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Northern Hemisphere atmospheric blocking in ice core accumulation records from Northern Greenland

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We investigate the connection between frequency of atmospheric blocking circulation and the variability of five high resolution accumulation records from Northern Greenland covering the last five centuries.

Using observational data we show that during high accumulation years the frequency of winter blocking circulation in the Euro-Atlantic region is significantly higher relativ to the years of low accumulation. Our results show an enhanced Greenland storm track as well as enhanced moisture transport toward Greenland during the periods of high blocking activity relative to the periods of low blocking activity.

The time series associated to the dominant mode of accumulation variability shows enhanced multidecadal variations during the last five centuries. Therefore positive (negative) phase of these multidecadal oscillations may be related with high (low) blocking activity in the Euro-Atlantic region.

We suggest that long-term and high resolution ice core records from Greenland can be used to put the decadal and interdecadal variations in the frequency of Euro-Atlantic blocking, as derived from observational data, into a long-term context.