Geophysical Research Abstracts
Vol. 20, EGU2018-2402-1, 2018
EGU General Assembly 2018

Covariance and climate signals in carbon and oxygen isotopes from locally moist and dry pine sites in central and northern Sweden

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We produce 20th century stable isotope data from pine trees growing at lakeshores and several decameters inland in northern Sweden (near Kiruna) and central Sweden (near Stockholm) to evaluate the influence of changing microsite conditions on the climate signals of tree-ring d13C and dd8O. The data reveal a latitudinal trend towards more depleted isotopes near the arctic tree line (-0.8‰ for d13C and -2.4‰ for d18O compared to central Sweden) reflecting widely recognized atmospheric changes. At the microsite scale, only d13C decreases from the dry inland to the moist lakeshore sites (-0.7‰ in Kiruna and -1.2‰ in Stockholm) indicating the importance of ground water access to this proxy. While all records from northern and central Sweden correlate significantly against temperature, precipitation, cloud cover and/or drought data, climate signals are consistently stronger in the data from moist microsites substantiating the importance of site selection when producing stable isotope chronologies.