



Planetary-scale teleconnections on European winter weather

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This work presents a review of the end-to-end processes from planetary-scale teleconnections to local winter weather patterns over Western Europe. The review will look at a range of mechanisms that could link tropical teleconnections, via the Arctic, to extra-tropical cyclones (ETCs).

We discuss the generation of planetary waves from tropical sources and their propagation to and impact on high-latitude climate, e.g. changes in tropospheric circulation and temperature over north Canada and Greenland from a tropically excited wave train generated in the tropical Pacific ocean.

From there we explore how Arctic change affects the midlatitudes. We highlight the broad range of mechanisms linking Arctic warming and sea ice loss to variability in the Atlantic sector, including the North Atlantic Oscillation (NAO). Given that Arctic sea ice is regularly cited as a predictor of the winter NAO, better understanding of these remote teleconnections can be exploited to achieve greater predictability of it on seasonal to interannual timescales.

These processes and remote teleconnections are brought together to look at how they impact the North Atlantic storm track. The relationship between the NAO and storm tracks has been well documented and there have been studies linking Arctic sea ice loss to variability in the storm tracks. This work will review how much of this variability in the storm tracks can be coupled to hemispherical dynamics through the Arctic and mid-latitude teleconnections.