperature outlooks as good or better than dynamic models at high latitudes
NCEP/NCAR R1 Reanalysis data are used to generate historical matches.

Multiple variables, antecedent months, and spatial domain can be specified in analog selection.

Pattern matches are based on root mean square error.

Potential variable choices:
- 2 m Temperature
- Sea level pressure
- Pressure level height
- Sea surface temperatures
- Precipitation
- Pressure level temperatures

Match area, timeframe, and predictive variable (pressure level for temp and height)

Forecast area, timeframe, and forecast variable

Observed conditions for forecast area, timeframe, and variable from 5 best match years

Average the 5 results

Final composite forecast
Arctic Focused Example
Aug-Oct Forecast Using Mar-May for Matches

**ASO 2020 Analogs Forecast**


**ASO 2020 Actual Temps**

![Map showing Actual T2M Anomaly for Aug-Oct 2020. Red Box Anomaly is 3.032 C. Blue Box Anomaly is 3.032 C. (c) University of Alaska Fairbanks]
COMPARISON WITH DYNAMICAL FORECAST MODELS

- % of months (2012-2019) in which better forecast is produced by Analogs (blue) vs NMME dynamical models (orange)

- Analog system outperformed dynamical models in the Arctic, underperformed in the middle latitudes

- Analogs improvements especially noted in late summer and early autumn

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