



Do changes in the mid-latitude circulation have any impact on the Arctic surface air temperature trend?

R. G. Graversen

Department of Meteorology, University of Stockholm, S – 106 91 Stockholm, Sweden
rune@misu.su.se

The warming of the near-surface air in the Arctic region has been larger than the global mean surface warming. There is general agreement that this Arctic amplification of the Surface Air Temperature (SAT) trend is to considerably extent due to local effects such as retreat of sea ice, especially during the summer season, and earlier melting of snow in the spring season. It is less clear whether the Arctic SAT trend may also be related to recent changes in the atmospheric mid-latitude circulation. The results presented here suggest that this might indeed be the case.

The atmospheric northward energy transport (ANET) across 60° N is an integrated property of the mid-latitude circulation. From ERA-40 reanalysis data from the European Center of Medium Range Weather Forecasts (ECMWF) we have estimated the ANET across 60° N. The results show that the ANET has increased in recent decades and that a significant portion of the mean Arctic SAT trend is explained by the ANET.

Another important characteristic of the mid-latitude circulation is the Arctic Oscillation (AO). Through the 1980s and early 1990s the AO index shows a positive trend in the winter months. However, even though a significant part of the SAT trend can be related to the AO in localized parts of the Arctic area, the mean Arctic SAT trend shows no significant linkage to the AO. Hence, the relation between changes in the mean Arctic SAT trend and the mid-latitude circulation is well captured by the ANET across 60° N but not by the AO.