



Reconstructing summer cloudiness from stable carbon isotope ratios in treerings

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Palaeoclimate information from the annual rings of trees dominates research on climates of the last thousand years because the proxy is unrivalled through its combination of geographical coverage, absolute dating and depth of study. The stable isotope treering proxies (carbon hydrogen and oxygen isotopes measured in wood cellulose extracted from annual rings) have received less attention by virtue of being relatively recent additions to the discipline. Treering stable carbon isotope ratios from northern Boreal sites have traditionally been used to reconstruct past changes in summer temperature. However, a summer temperature reconstruction based on stable carbon isotope ratios in *Pinus sylvestris* from a site in northern Finnish Lapland (Gagen et al 2007) appears inconsistent with early instrumental temperature series from the region. A further stable carbon isotope series from *Pinus sylvestris* sampled in Northern Norway reveals that, when the relationship between instrumental temperature and cloud cover in the region has diverged in the past, treering stable carbon isotope ratios in fact record summer cloud cover not temperature. Here we present summer cloud cover reconstructions from Norway and Finland revealing that cloud cover was diminished during cold centuries over the recent past. At these high latitude sites a negative short-wave cloud feedback is indicated.