Geophysical Research Abstracts
Vol. 18, EGU2016-2690, 2016
EGU General Assembly 2016

Investigating possible Arctic - midlatitude teleconnections in a linear framework

Camille Li (1,2), Stefan Sobolowski (3,2), Raymond Sellevold (1,2)

(1) University of Bergen, Geophysical Institute, Bergen, Norway , (2) Bjerknes Centre for Climate Research, Bergen Norway, (3) Uni Research Climate, Bergen, Norway

There is an ongoing debate over whether near-surface Arctic warming (Arctic Amplification) is responsible for the anomalous weather experienced by midlatitude regions in recent years. Among the many postulated mechanisms is a common idea that the warming heats the atmosphere, weakens the equator-to-pole temperature gradient, and exaggerates the waviness of the midlatitude jet, which can lead to more persistent weather patterns. Due to the short observational record and large atmospheric internal variability, however, it is difficult to identify robust relationships and infer causality. Here, a linear, steady-state model is used to investigate the direct response of the midlatitude atmospheric circulation to thermal perturbations characteristic of Arctic Amplification, specifically, near-surface Arctic heating and weakened equator-to-pole gradients. The model is idealized, but well suited to addressing the question of whether Arctic changes can decelerate the jet and alter the midlatitude stationary waves. The results suggest that there is only a weak midlatitude response to near-surface Arctic heating or a weakened temperature gradient. Furthermore, the stationary wave responses are shown to be well within the bounds of interannual variability. This work supports recent studies arguing that Arctic Amplification is not a direct driver of midlatitude circulation changes, but may modulate other drivers and sources of variability.