Geophysical Research Abstracts, Vol. 7, 02937, 2005 SRef-ID: 1607-7962/gra/EGU05-A-02937 © European Geosciences Union 2005



Nonlinear association between the Arctic Oscillation and North American winter climate

A. Wu (1), W. Hsieh (1) and A. Shabbar (2)

(1) University of British Columbia, Canada, (2) Meteorological Services of Canada

The nonlinear association between the Arctic Oscillation (AO) and North American winter climate has been investigated by nonlinear projection ($\mathbf{y} = f(x)$), with x the AO index and the general nonlinear function f modelled by neural networks. Separate nonlinear projections of the AO index onto North American winter (December–March) 500-mb geopotential height (Z500), surface air temperature (SAT) and precipitation anomalies revealed pronounced asymmetric atmospheric response patterns during the positive phases of the AO and negative phases of the AO, suggesting non-linear impacts of the AO on the North American winter climate. The nonlinear SAT and precipitation anomaly patterns can be largely explained by the nonlinear Z500 anomaly patterns. Intriguingly, while the linear responses to AO are predominantly in the Atlantic-East Coast of N. America sector, the nonlinear responses to AO, the nonlinear responses are not standing oscillatory patterns, hence movies are used to reveal their more sophisticated structures.