

# **World Climate Change Conference**

Всемирная конференция  
по изменению климата

## **ABSTRACTS**

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# Abstracts of presentations on the World Climate Change Conference

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Part 1. Plenary session

Part 2. Section oral presentations

Part 3. Poster presentation

## Information on the Round Tables

1. Round Table of social and non-governmental organizations (Social Forum)
2. Carbon Business-Forum
3. Energy and Climate Change

Chairmen of the International Organizing Committee - **Yury Izrael**

Scientific Secretary – **Elena Kvasnikova**

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# MILLENNIUM LENGTH RECONSTRUCTION OF EXTREME TEMPERATURE EVENTS IN NORTHWEST SIBERIA

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Extreme climatic events have a strong effect on the state, functioning, and stability of ecosystems. At high latitudes, they include frosts and multi-day abrupt temperature declines during the growing season. The analysis of pathological structures in tree rings provides a promising method for reconstructing such events in times before the advent of instrumental meteorological observations.

Two types of micro-anatomical trace have been used for the reconstruction of such short extreme temperature events, namely: frost-damaged layer of cells (frost rings) and thin walled latewood cells (light rings). Analysis of frost and light ring frequency have been carried out on the wood of Siberian larch (*Larix sibirica* Ledeb.) and Siberian juniper (*Juniperus sibirica* Burgsd.) growing in the foothills of eastern slope of the Polar Urals and in the southern Yamal Peninsula. To prolong chronologies beyond the age of the oldest living larches and junipers, samples from dead trees and shrubs have been used. Several dozens of samples from each site and each species have been used for the analysis.

Using daily air temperature data of meteorological observations from the meteorological station at Salekhard we have shown, that the presence of frost lesions in tree rings provides evidence for frosts that occurred in late June or in the first half of July. As to light rings, the comparison with meteorological data indicates that formation of light rings in the larch coincides with extreme low mean July - August air temperature, i.e. during the middle and end of summer.

The extreme years tend to co-occur in both species and at the various sites (fig. 1). Thus, the observed degree of synchronicity in the frost and light rings suggests that the climate phenomena causing them had at least a regional extent. The most severe temperature events in Yamal and Polar Urals were in AD 801, 1109, 1259, 1278, 1466, 1601 and 1783 .

Frost and light rings may be related not only to regional climate extremes, but also to global phenomena. Comparison of our data with data from other regions of the world shows that there is agreement in the timing of extreme temperature events in AD 800-801, 1109, 1258-1259, 1453, 1466, 1585, 1601, 1783, 1884, 1912 and 1992 between several regions. Most probably, these extremes have been caused by climatically effective explosive volcanic eruptions.

Figure 1. The proportion (in %) of frost rings (bold part of bars) and light rings (thin part of bars) in the wood of juniper and larch from the Polar Ural mountains and Yamal Peninsula. The height of each band is 100%.

