



## **Dendrochronological evidence of abrupt atmospheric circulation changes in Northern Scandinavia in the middle Holocene**

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Tree-ring width data collected for Northern Finland allowed reconstruction of variations in summer temperatures  $\Delta T$ s for the last 7,500 years. The tree-ring proxy of summer temperature anomalies was analyzed using both the Fourier and wavelet approaches. A distinct ca 2.0-2.5 Kyr periodicity was revealed in this temperature proxy, which is likely to be a manifestation of the 2,300-2,400 year cycle present in many climatic records and also in  $\Delta^{14}\text{C}$  concentrations in tree rings during the Holocene. In the time interval of the Holocene, variations in  $\Delta^{14}\text{C}$  characterize mainly variations in solar activity. Cross-correlation of  $\Delta T$ s and  $\Delta^{14}\text{C}$  curves has revealed that they are very similar and synchronous, which suggests that solar activity exerts influence on long-term climatic processes. An important feature, i.e., a sharp change of the relation between phases of variations in  $\Delta T$ s and  $\Delta^{14}\text{C}$  to the opposite one around ca 3500 BP, has been found. Such a change in phases can be indicative of an abrupt change in atmospheric circulation in the North-West of Europe. A sharp change in climatic conditions in Northern Finland around ca 3-4 Kyr BP is also revealed in analysis of proxy climatic data for Northern Scandinavia and North-East Russia. At ca 6-4 Kyr BP the North of Scandinavia was characterized by a warm and dry climate, which is evidenced by a considerable decrease in the lake level and palynological data. However, after ca 4-3 Kyr BP the temperature decreased and humidity considerably increased, which points to a substantial change in the character of atmospheric circulation over the Northern Scandinavia region. The result obtained presents new evidence of the solar-climate link over the most of the Holocene time interval. This work was supported by by INTAS (No. 2001-0550 and No. 03-51-4445), RFBR (projects 03-04-48769 and 03-

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