

Project acronym: TREENE

Project title: Tree-ring Records of Extreme Events in Northern Europe

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Discipline: Earth Sciences & Environment

Station(s): Kevo Subarctic Research Institute, Finland

The frequency of climatic extremes events is predicted to increase substantially in the future, impacting societies worldwide. However, in comparison to climate reconstruction, not many studies have been conducted to elucidate on this predicted change in the frequency of climate extremes. Wood anatomical abnormalities can give valuable additional information about the environmental conditions during tree growth and especially on extreme events.

A new and perspective approach to investigate extreme climatic phenomena of the past is the analysis of structural anomalies in trees and shrubs. A classical method of building tree-ring chronology is based on cores of old long-live trees. But young trees are very sensitive to climate extremes in compare with old trees.

We will use a novel and promising method to build chronology of abnormalities based on different-age trees. We have already approved our method in northern Siberia to reconstruct cold and short growth periods, reveal relations between air temperature and frost-ring formation in Siberian Larix and Picea. In modern time no any systematical investigations of tree-ring abnormalities in coniferous over the Northern Europe exists.

We aim to assess the effects of past, present and projected climatic extremes on the performance of individual trees based on the type, frequency, temporal and spatial distribution as well as intensity of structural abnormalities in tree rings of various coniferous tree species. One of the study site is located near by Kevo Subarctic Research Station (Finland). This knowledge will be ultimately used to asses of on the dynamics of forests and tundra ecosystems.