Spatial and Temporal Modes of Variability in Arctic Summer Temperature over the Past 400 Years

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*http://www.ncdc.noaa.gov/paleo/parcs/hi_res_whoi.html
Instrumental Record **Too Short** for Evaluating Recent Trends in Context of Natural Background Variability

**Paleoclimate Records Key**

High Resolution
Multi-Century
Overpeck et al., Science, 1997
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AO surface temperature anomalies (C) 1950-96
CONCLUSIONS

• Proxy data accurately record modes of Summer Arctic Temperature Variability
  – Mode 1  Average Summer Temperature
  – Mode 2  Wave number Three Circulation
  – Mode 3  Arctic Oscillation

  In Context of Past 400-600 Years

• Anomalously High Temperatures in Last Century
• Recent AO Index Not Anomalously High
• Increased Variance in Last Century (all modes)
Proxy and instrumental spatial cross-correlation
Arctic Average Temperature vs Hypothesized Forcings

Correlation coefficient $r_{(CO2, Solar)}$

Year AD

Correlation coefficient $r_{(Volcanism)}$

Arctic Average Temperature vs Hypothesized Forcings

Correlation coefficient $r_{(Volcanism)}$

Year AD

Correlation coefficient $r_{(CO2, Solar)}$
c2 (9.6%)
c3 (7.4%)