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Onshore-offshore climate changes in southwest Greenland and eastern Baffin Island area since 7000 years

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Most paleoclimate reconstructions from the Arctic and subarctic areas focus on changes in summer temperature. However, moisture and cloudiness are climatic parameters that also play a determinant role on the distribution of the biota in high latitude environments. This can be illustrated by multivariate analyses performed on modern pollen data from Canada and Greenland (n=831), which show that the sunshine or cloudiness is one of the most important climate parameter that controls vegetation growth and pollen production in Arctic areas. On these bases, the modern analogue technique was applied to Holocene pollen sequences of eastern Baffin Island (Akvaqiak Lake, 66˚47'N, 63˚57'W, 45 m asl) and southwestern Greenland (Qipisarqo Lake, 61˚00'N, 47˚45'W, 7 m asl). The results indicate limited changes on Baffin Island with a slight decrease of July cloud cover and air temperature, whereas the Greenland record reveals significant increased of cloud cover by about 9% concomitant with July air temperature decreased of from 12.0 to 8.5˚C since 7000 years. Such reconstructions are consistent with paleoceanographical records from the northwest North Atlantic showing little change of sea-surface temperature to the west and significant cooling to the east, from the early to late Holocene. The overall data point to strong linkages between terrestrial climate and oceanic conditions in the subpolar North Atlantic and suggest long term changes in synoptic scale circulation, ocean currents and cloudiness, possibly in relationship with dominantly positive NAO conditions during the early-middle Holocene.