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An assessment of mid-tropospheric teleconnection patterns simulated by state-of-the-art AOGCMs

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This paper aims to assess of the ability of state-of-the-art atmosphere-ocean general circulation models (AOGCMs) to reproduce atmospheric low-frequency variability in terms of mid-tropospheric teleconnection patterns. Therefore, present day simulations performed for IPCC AR4 have been analysed and compared with corresponding analyses of observations. Teleconnection patterns have been determined by a rotated principal component analysis. The simulated mid-tropospheric teleconnection patterns have been assessed by means of Taylor diagrams and appropriate metrics.

The comparison with observations reveals that state-of-the-art AOGCMs are able to reproduce the spatial structure of the most dominant patterns realistically, especially that of the NAO- and PNA-patterns. However, the temporal behaviour of the teleconnection patterns is not captured due to the random, internally generated variability. The differences between the results of the coupled simulations and the atmosphere-only model runs give first insights into the influence of boundary conditions on the spatial and temporal structure of simulated teleconnection patterns. The analyses of available ensemble runs enables us to estimate the uncertainty range for the simulation of present-day teleconnection patterns.