The IRWIN road climate scenarios.

Overview of methods and results.

David Rayner
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Overview

• Modeling global climate change
• The need for downscaling
• Downscaling methodology
• Slipperiness index results.
General Circulation Model (GCM)
GCMs actually work!
GCM Projections for IRWIN: Nov-March Temperature.
GCM Projections for IRWIN: Nov-March Precipitation.
GCM limitations

• Lack appropriate variables.
• Spatial resolution too low.
• Temporal resolution too long.
• Biases.
GCM data looks like:
Road data looks like:
Statistical Downscaling

• Combine:
  – changes from GCM
  – “weather” from Road Weather stations
  – other historical weather information.
Analogue Statistical Downscaling

• Classify daily historical large-scale atmospheric conditions.
• Classify daily GCM atmospheric conditions.
• Construct 30-minute road weather scenarios by using days with the same classes.
1. Characterize atmospheric patterns.
Lamb-Jenkinsson atmospheric classification

![Graph showing relative occurrence of different atmospheric classifications]

- Reanalysis (Actual)
- ECHAM5 (GCM)
- CCSM3 (GCM)
Analogue days must have...

• Similar Lamb-Jenkinsson class.
• Daily regional temperature within 5°C.
Historical resampling...
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  - implications!!
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- Similar clear-sky solar radiation.
Downscaled data looks like...
Road data looks like:
Example Results: Swedish Vägverket Slipperiness

- Road icing
- Rain or sleet on a frozen road
- “Class 3” snowfall

(Andersson et al., 2007)
Summary & Implications.

• Downscaling to 30-minutes is difficult!
• BUT! Obtain a product designed for road weather impact studies.
• Results: Gradual changes.