TRACE 2017

trees rings in archaeology, climatology and ecology

16-21 MAY 2017 Svetlogorsk Kaliningrad region, Russia

СИБИРСКИЙ ФЕДЕРАЛЬНЫЙ УНИВЕРСИТЕТ
SIBERIAN FEDERAL UNIVERSITY

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ASSOCIATION FOR TREE-RING RESEARCH

РНФ | Российский
научный
фонд

Climate and the growth of coniferous trees and shrubs at the Northern Timberline in the Yamal Peninsula and Polar Urals

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Dendroclimatic studies in subarctic regions revealed important space and time dependencies of radial growth of tree species as well as of climatic conditions. Climate reconstruction from tree rings of shrubs could provide more details on inter-seasonal/intra-seasonal variability of summer temperature in the cold regions. The long living Siberian juniper is one of the most promising species for dendroclimatic studies in Siberia, Ural Mountains and northern Russia in Europe. Siberian juniper ring-width indices contain temperature information on summer months (June–July), and spring month (May). If juniper ring width–mean May temperature relationship turns out to be reproducible and reliable, this open the possibility to reconstruct new climatic data. Such a reconstruction has been produced on the base of estimation of parameters of multiple linear regression equation. The resulting reconstruction matches better with the actual temperature curve than those based on single species

The analysis of anomalous structures in tree rings provides a promising method for reconstructing frosts and multiday abrupt temperature declines during the growing season in times before the advent of instrumental meteorological observations. This is of particular importance in the subarctic regions of Siberia and the Urals where, in contrast to the situation in Europe, there are virtually no records of anomalous climatic events in preinstrumental times. Frost and light rings of living and dead individuals of Siberian juniper and Siberian larch growing at the upper (Polar Ural Mountains) and polar (Yamal Peninsula) tree lines in northwest Siberia have been studied to reconstruct summer frosts and abrupt temperature declines during the second half of the growing season over the past 1250 years. Comparison of our data with data from other regions of the world shows that there is agreement in the timing of extreme temperature events between several regions