

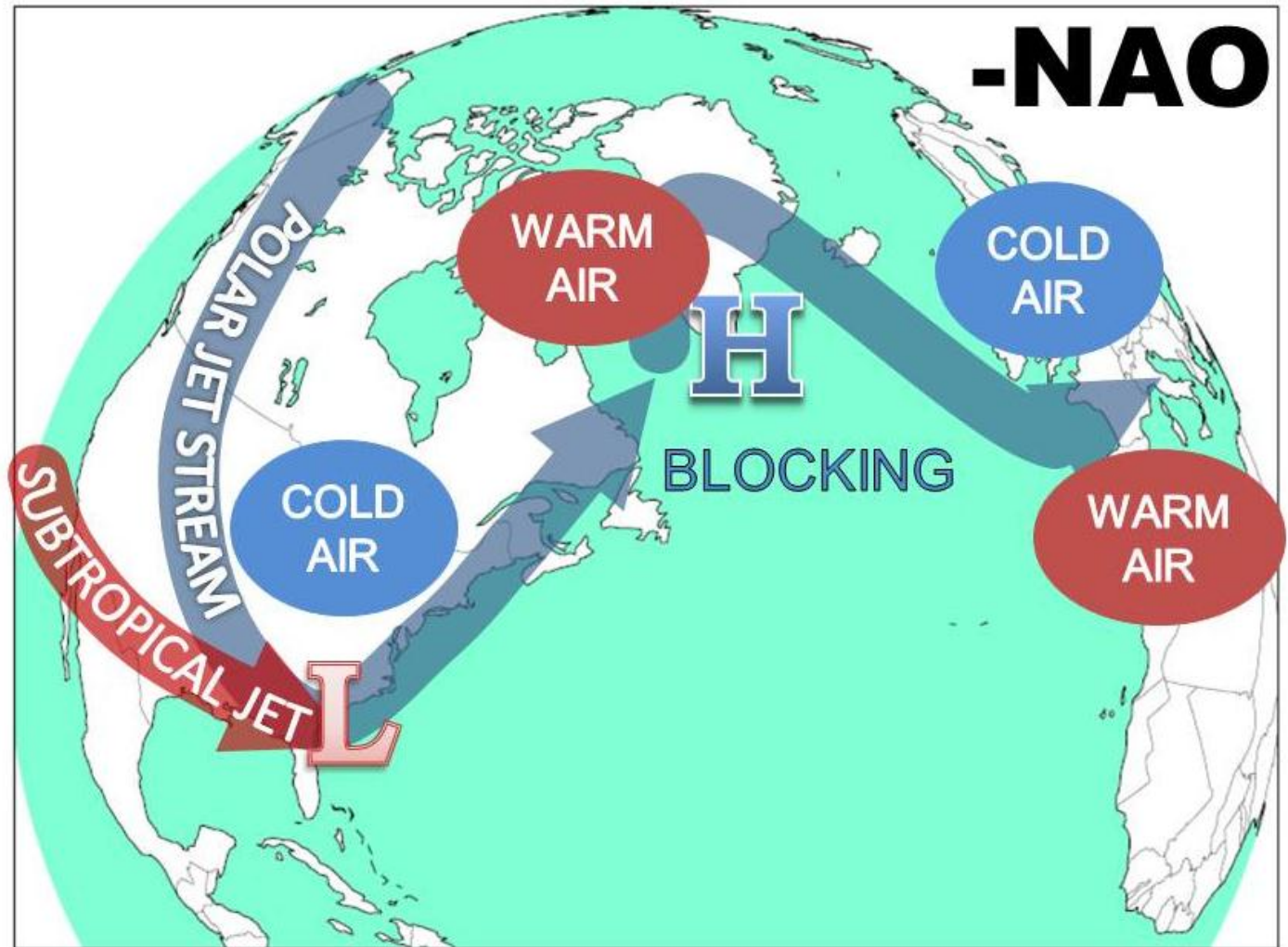
The Connection between Alaska and Greenland Ice Cores under Different Climate Regimes

Stacy E. Porter
Ellen Mosley-Thompson
Lonnie G. Thompson

93rd Annual AMS Meeting

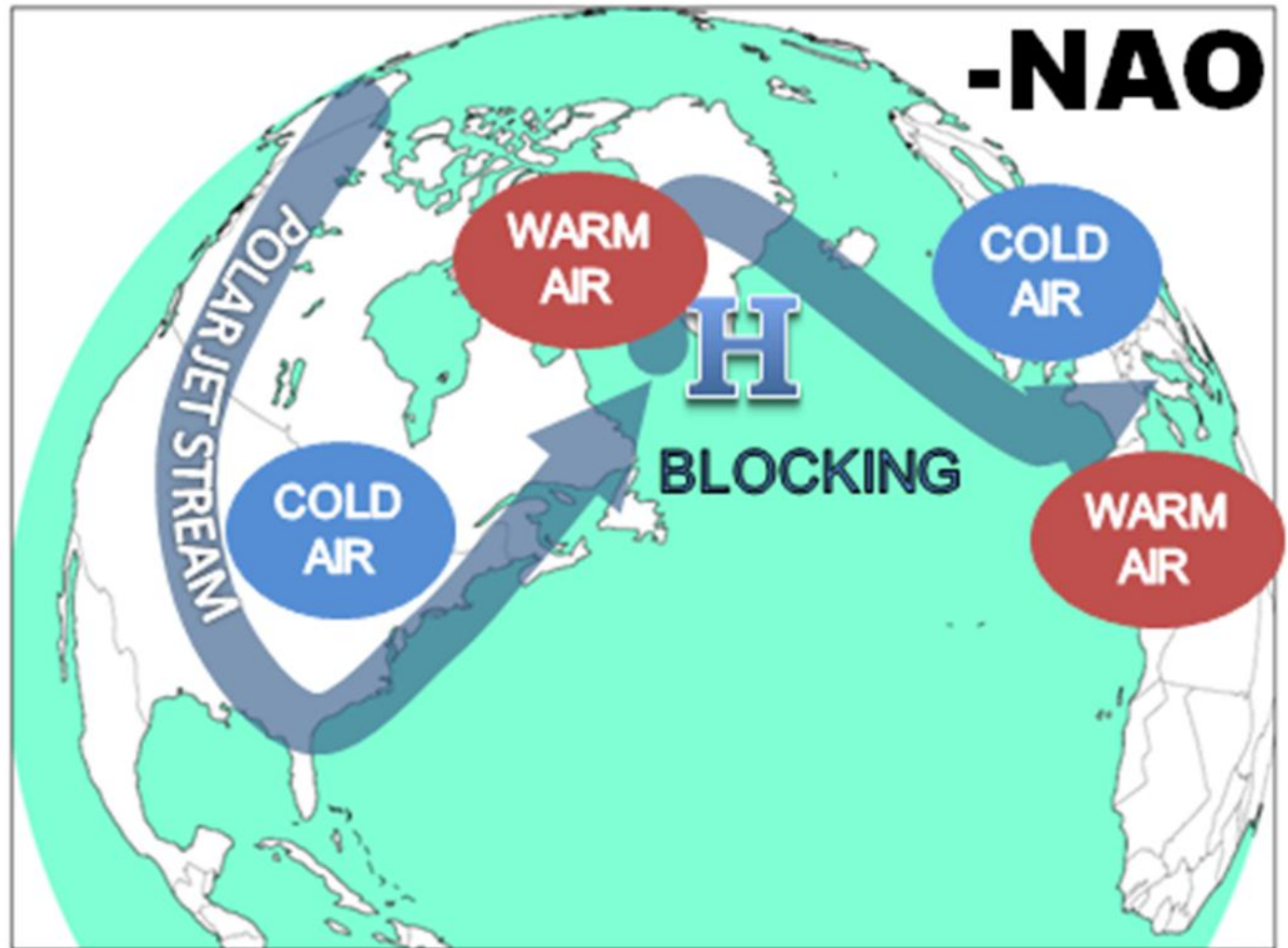
Winter 2009/10

-NAO & El Niño



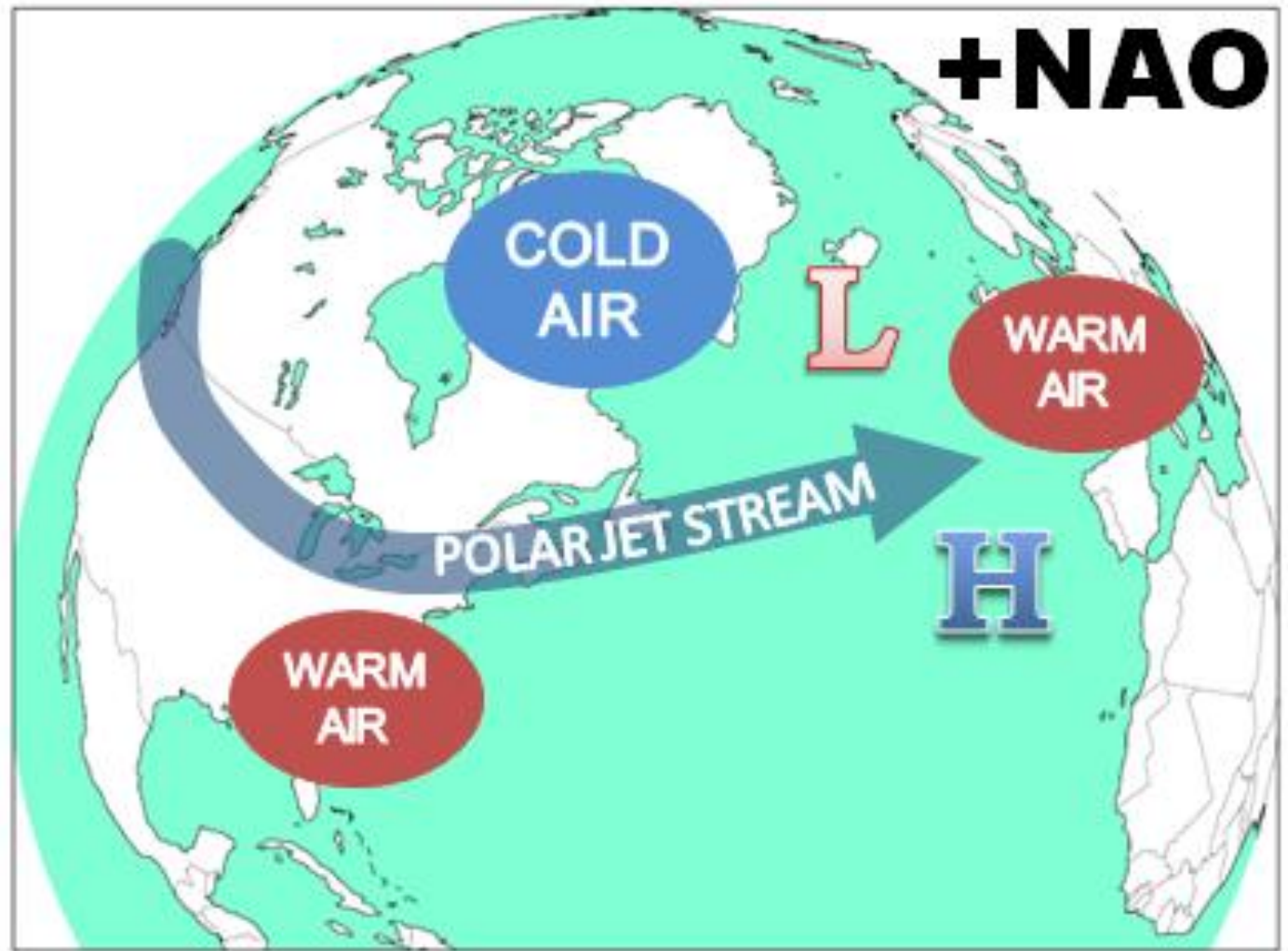
Winter 2010/11

-NAO & La Niña

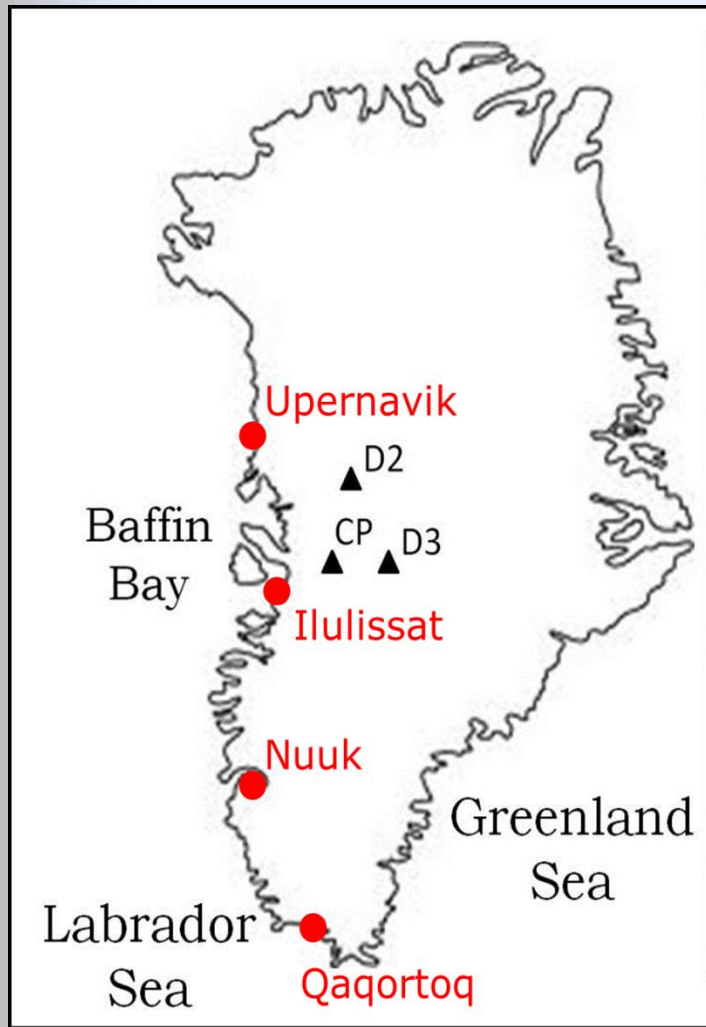


Winter 2011/12

**+NAO &
La Niña**



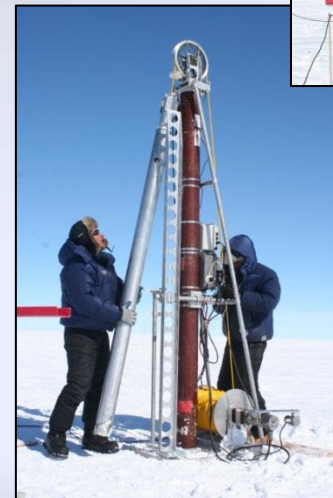
Ice core data serve as climate proxies



- Net accumulation
- $\delta^{18}\text{O}$ (temperature)
- Dust and chemistry

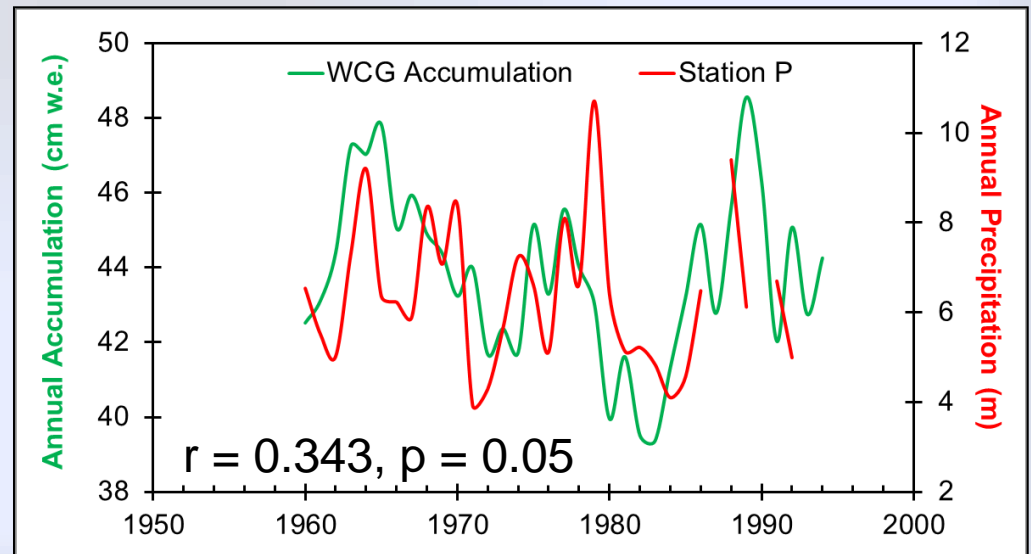
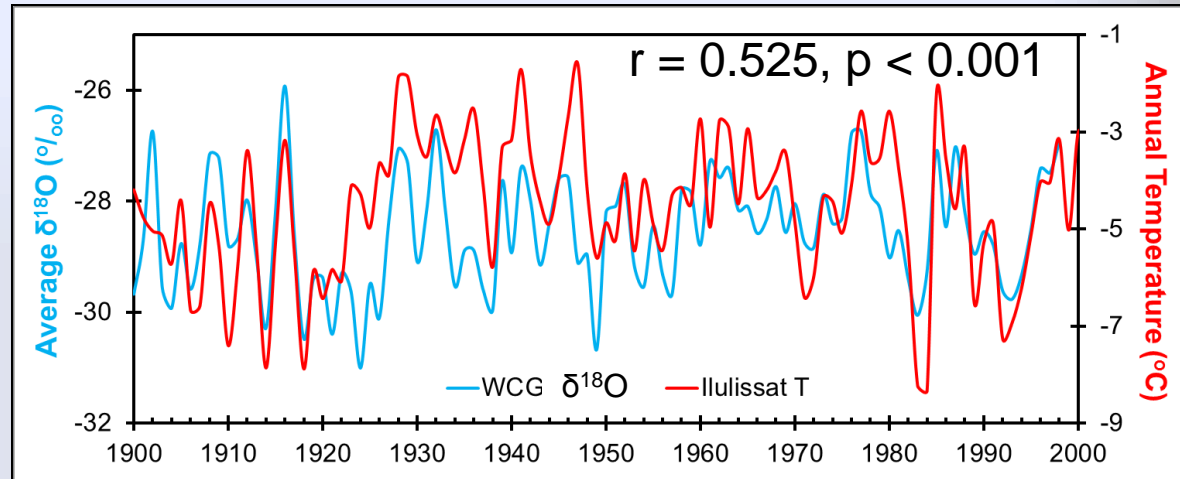
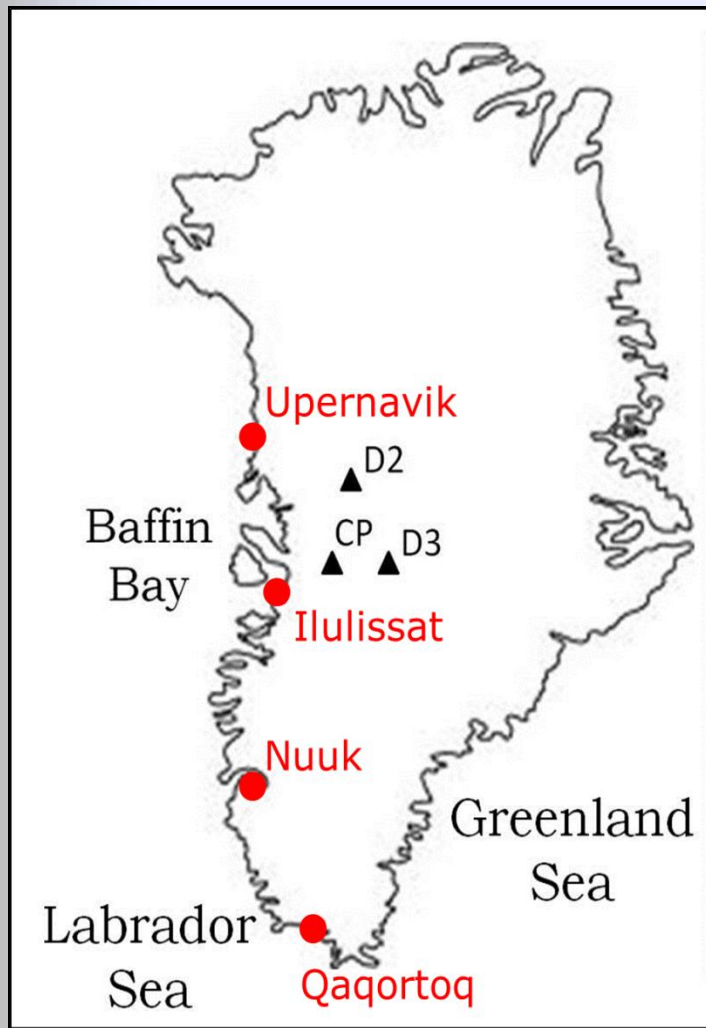


Vladmir Mikhaleiko

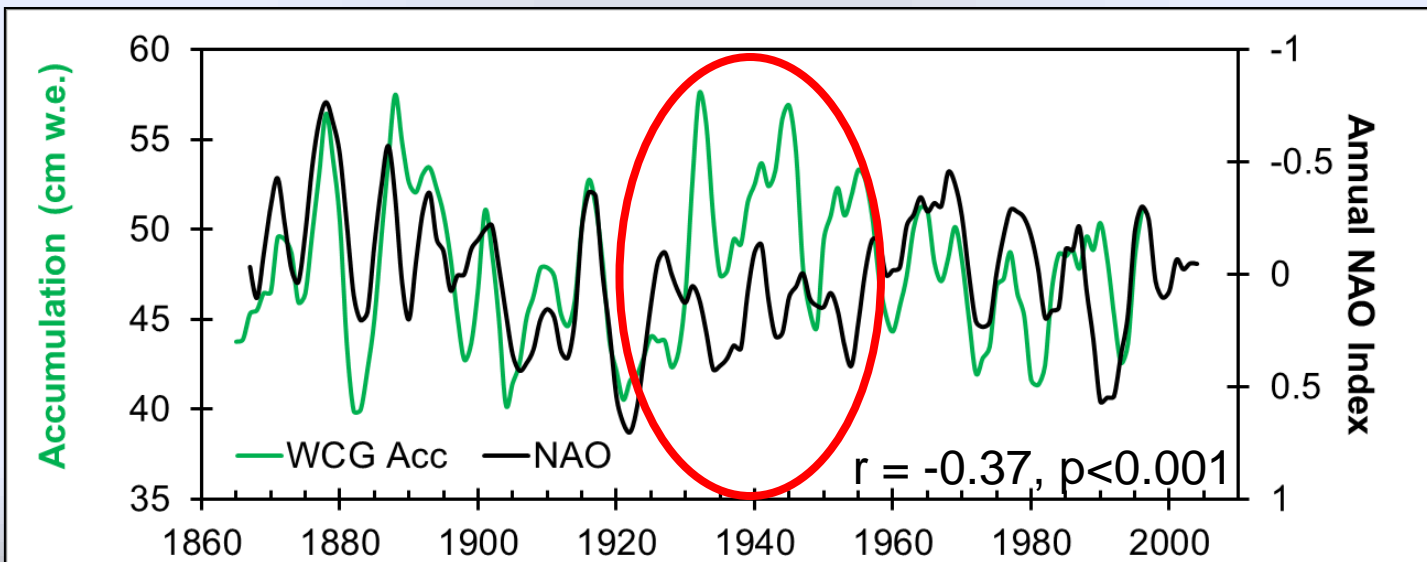
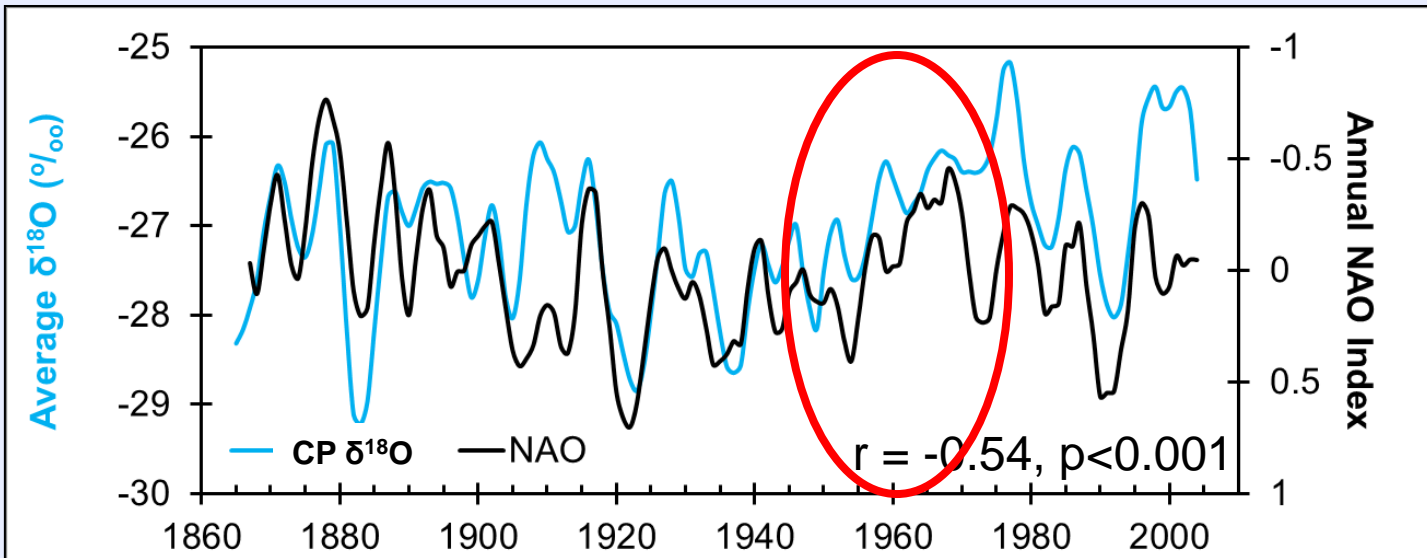


Courtesy of Lijia Wei and Vladmir Mikhaleiko

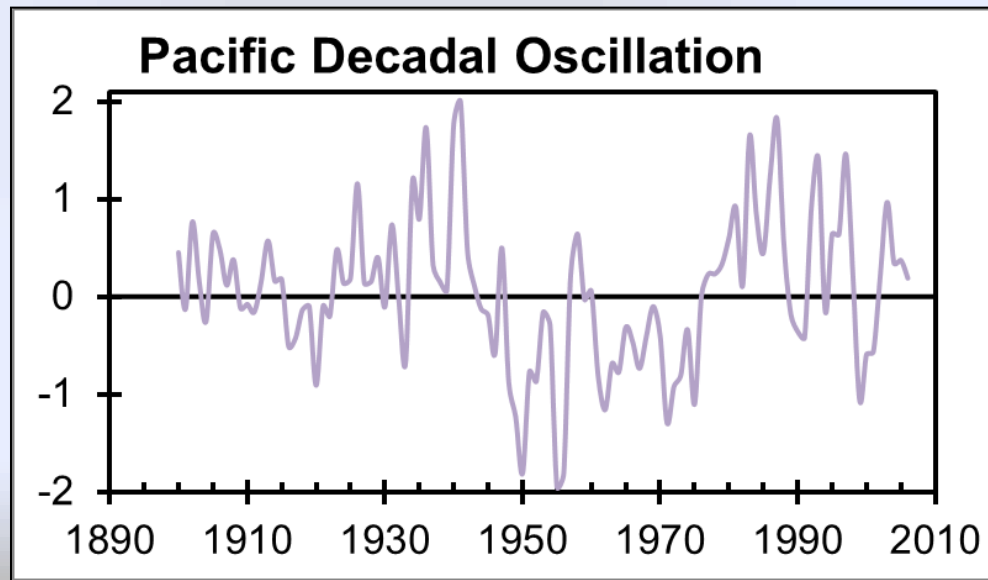
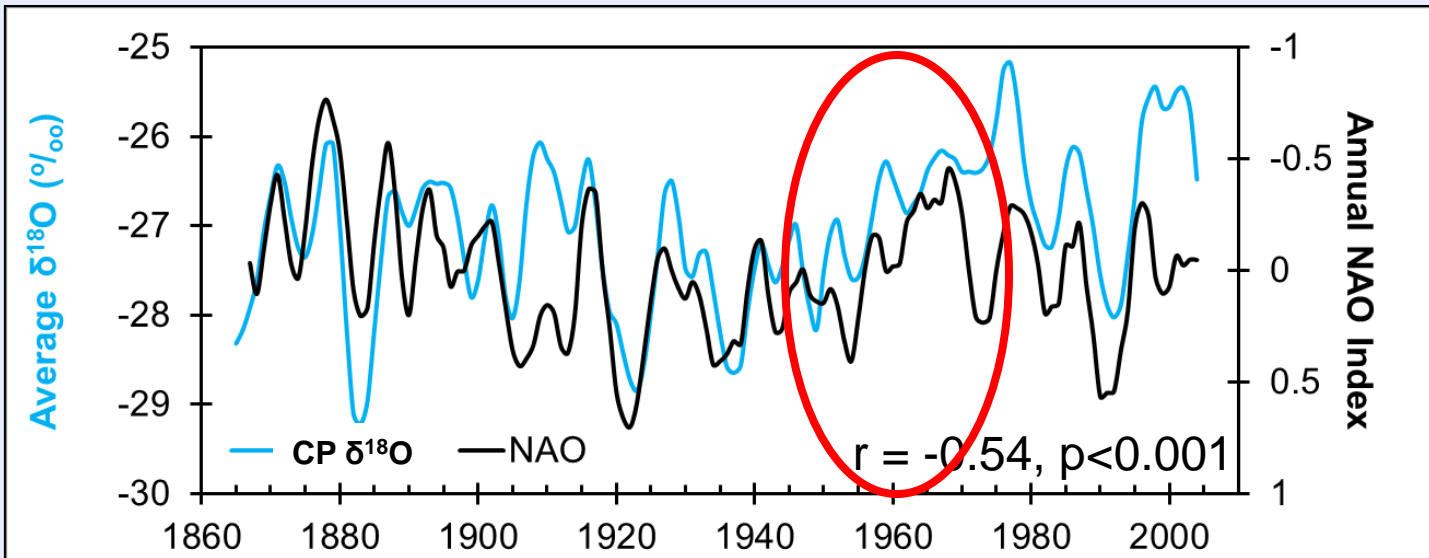
Ice core data serve as climate proxies



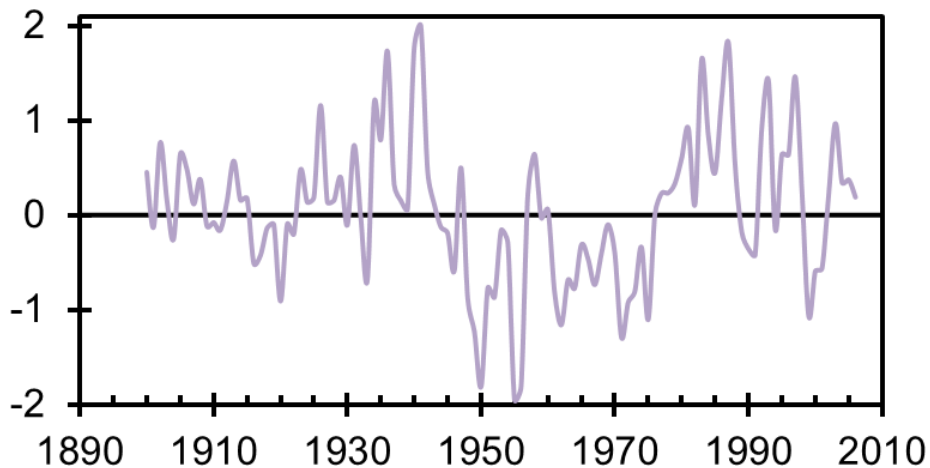
The influence of the NAO on Greenland is transient



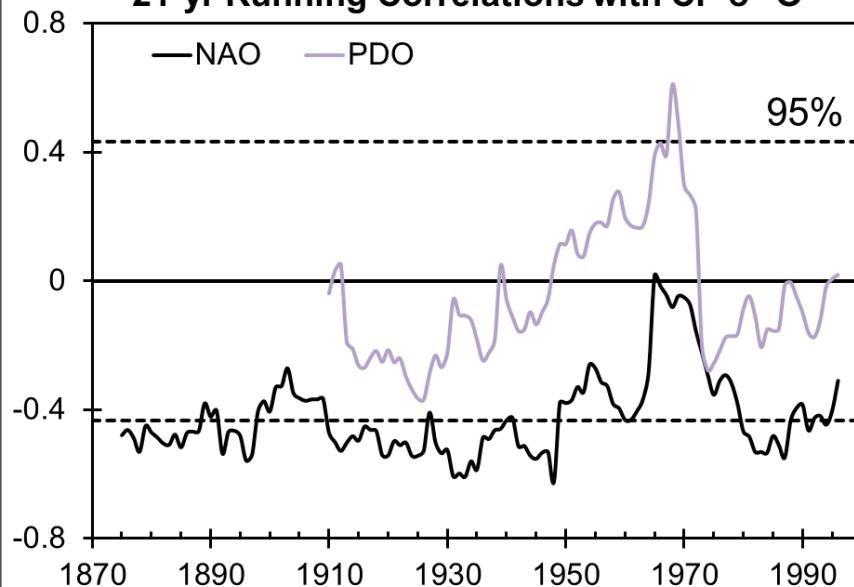
The influence of the NAO on Greenland is transient



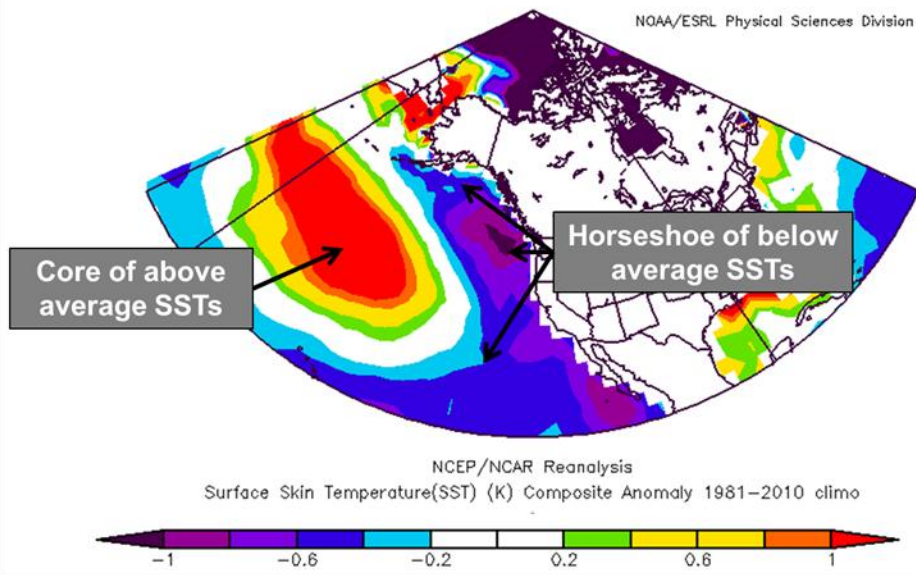
Pacific Decadal Oscillation



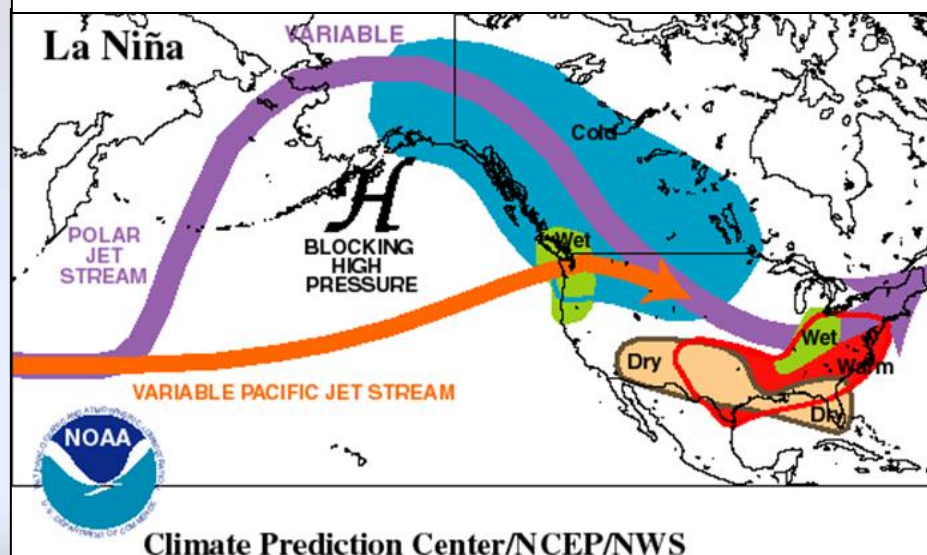
21-yr Running Correlations with CP $\delta^{18}\text{O}$



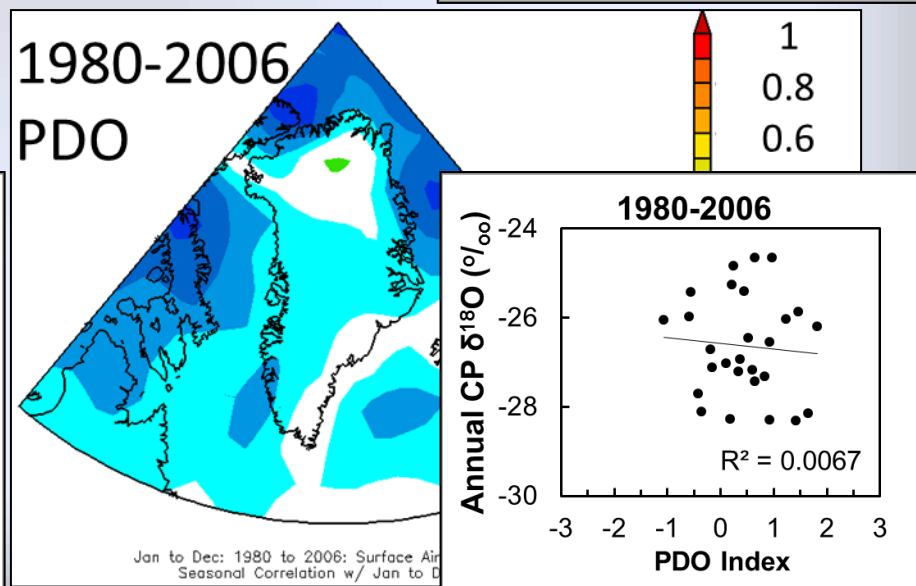
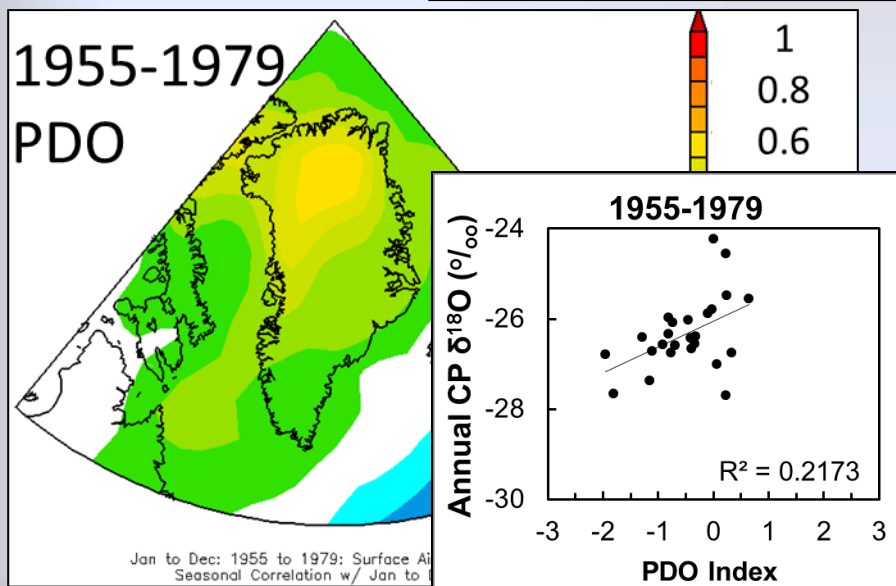
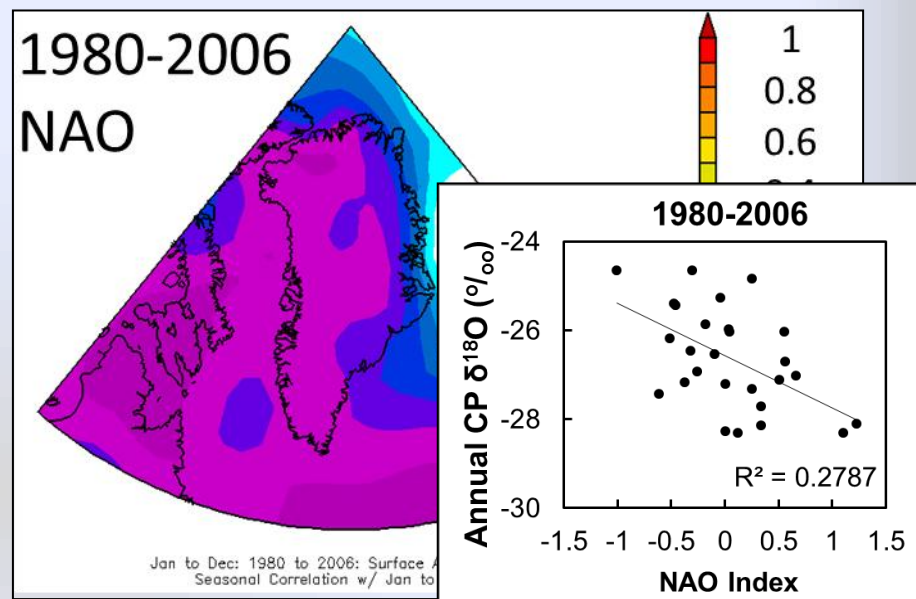
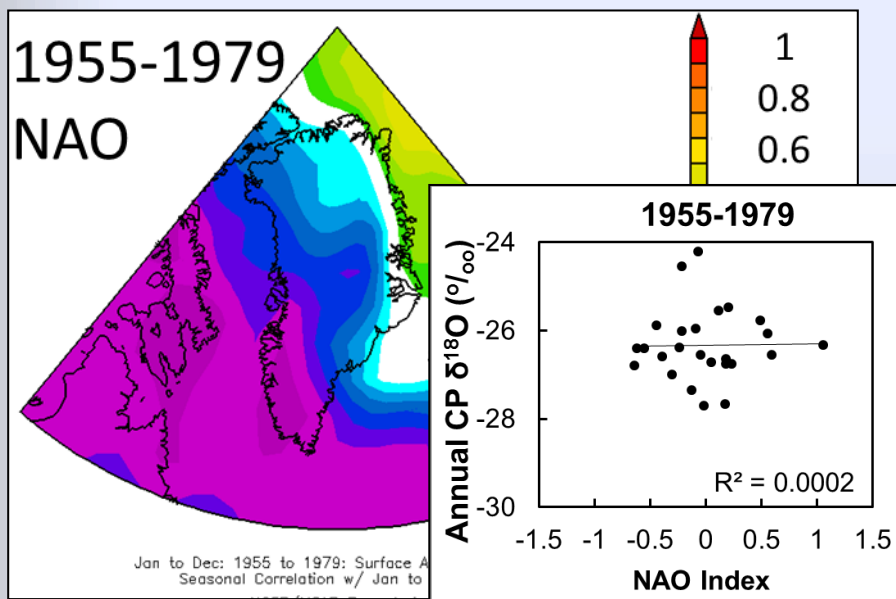
Cool PDO SST Anomaly Pattern



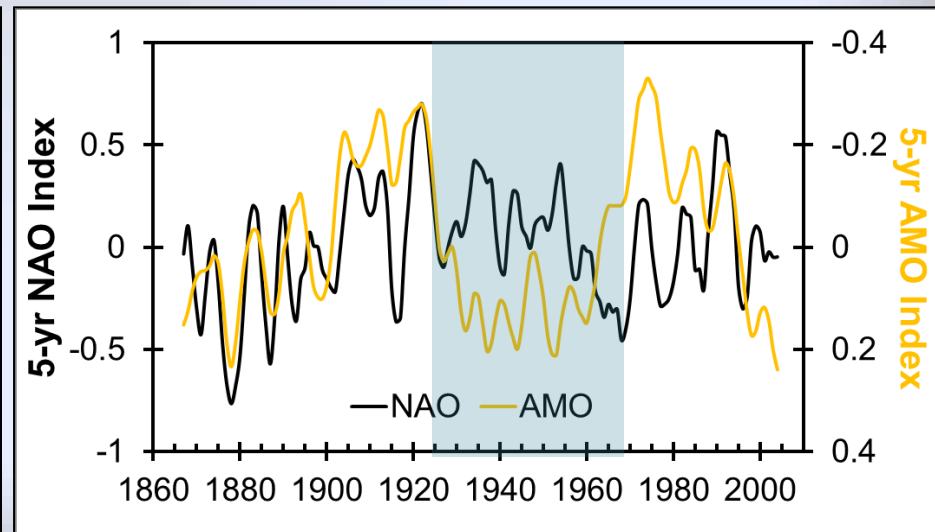
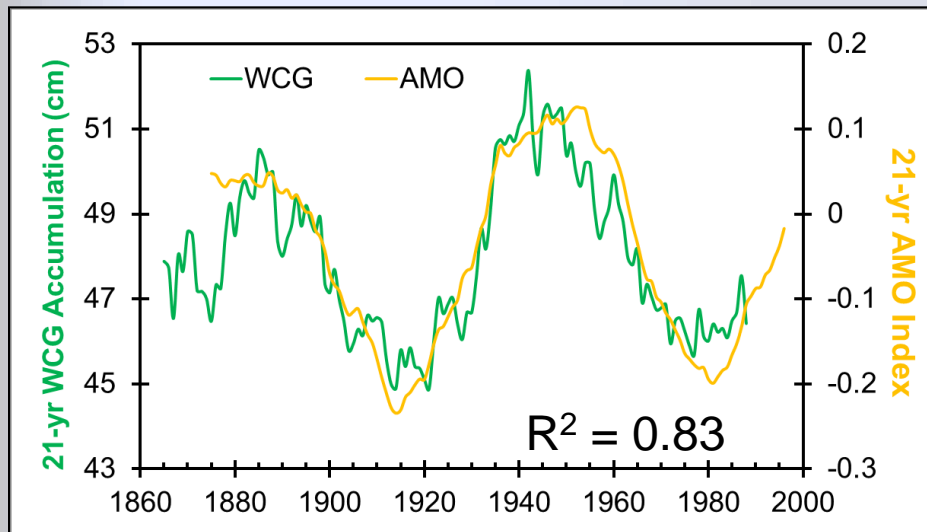
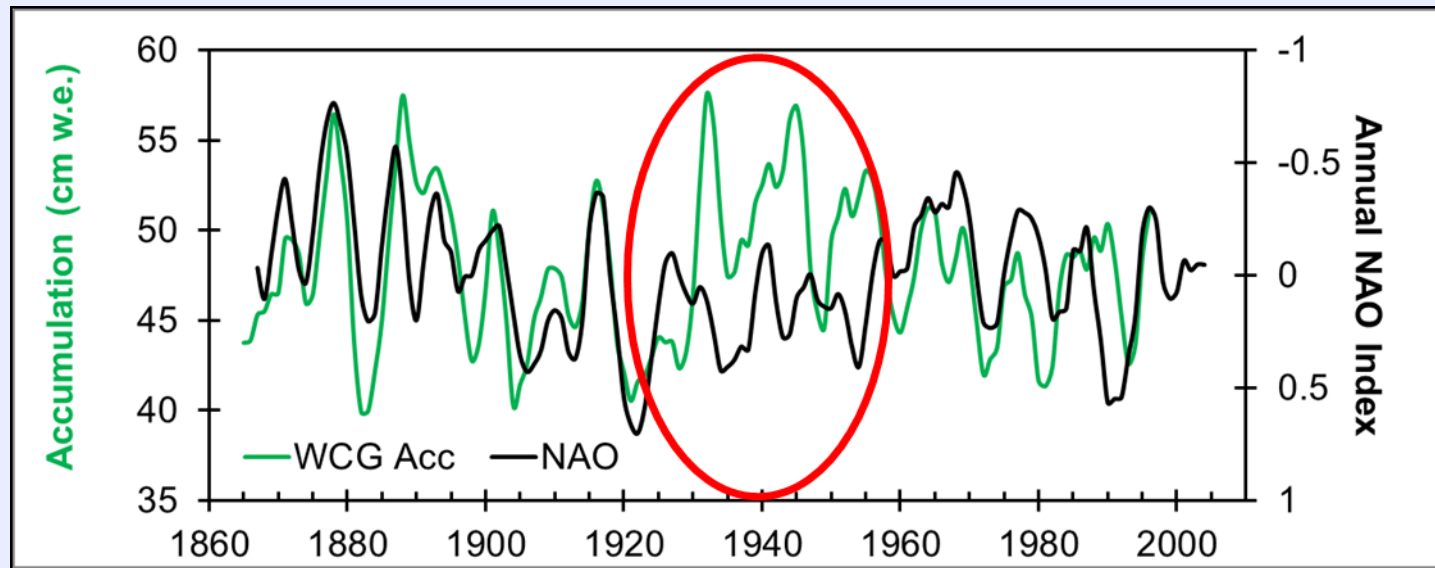
La Niña Circulation Pattern



Correlations with surface air temperature

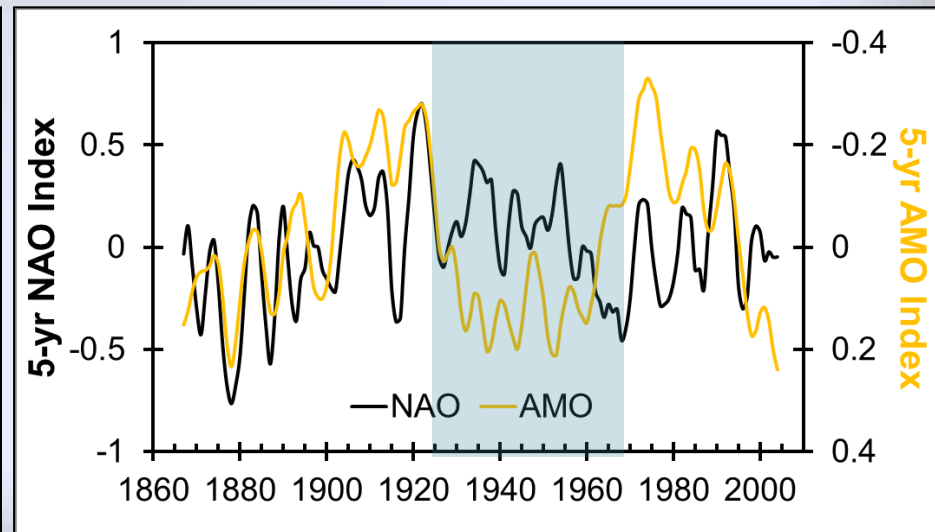
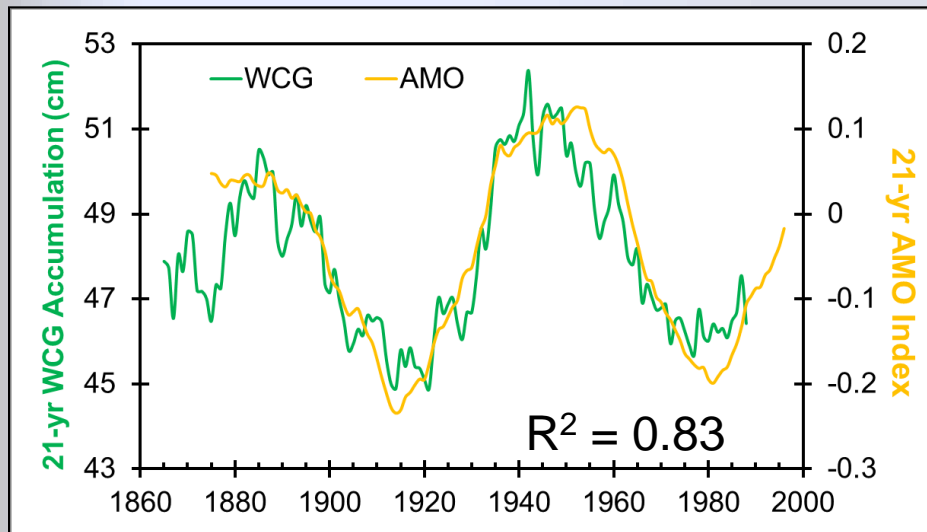


Accumulation more consistently records the AMO rather than the NAO

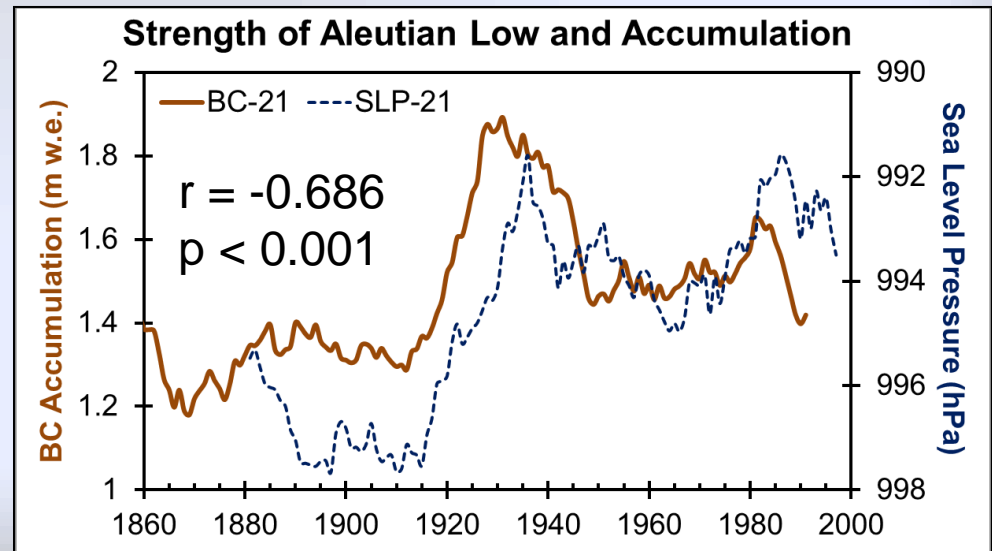
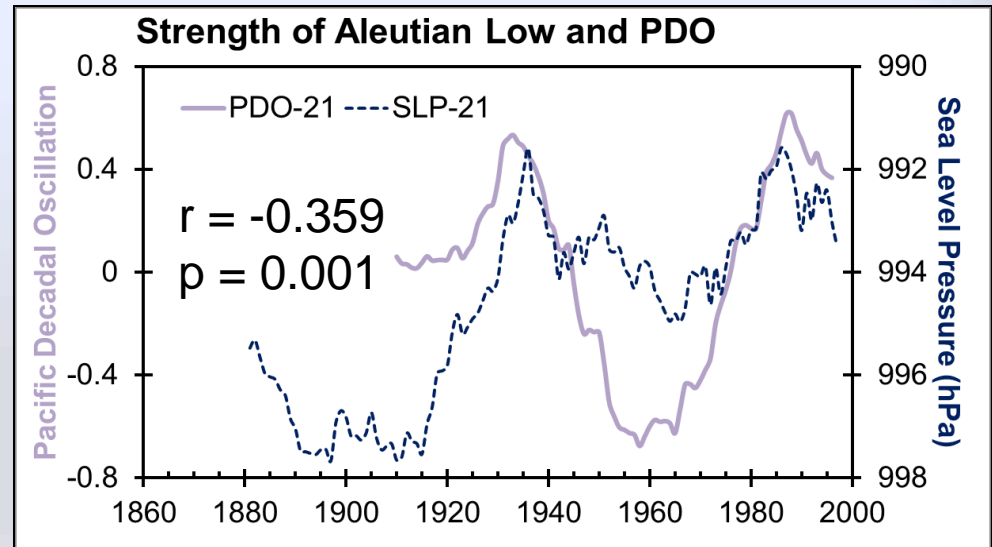
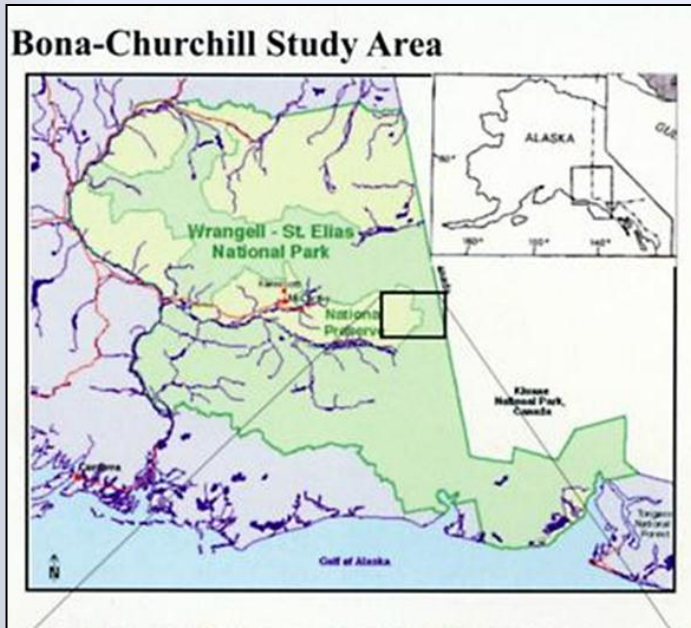


Accumulation more consistently records the AMO rather than the NAO

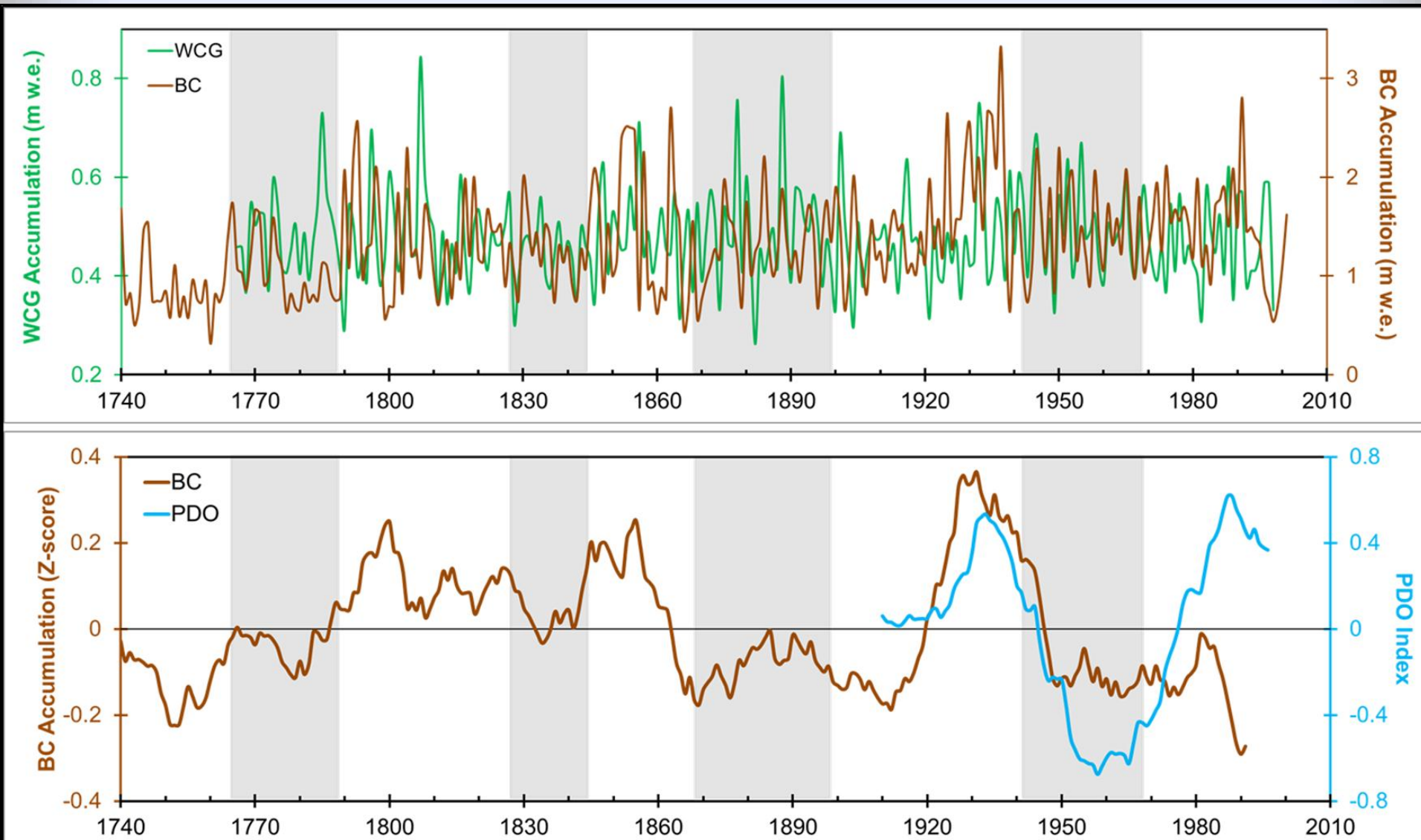
- Walter and Graf (2002) note the influence of the tropical Pacific SSTs on the Atlantic SSTs
- Global vs. regional regimes



Bona-Churchill, AK ice core records strength of the Aleutian Low

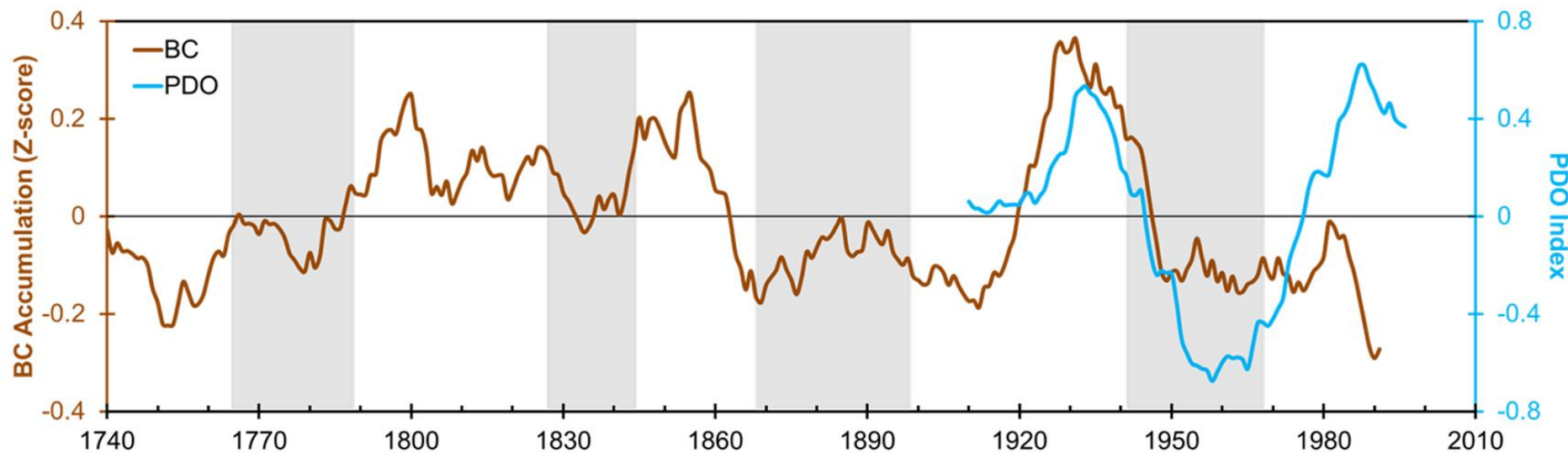
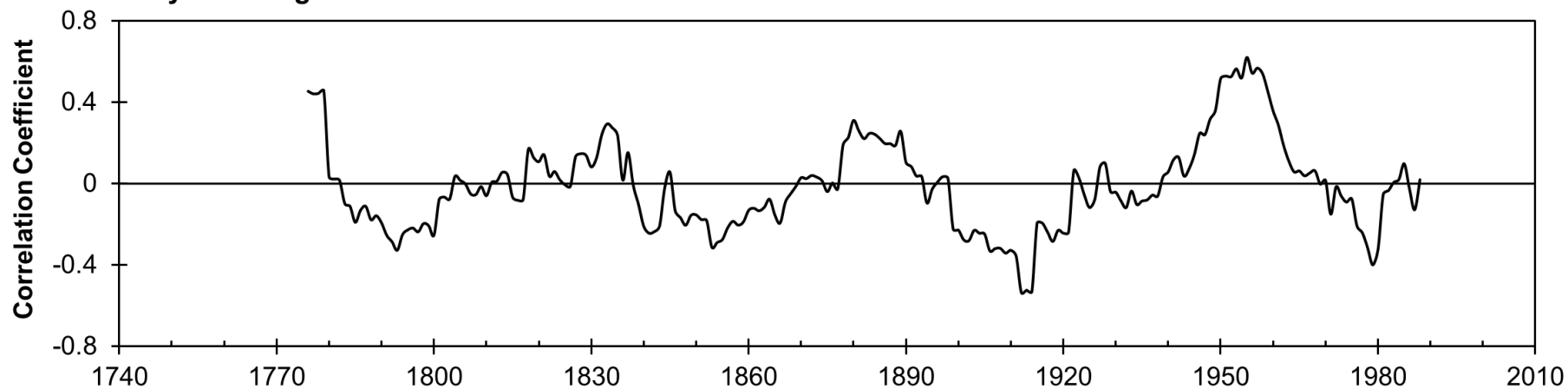


BC and WCG in phase during weak Aleutian Low

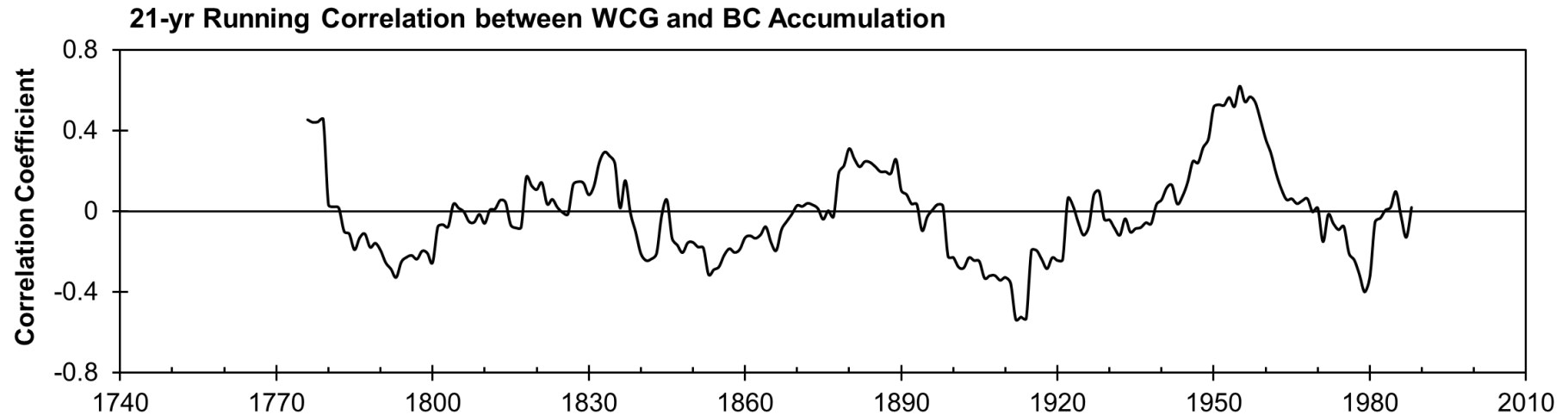


BC and WCG in phase during weak Aleutian Low

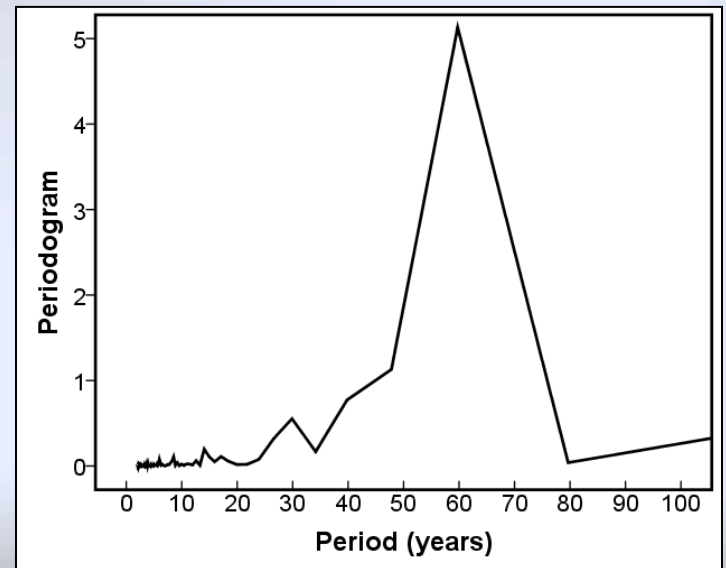
21-yr Running Correlation between WCG and BC Accumulation



BC and WCG in phase during weak Aleutian Low



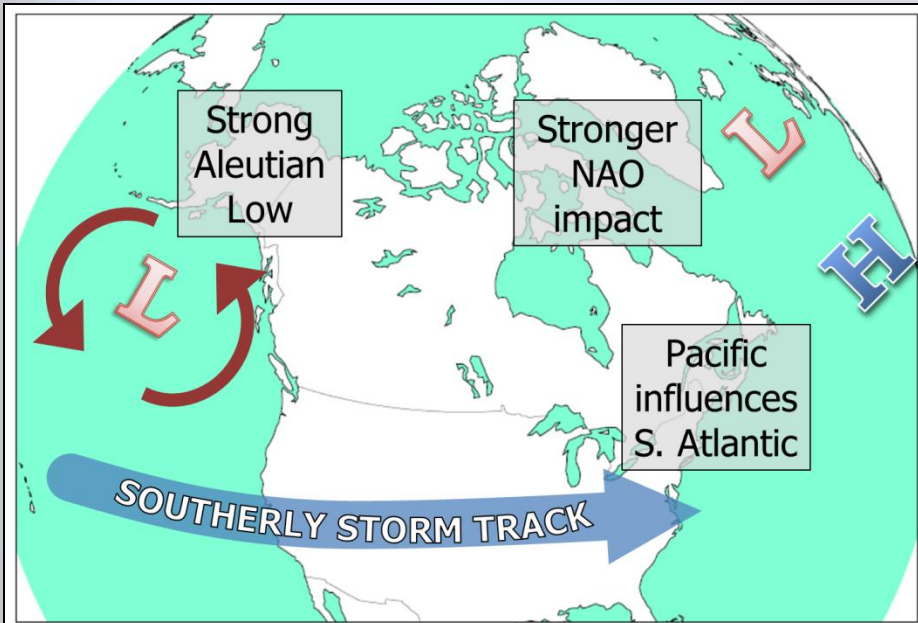
- Spectral peak around 60yr
- Global vs. regional regimes



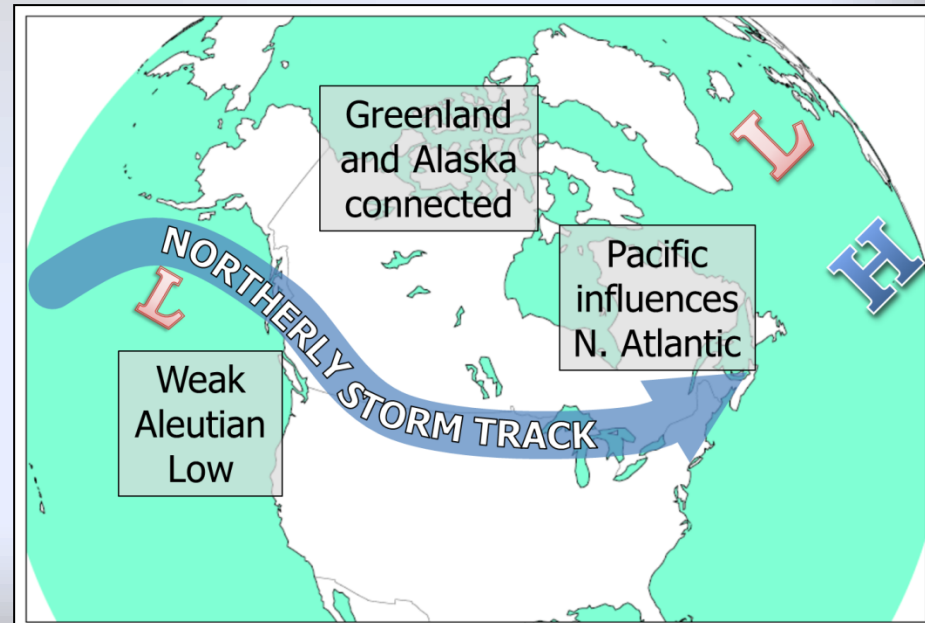
Conclusions

- Pacific variability explains periods when the NAO influence is weak over Greenland
 - Cool phase of the PDO influences $\delta^{18}\text{O}$
 - NAO/SST decoupling impacts accumulation
 - Strength of the Aleutian Low may modulate regime

Regional



Global





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T H E O H I O S T A T E U N I V E R S I T Y

Stacy E. Porter

porter.573@osu.edu

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- OSU's Climate, Water, and Carbon Program