Scale-dependent relationships between U.S. temperatures and teleconnections

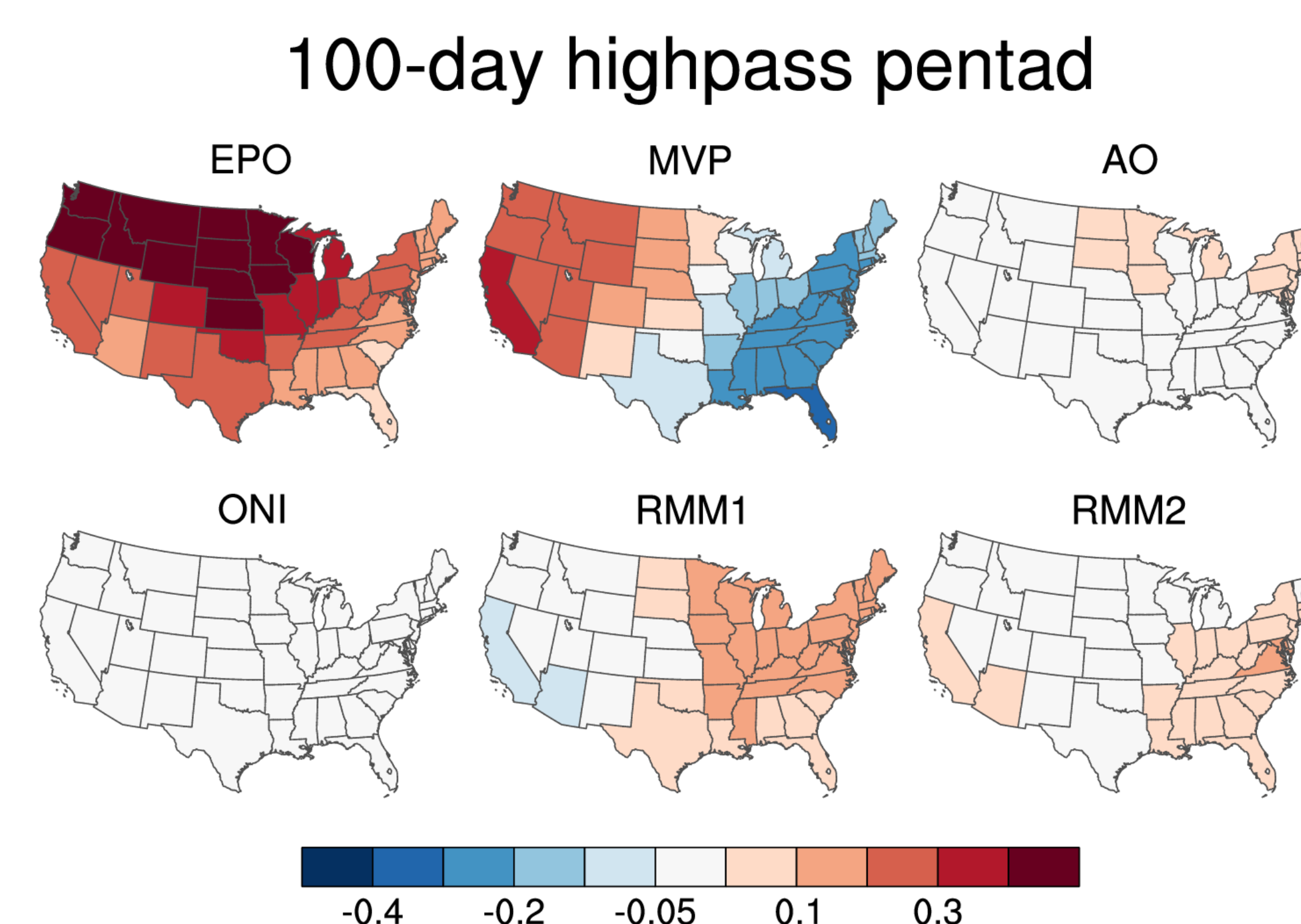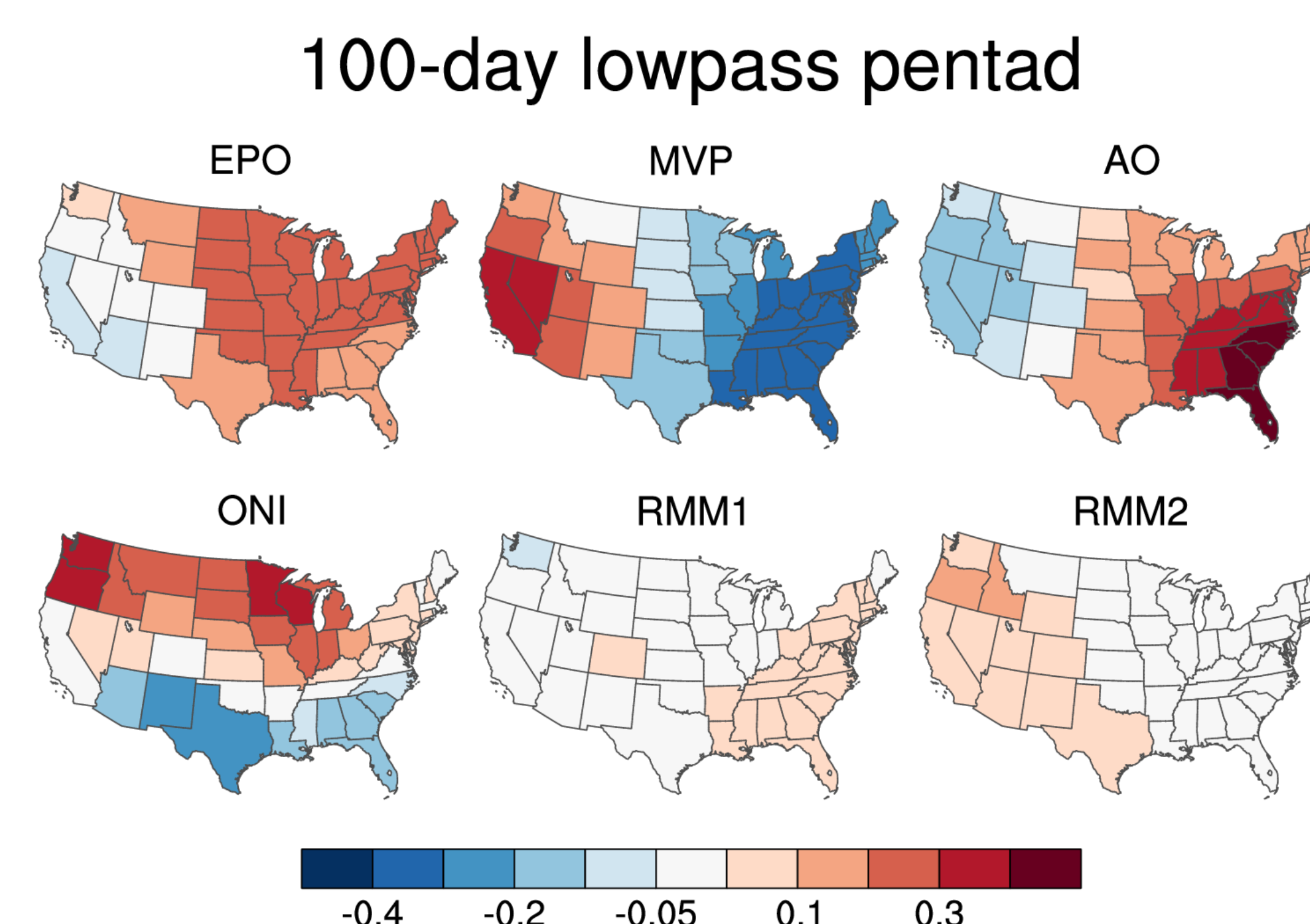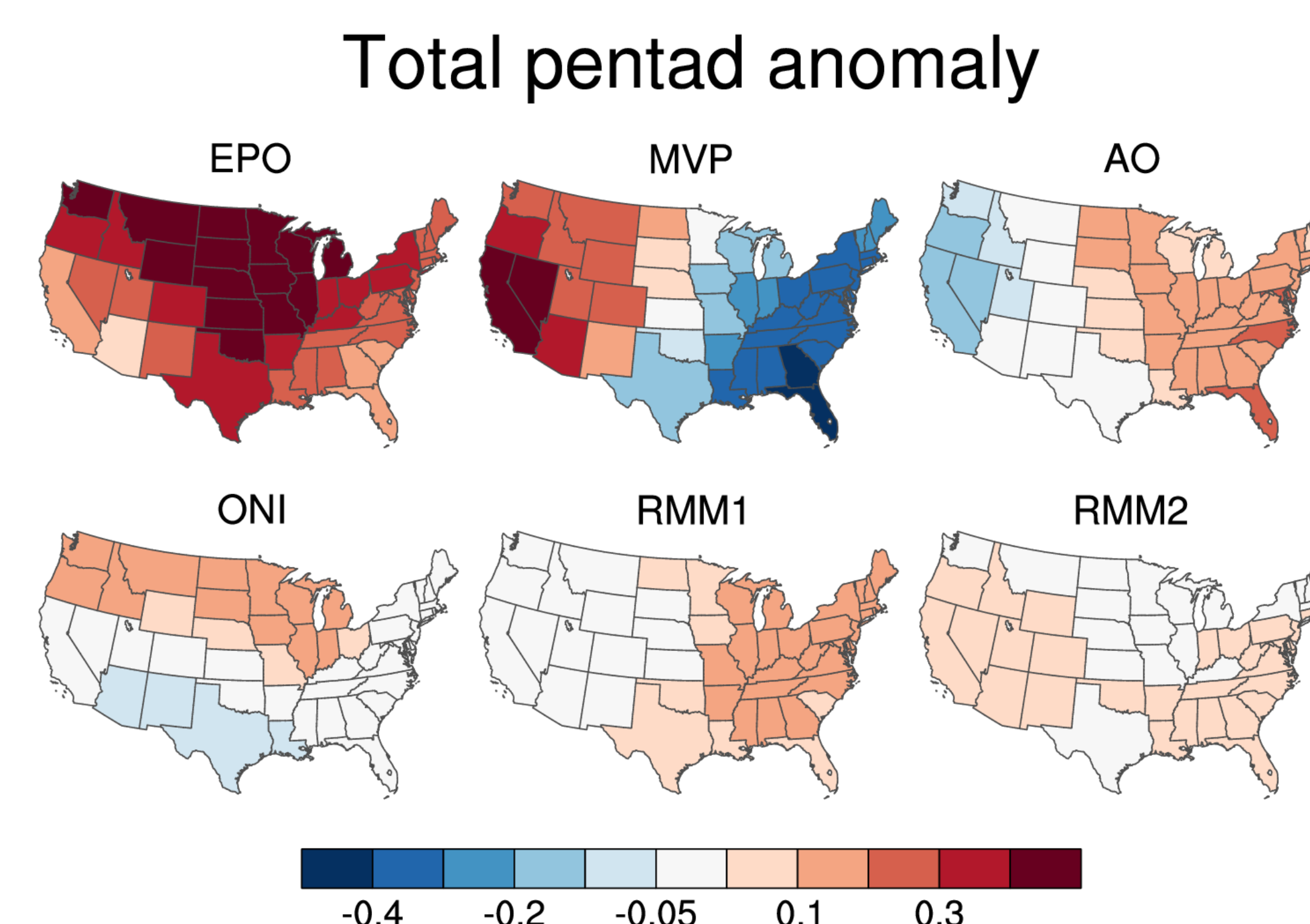Carl Schreck[1], Jared Rennie[1], Lance Watkins[2,3], Kelly Dobeck[2,4], and Derek Podowitz[2,5]

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Question

Which teleconnections have the strongest association with U.S. temperatures at different time scales?
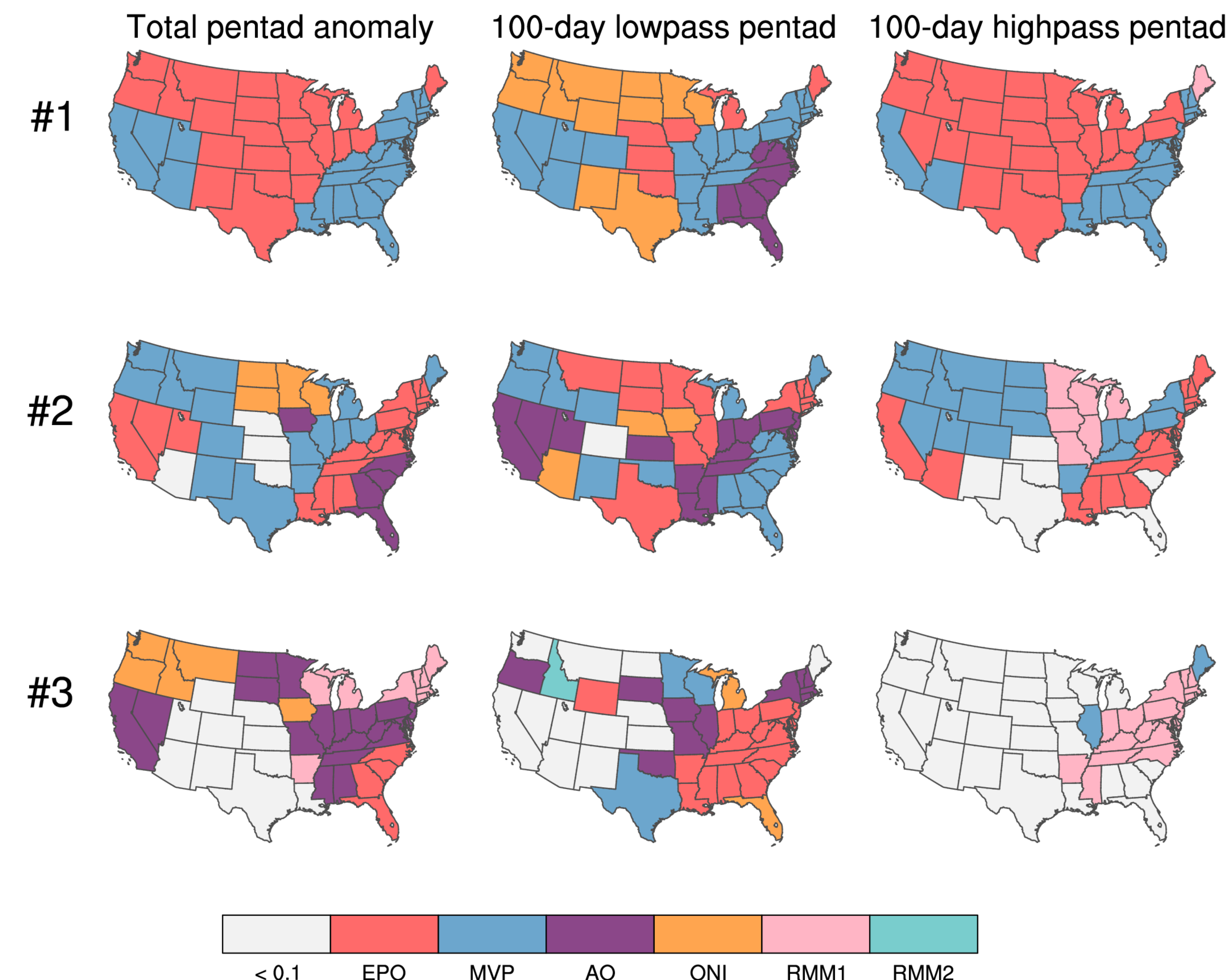
Data & Methodology

Temperature Data
- GHCN-daily data aggregated to climate divisions and then to states
- NCEI U.S. Normals used to produce daily anomalies

Time Scales
- 5-day running average (pentads) to eliminate day-to-day variability
- 100-day lowpass filter identifies seasonal signals
- 100-day highpass filter identifies subseasonal signals

Teleconnections
- **EPO:** East Pacific Oscillation
- **MVP:** Multivariate Pacific North American (PNA)
- **AO:** Arctic Oscillation
- **ONI:** Oceanic Niño Index
- **RMM1/2:** Real-time Multivariate Madden–Julian Oscillation (MJO)

Correlations

Total pentad anomaly

100-day lowpass pentad

100-day highpass pentad

Conclusions

- EPO dominates total and subseasonal
- MVP/PNA is a major player at all time scales
- AO is primarily low-frequency
- MJO beats out AO at subseasonal scales

Rankings

Total pentad anomaly | 100-day lowpass pentad | 100-day highpass pentad

#1

#2

#3

< 0.1   EPO   MVP   AO   ONI   RMM1   RMM2

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