Advanced Diagnostics for Tropical-Midlatitude Interactions and Teleconnections on Intraseasonal Time-Scales

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Project Overview

Main objective

- Deliver NWS forecast tools that will enhance Week 3 to 4 forecast outlooks

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Focus

- Implement diagnostics designed to exploit the predictability conferred by the intrinsic variability of midlatitude circulation and its interaction with the organized tropical convection

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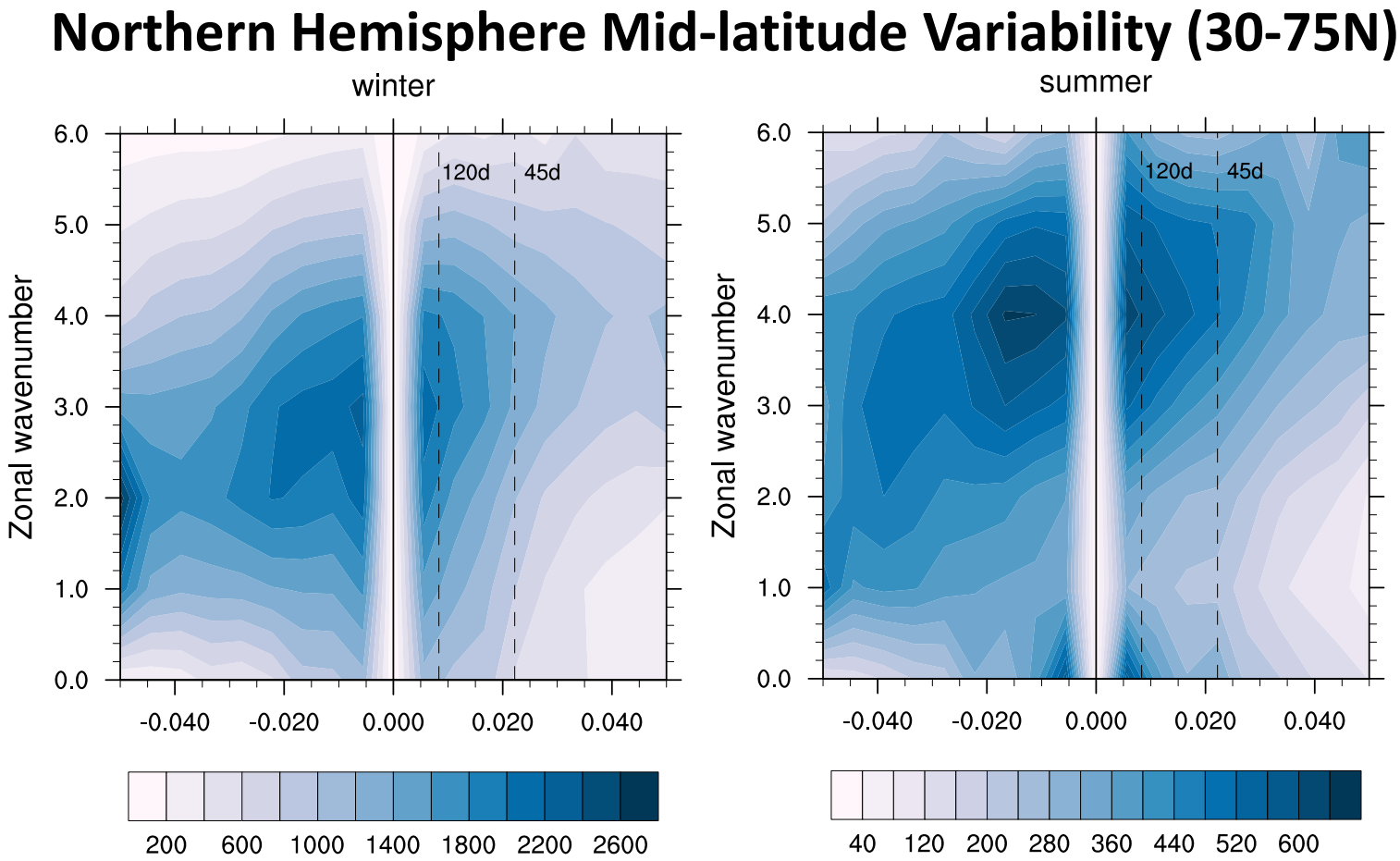
Project Direction



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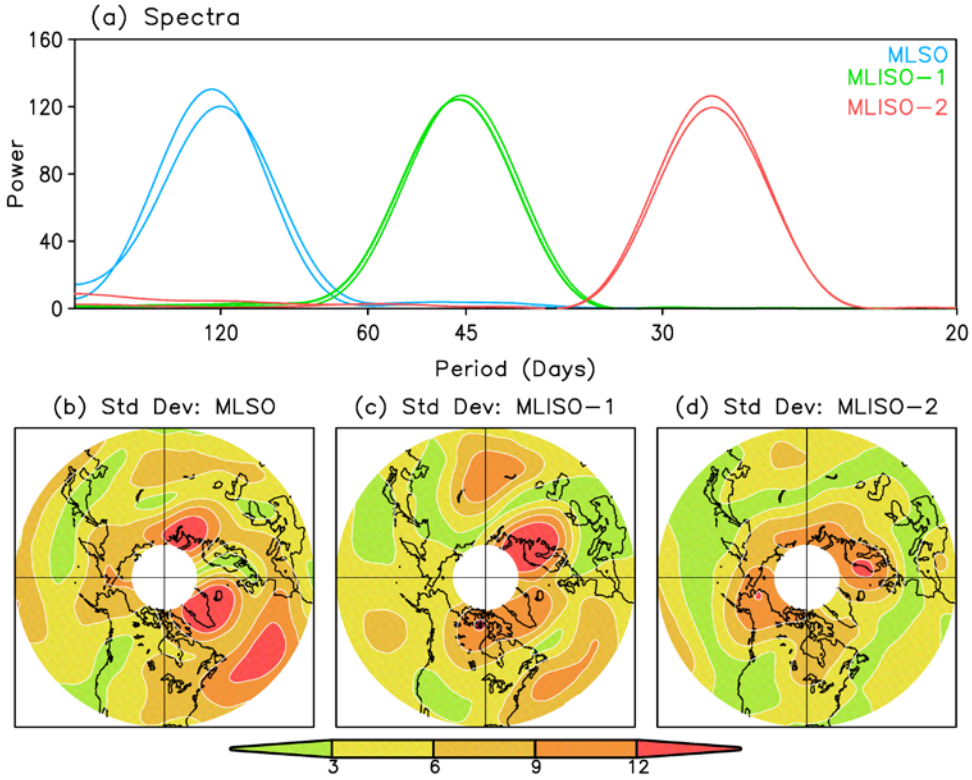
Project Direction

Northern Hemisphere Mid-latitude Variability (30-75N)



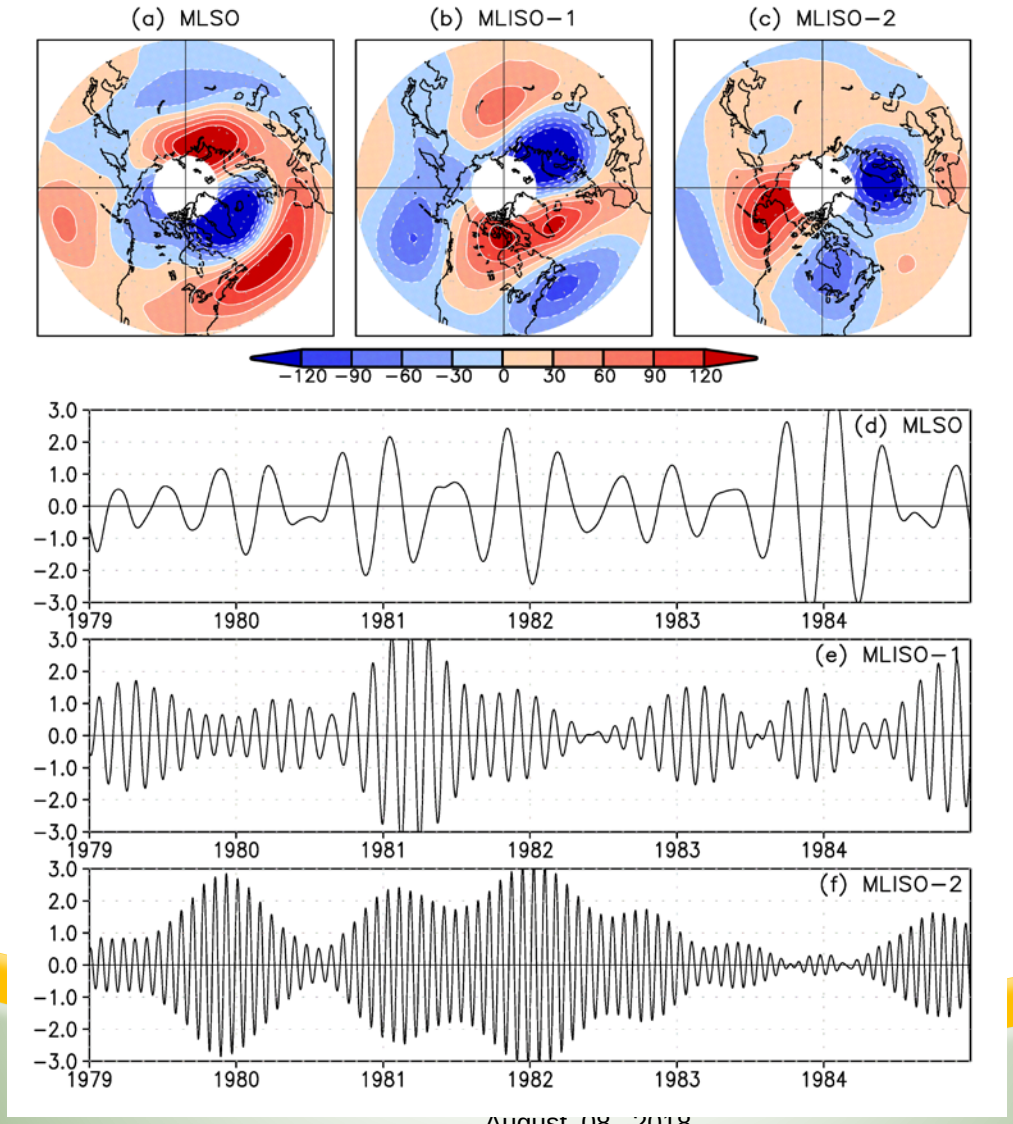
Data adaptive method (MSSA) applied to 500-hPa geopotential height daily anomalies between 1979-2012:

- MLSO – 120 days
- MLISO-1 – 45 days
- MLISO-2 – 28 days

Stan and Krishnamurthy, 2018 (MWR, under revision)

Project Direction

Northern Hemisphere Mid-latitude Oscillation Patterns



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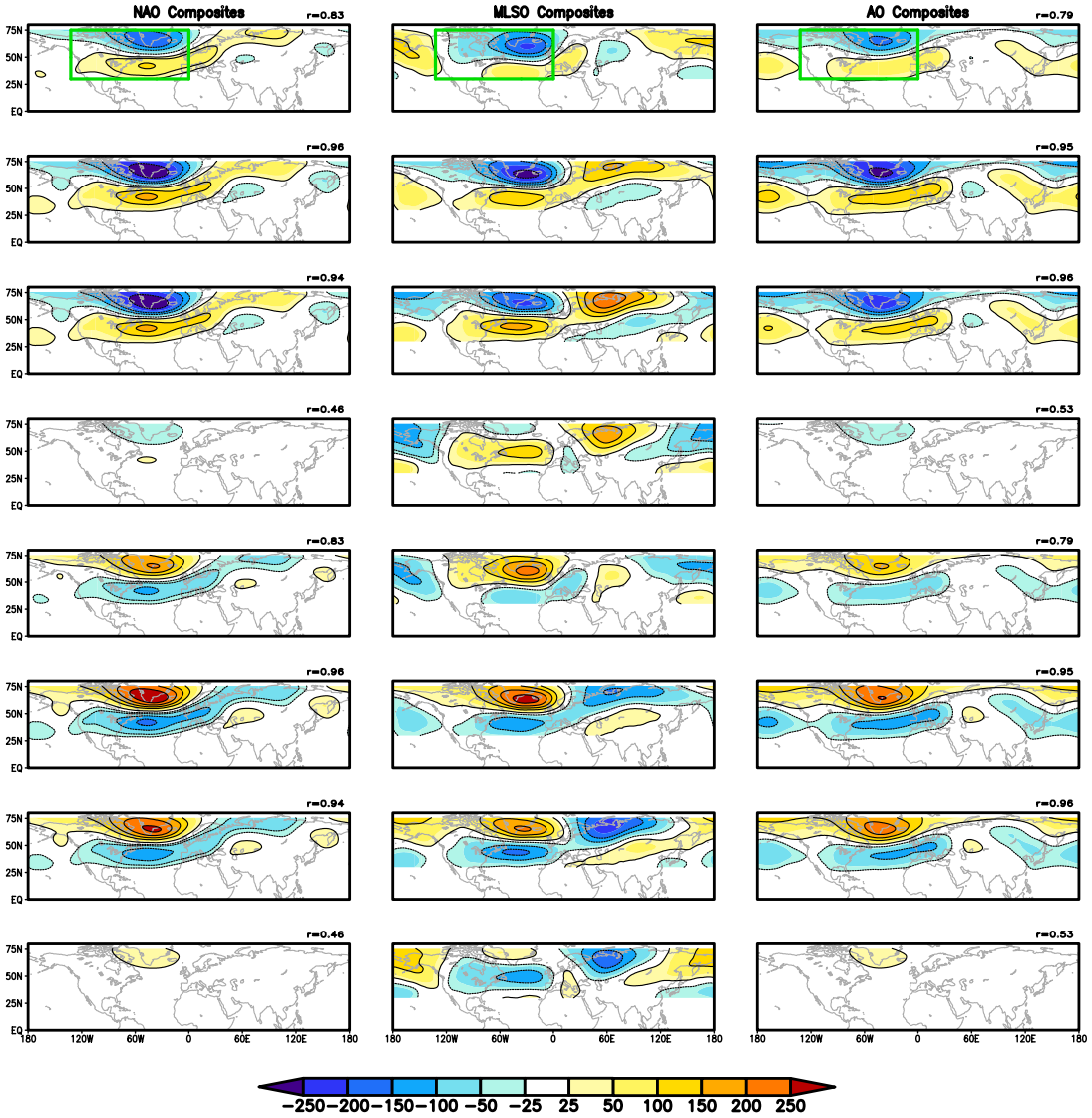
Project Direction

Is MLSO equivalent to NAO or AO?



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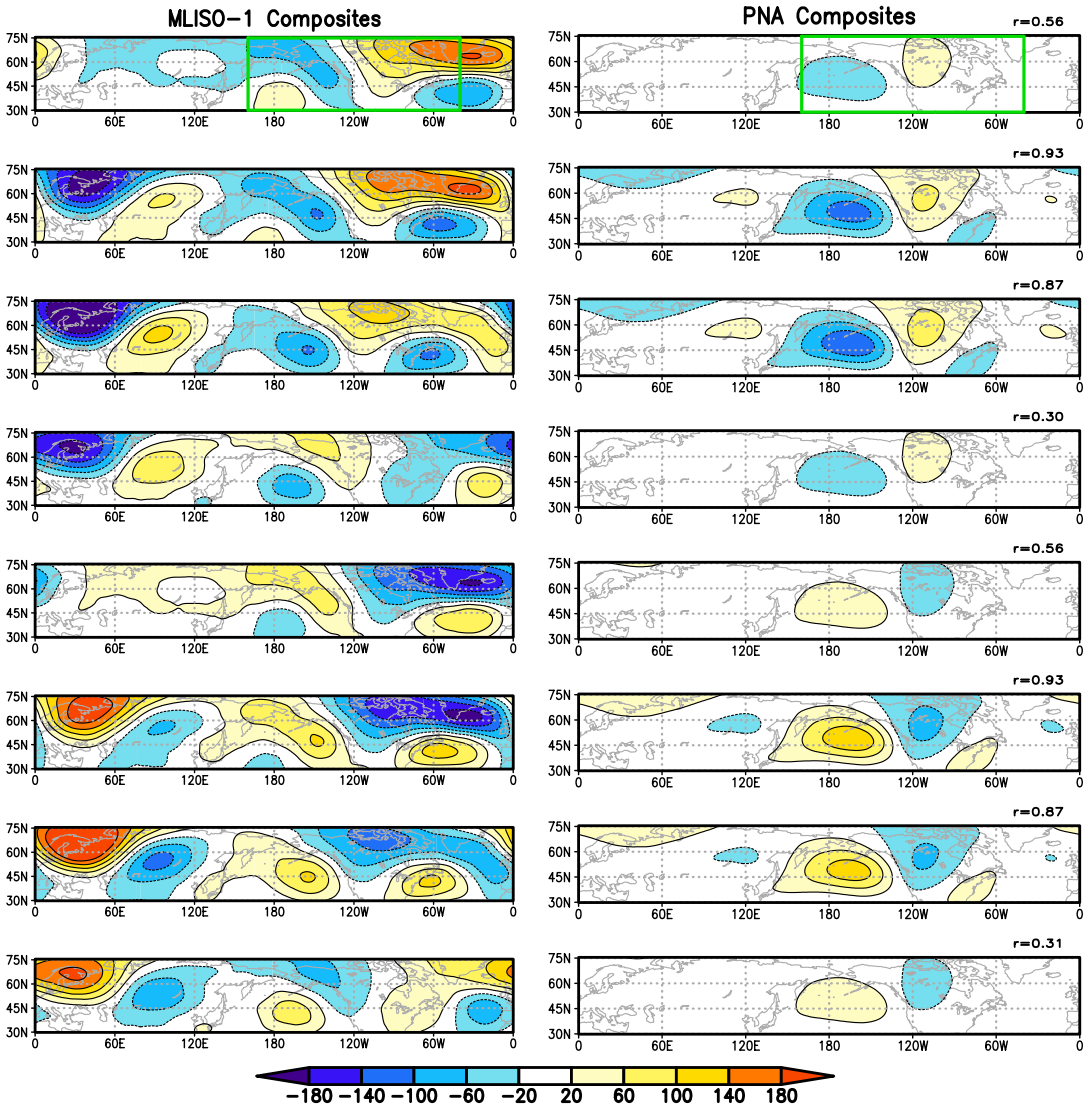
Project Direction

Is MLISO-1 equivalent to PNA?



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Status of Research and Development

Potential Predictability of Mid-latitude Oscillations

- Linear regression model (Rodney et al. 2013):

Predictors:
- RMM1(0), RMM1(0)
- RMM1(-1), RMM2(-1)
- T2m(0)

Predictand:
- T2m(t), t = 1,2, 3, 4 pentads

Predictors:
- RMM1(0), RMM1(0)
- RMM1(-1), RMM2(-1)
- T2m(0)
- **ML Oscillation(0)**

Predictand:
- T2m(t), t = 1,2, 3, 4 pentads

Status of Research and Development

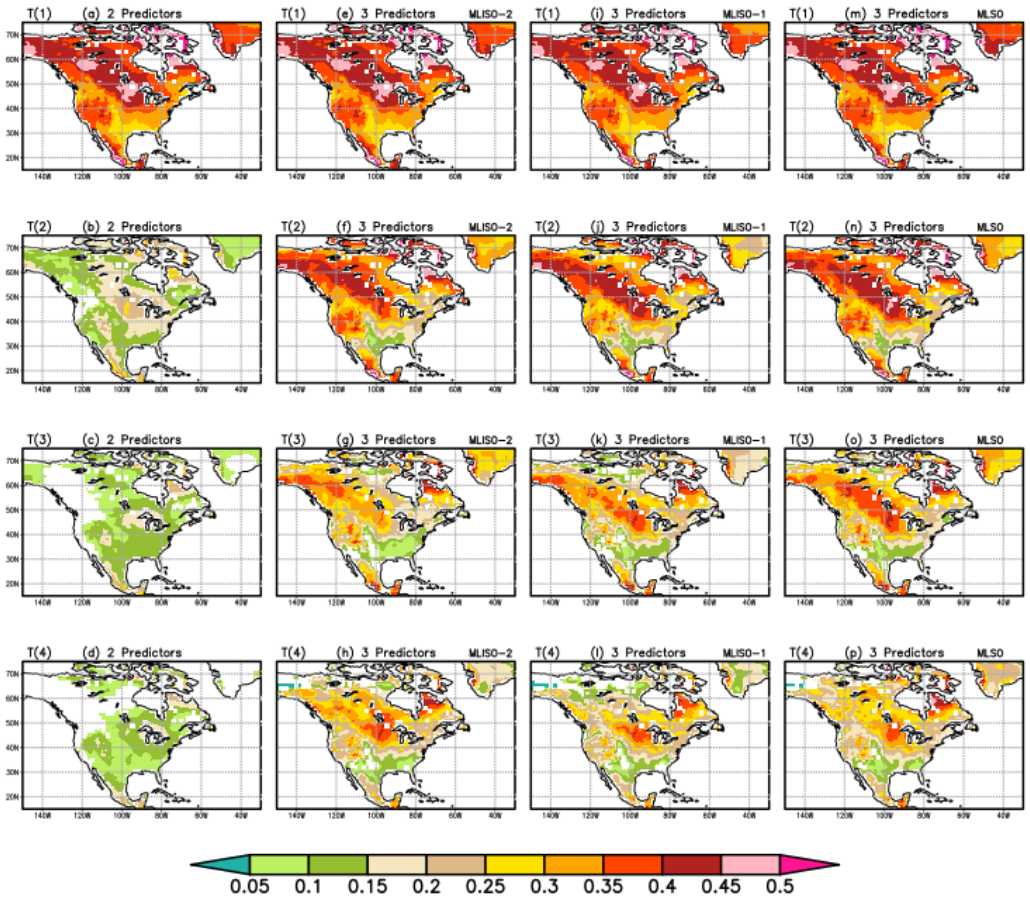
T2m anomaly correlation

Pentad 1

Pentad 2

Pentad 3

Pentad 4



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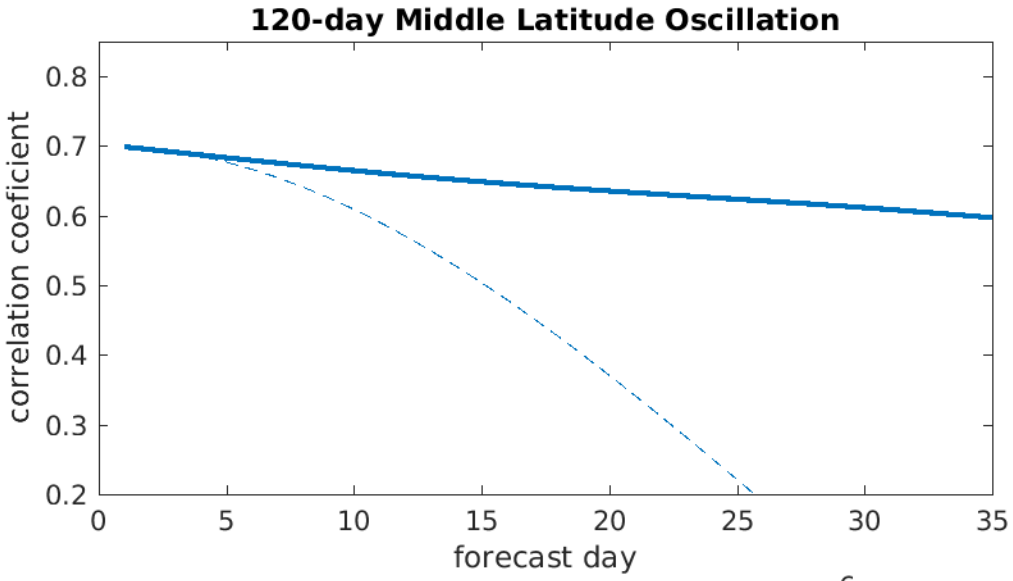
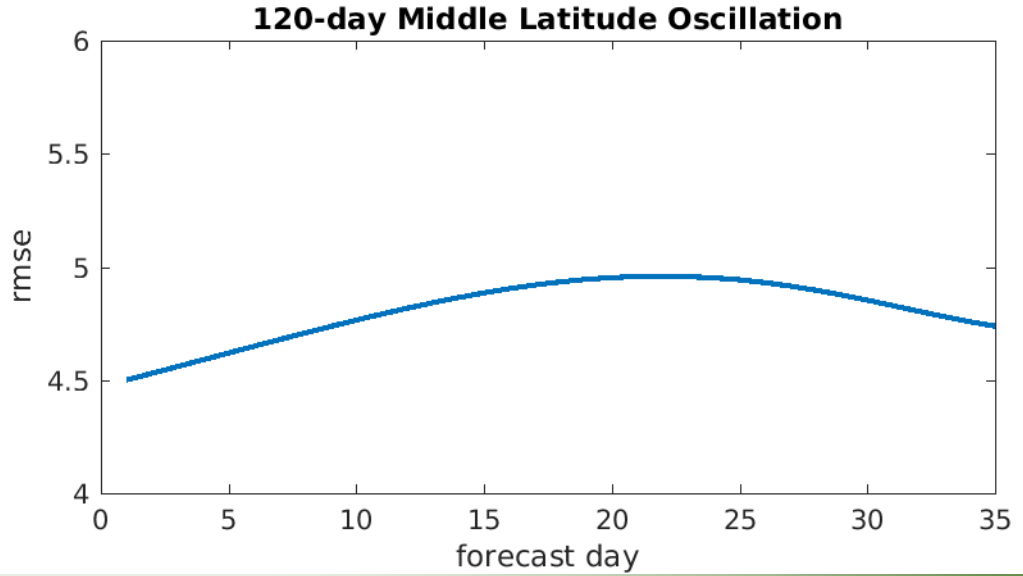
Status of Research and Development

GEFS Forecast Skill



SubX re-forecasts 1999-2008



Future Directions

- Evaluate the forecast skill of mid-latitude oscillations in other SubX models
- Explore the physical drivers of mid-latitude oscillations
- Explore the impact of mid-latitude oscillations on other meteorological parameters, e.g., precipitation.