Researching Consistencies and Discrepancies of Regional Climate Models

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Why Climate Models?

Climate models are the most sophisticated tool climate scientist have in their arsenal.

General Circulation Models (GCMs)
- GCMs can operate on resolutions as large as 500km but typically within 150-200km

GCMs can overlook regional influences, primarily topography

Regional Climate Models (RCMs)
- Downscaled from GCM pairings

Research Qs

Can robust patterns be observed across RCMs?

Can explicit differences be observed?

Further Questions:
  What might account for these differences?
Methodology

Focus on 4 Primary Variables
- $T_{\text{max}}, T_{\text{min}}, \text{Precip}$, snow water equivalent (SWE)
- All contained in netCDF format

Focus on PNW domain
- However spatial domain was not identical across all 3 models

All data was analyzed in MatLab programming language

Assumed correctly processed data
Focused on 3 RCMs for Analysis

Dynamically Downscaled vs Statistically Downscaled

Dynamically Downscaled RCMs

**NARCCAP** (1968-1999, 2038-2069)
- 50km resolution
- 10 GCM-RCM pairing

**regCPDN** (1985-2005, 2029-2049)
- 25km resolution
- 1 GCM-RCM pairing
- Super-ensemble (Thousands of runs as part of weather@home project)

- 15km resolution
- 3 GCM-RCM pairing
Change in Max Temp for Spring

NARCCAP

Elevation (m)

Change in Max Temp (*C)
regCPDN
regCLIM
How does this fit in?

Can help improve confidence in regional climate model projections because it hits on physical processes at play

More useful for informing stakeholders and policy makers

Identify areas of weakness with the intent on future improvement

How does this fit into REACCH?

Offers more regionally cognizant projections for agriculture
Take home points

1. Influence of elevation on change in temperature
2. Be diligent when interpreting a single model.
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