Geophysical Research Abstracts
Vol. 12, EGU2010-10208, 2010
EGU General Assembly 2010

Dendro-climatic reconstruction of summer temperatures in the central part of the Kola Peninsula in the last millennium

Yury Kononov (1), Tatjana Boettger (2), and Michael Friedrich (3)

(1) Institute of Geography, RAS, Moscow, Russia (jukon02@mail.ru), (2) UFZ, Helmholtz Centre for Environmental Research - UFZ, Halle, Germany (tatjana.boettger@ufz.de), (3) Hohenheim University, Stuttgart, Germany (michaelf@uni-hohenheim.de)

In this paper, we present a tree-ring chronology for the central part of the Kola Peninsula (Khibiny Mountains), performed in the framework of the EU integrated project Millennium, (contract # 017008 GOCE). During many years of field research, we have obtained data allow to construct a tree-ring chronology for a period of more than 1000 years.
Collection of wood samples obtained for the tree-ring chronology includes one species - Scots pines (Pinus sylvestris L.). In total, 259 samples were selected. Identification of climate-growth relationship for Scots pine was carried out using the instrumental data of meteorological stations closest to the research area.
Dendro-climatic reconstruction, made on this chronology, is characterized by significant temperature fluctuations. The magnitude of temperature change from the coldest to the warmest period was around 5°C. During the entire period (1000 years) the average temperature of two summer months (July-August) was 12.4°C. In the presented reconstruction of summer temperatures one can recognize four explicit warming periods. First warming took place since the second half of XI century to the beginning of XIII century. At that time mean temperature exceeded the average for the entire period by 0.6° and was equal to 13.0°. We can surely identify that time as the medieval warm period over the study region. It should be noted that in the middle of this warming (roughly from 1120 to 1140) a short-term cooling occurred. Next warming was not so significant. Temperature exceeds the average value of only 0.1°. This warming started in the second half of the XIV century and terminated in the first of XV century. Third warming occurred since the beginning of XVI until the first half of XVII century. Summer temperatures at the time reached 13° that is comparable with the medieval climate optimum. And, finally, the last modern warming began in the second half of the XIX century with the mean temperature of 12.8 °C. The periods of cooling, separating these warming can be considered as phases of the Little Ice Age. Summer temperatures dropped then down to 11.9 ° on average. The most cold was the final phase of the Little Ice Age - the second half of XVII century to the first half of the XIX century. Summer temperatures in this period were 11.7°C, which is 0.7°C below the mean for the last millennium as a whole.
Thus, we can conclude that on the Kola Peninsula the Little Ice Age manifested in three phases, and the modern warming realized during the warm season, has not yet reached the values of the Medieval Climatic Optimum. Besides, the warming of XVI - first half of XVII century is not reflected in the commonly adopted climate history of Europe in the last millennium, and most likely is a regional case.