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ABSTRACTS

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LARCH GROWTH VARIABILITY DURING THE LAST 2000 YEARS OVER NORTHERN, WESTERN AND MIDDLE SIBERIA

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Using the oldest growing larch trees: European larch, Siberian larch and Gmelin larch (at the age up to 720 years), residues of died off trees found on ground surface as well as semi-fossil wood from alluvial deposits of small rivers the super-long (from 800 to 3240 years) generalized tree-ring chronologies were obtained for the four key subarctic regions of Siberia: the Polar Urals, the Yamal peninsula, the eastern part of Taimyr,and the lower flow of the Indigirka river. The main statistical characteristics of chronologies show that the strong climatic signal is contained in variability of standardized changes of tree-ring width (indexes). Calculations and analysis of climatic response functions showed that 60-70% of the total dispersion of tree-ring chronologies (R=0, 75-0.83) is explained by variability of summer (June-July) temperatures. Chronologies fix reliably both the year-to-year with the interval 8-10° C and the age-long (secular) temperature variations. Corellation between variations of tree-ring width indexes and summer temperature increases up to 0.8-0.9 for data smoothed by the 5-year sliding.

Analysis of synchrony of the year-to-year (high frequent) fluctuations of tree-ring width indexes between generalized chronologies shows that this component of summer temperature variability in each of three main studied sectors of Subarctic (Western, Central and Eastern) is greatly determined by regional peculiarities. So, only 38% of all the years during the last century are common warm or cold for the whole Siberian Subarctic. However, the long temperature variations revealed on the generalized curve in all the four key regions have no regional but global character. These variations agree well with temperature variations obtained through another indirect source (ice cores from Greenland) of temperature variations for high latitudes of the northern hemisphere. Both indirect sources show existance of secular or super-secular (76-78 and 180 years) cycles in temperature variability. The tree-ring chronologies show the availability of stable cyclicity in high latitude temperature variations with intervals 22 and 11 years. Analysis of amplitude of the long-term variations of temperature according to tree-ring chronologies also shows that the warming in the middle of the 20-th century was not an extraordinary one, temperature increase in the middle of the 13-th century had the amplitude close to it. Thus, it is reasonable to suppose that summer temperature variations in high latitudes of Asia are determined, mainly, by natural reasons up to now.