Geophysical Research Abstracts
Vol. 21, EGU2019-15324, 2019
EGU General Assembly 2019

Reconciling the role of Arctic Amplification and atmospheric internal variability on Eurasian winter

Rohit Ghosh, Daniela Matei, Juergen Bader, Elisa Manzini, and Evangelos Tyrlis
Max Planck Institute for Meteorology, Hamburg, Germany (rohit.ghosh@mpimet.mpg.de)

The observed Warm Arctic Cold Eurasia (WACE) pattern in the surface air temperature (SAT) trend is often evoked to explain the effect of Arctic Amplification (AA) on mid-latitude climate. However, recent studies have suggested that the WACE can arise solely because of atmospheric internal variability (IV). Here, we use the ERA interim reanalysis data to show that in observations there are two discrete WACE-like patterns. One of them represents the internal variability (IV-WACE) and the other is associated with AA (AA-WACE). The AA-WACE pattern is linked to the long-term trend in the first mode of variability of SAT over Eurasian region. The IV-WACE pattern is related to the de-trended second mode of variability of SAT over Eurasian region. We perform atmospheric model inter-comparison project (AMIP) type experiments using ECHAM6 in its high resolution version to show that the model can robustly simulate the IV-WACE pattern. However, it fails to simulate the observed AA-WACE pattern because of its inability to capture the observed long-term trend in the first mode variability of SAT over Eurasia. Hence, our study suggests that the model could be unrealistically sensitive to certain atmospheric processes that overshadow the AA-WACE pattern. Thus it might be too early to dismiss the observed link of AA with WACE solely based on model results.