The role of arctic forecast errors in the evolution of northern extra-tropical forecast skill

Thomas Haiden
ECMWF, Evaluation Section, Reading, United Kingdom of Great Britain and Northern Ireland (thomas.haiden@ecmwf.int)

Increases in extra-tropical numerical weather prediction (NWP) skill over the last decades have been well documented. The role of the Arctic, defined here as the area north of 60N, in driving (or slowing) this improvement has however not been systematically assessed. To investigate this question, spatial patterns of changes in medium-range forecast error of ECMWF's Integrated Forecast System (IFS) are analysed both for deterministic and ensemble forecasts. The robustness of these patterns is evaluated by comparing results for different parameters and levels, and by comparing them with the respective changes in ERA5 forecasts, which are based on a ‘frozen’ model version. In this way the effect of different atmospheric variability on the estimation of skill improvement can be minimized. It is shown to what extent the strength of the polar vortex as measured by the Arctic and North-Atlantic Oscillation (AO, NAO) influences the magnitude of forecast errors. Results may indicate whether recent and future changes in these indices, possibly driven in part by sea-ice decline, could systematically affect the longer-term evolution of medium-range forecast skill.