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Seasonal stable isotope signals in Greenland ice cores: Relations to atmospheric circulation patterns and regional temperatures during the past 200 years

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Twenty ice cores drilled in areas of the Greenland ice sheet with medium to high rates of accumulation have been used to extract seasonally resolved stable isotope records.

Relations between the seasonal stable isotope data and atmospheric flow as well as Greenland and Icelandic temperatures are investigated both for the winter and summer seasons.

The stable isotope data from the winter season are influenced by the North Atlantic Oscillation (NAO) and very closely related to the Greenland west coast winter temperatures during the past 200 years.

The data from the summer season related to Stykkisholmur summer temperatures and the North Atlantic SST conditions in Icelandic waters.

The results strongly suggest that the temperature and circulation signals in the seasonal data can be used in high-resolution reconstructions of climatic conditions in the North Atlantic region. This is encouraging because several highly resolved Greenland ice core records cover most of the last two millennia.