Geophysical Research Abstracts
Vol. 21, EGU2019-16922, 2019
EGU General Assembly 2019

The dependence of Boreal winter teleconnections on atmospheric biases in a climate model.

Nicholas Tyrrell (1), Alexey Karpechko (1), and Sebastian Rast (2)

(1) Finnish Meteorological Institute, Helsinki, Finland (nicholas.tyrrell@fmi.fi), (2) Max Planck Institut für Meteorologie, Hamburg, Germany

We investigate the effect of systematic model biases on the teleconnections influencing the Northern Hemisphere wintertime circulation on seasonal to sub-seasonal timescales. Annually repeating bias-correction terms are added to the dynamic variables of the ECHAM6 atmospheric model to reduce errors in the model's annual climatology, relative to ERA Interim. This results in an increase in the strength of the Northern Hemisphere wintertime stratospheric polar vortex, reducing errors in the DJF zonal stratospheric winds by up to 60%.

We compare the bias-corrected and control run teleconnections from the increased Siberian October snow cover, and from the Quasi-Biennial Oscillation. We see changes in magnitude and structure of the response of the polar vortex to the anomalous snow cover forcing, and significant differences in the timing of the response. The bias-corrected run shows some indication of a late-winter polar vortex response to an October snow anomaly, similar to that seen in ERA-interim, whereas the control run response largely disappears by January. However, for the bias-corrected run the magnitude and the sub-seasonal timing throughout winter is still different to ERA Interim. This work highlights the importance of the correct model climatology to simulate the teleconnections relevant for accurate seasonal predictions.