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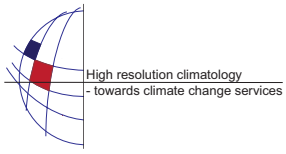

The last millennia climate dynamics in Central Asia as a function of recent geochemical response of lacustrine sedimentation

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Our knowledge of climate change with associated forcing during the last thousand-years remains limited because that cannot be studied thoroughly by instrumental data. So it is an actual task to find high resolution paleoclimate records and to compare it with recent patterns of short-period oscillations. Combination of lake sediments and tree rings appears to be effective for understanding of regional climate forcings.

There are several dendrochronologies (up to 1700 years long) and comparable annual reconstructions by Teletskoye Lake sediments (1500 years) in Altai region. They are calibrated by data from 14 local weather stations (time series up to 80 years) and Barnaul station (170 years) as well. We used tree-ring series together with element contents in sediments as an additional proxy for calculation of transfer function, considering that tree-ring series are responded to summer temperature in this climatic zone. Such combined version allows taking one more independent environmental indication for objective reconstructions.

Element content in sediments is provided by X-ray Fluorescence on Synchrotron Radiation microanalysis with scanning step up to 0.1mm. Age model is based on three strong dates: AD 1963 by 137Cs, and AD 897 and 1540 by radiocarbon. Time series of both annual temperature and precipitation from AD 450 to 2000 are obtained from Teletskoye Lake sediments by multiple regression and artificial neural network methods using transfer function trained by meteodata. Revealed climatic proxies (Br, U and Ti content, Sr/Rb ratio and X-ray density) appear to be fundamental for silt-clay organic-bearing sediments because the same correlation is determined in standard samples from European as well as from Siberian, Chinese and Mongolian cores.

The characteristic periods for northern hemisphere such as medieval warming and Little Ice Age known in the Europe and in other Asian areas (China) are revealed in Siberian region. The spectral analysis of temperatures and humidity time series revealed the subdecade up to multidecade periods of harmonious fluctuations over the both instrumental (170 years) and restored (1500) time intervals. Some of cycles coincide within both dataset as well as with global cyclicity of atmospheric circulation.