Focus on **Question 2:**
- Pathways of arctic/mid-latitude teleconnections?
- Robustness of these links?

**Different proposed Pathways: Ordered from HIGH confidence to LOW confidence:**

1) Arctic amplification moderating cold air outbreaks
2) Increasing geopotential thickness
3) Thermal wind affect/weakening zonal flow
4) Stratosphere-Troposphere coupling – conditional on the QBO phase
5) Transient (synoptic-scale) waves
6) Planetary waves
7) Resonance with surface forcing

**These pathways/mechanisms are supported by:**
- Physics
- Observational studies
- At least some modeling studies
Important to keep in mind:
- State dependence: background state matters, non-linearities, regional dependence
- (Still) a very useful concept: Forcing of complex system changes the odds, and the response maps on the natural modes of variability (Tim Palmer). Difficult to extract the forced response from natural variability

How strong are these mechanisms as compared to tropical teleconnections affecting mid-latitude weather?

Probabilistic Attribution? How much more likely has Arctic Amplification / sea-ice melt made the observed central Asian cooling trend? (Analogous to extreme weather attribution studies)

Extreme Weather:
- (often) multiple sources interact leading to extreme weather events
- Probabilistic: Remote pathways might change the odds
Central challenge:
How can we reconcile model and observation studies?
→ Merging of observational and modeling approaches
  - (Coupled) data assimilation, relaxation experiments
  - Process-based model validation using complex system tools (e.g. causal effect networks): Understand the pathways: Why does a model produce a certain response?

Sample Size (Question 3):
Proxies: capitalize on paleo-proxy data / use surface-temperature fingerprint methods