HOLOCENE WINTER CLIMATE VARIABILITY IN NW EUROPE

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Variations in the North Atlantic Oscillation (NAO) index are reflected in glacier mass balance records in western Scandinavia. The NAO index is best correlated with the net mass balance on maritime glaciers in southern Norway. Holocene glacier variations of maritime glaciers in western Scandinavia may therefore reflect winter precipitation changes and thus be a proxy for winter climate variability in NW Europe. A close exponential relationship between mean ablation-season temperature (1 May-30 September) and winter precipitation (1 October-30 April) at the equilibrium-line altitude (ELA) of modern Norwegian glaciers has been established. This implies that an independent record of summer temperature reconstructed from biological proxies together with a record of ELA variations reconstructed from glacier records can be combined to calculate Holocene variations in winter (accumulation-season) precipitation. Holocene winter precipitation curves from the Jostedalsbreen and Hardangerjøkulen areas in southern Norway have been reconstructed. The reconstructed winter precipitation curves for both areas are strikingly similar. The records show periods with prevailing wet/dry winters peaking at 8400, 7000, 5600, 4400, 3700, 2100, 1500, 1200 cal. yr BP and 10000, 9300, 8200, 6200, 4900, 4100, 2900, 1700, 600 cal. yr BP, respectively. The periods with prevailing dry/(cold?) winters in NW Europe seem to correlate with periods of increased ice rafting in the North Atlantic Ocean.