



The contribution of atmospheric circulation to decadal trends in northern hemisphere temperature

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The early twentieth century (1920s-1940s) was characterised by a warming period, concentrated particularly in the Arctic in winter. The causes of this Arctic warming are not completely understood but a combination of internal variability and external forcing has been suggested. Here we investigate the contribution of atmospheric circulation to this northern hemisphere warming trend. We identify the atmospheric pressure patterns that occurred during this period using reanalysis data. We then calculate their contribution to the observed winter temperature trends through an analogue technique in which similar atmospheric circulation patterns are identified in interannual variability across the whole twentieth century, and their relationship to northern hemisphere temperature calculated through regression. We also examine the contribution of other known atmospheric modes to northern hemisphere temperature during this period and for other periods of increasing and decreasing temperature, including the North Atlantic Oscillation/ Arctic Oscillation and the Cold Ocean Warm Land Pattern, which is associated with warm air advection from ocean to land in the northern hemisphere in winter.