



The role of variability in atmospheric circulation and Greenland precipitation for interpreting ice core records

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Ice cores from Greenland contain the layers of snowfall accumulated throughout each year. Variability in snowfall accumulation can therefore influence the climatic signal recorded in the ice cores. This study uses reanalysis data from ERA-Interim (1979-2015) to investigate how atmospheric circulation patterns can drive precipitation and accumulation variability on the Greenland Ice Sheet. This is examined by comparing the spatial and temporal variability in precipitation amount and frequency with specific phases of atmospheric patterns such as the North Atlantic Circulation (NAO) as well as with the position of the North Atlantic jet stream. Results show that large-scale atmospheric conditions associated with high precipitation events in northwestern Greenland (near the ice core site NEEM) differ from the atmospheric conditions associated with high precipitation events in northeastern Greenland (near the ice core site EGRIP). The relationship between the large-scale conditions and moisture transport paths are investigated to determine how this precipitation variability arises. A further understanding of the atmospheric circulation patterns role in the precipitation variability and high precipitation events can help to improve the interpretation of the ice core records for past and present-day climates.