



Forecast of annual temperatures changes in Altai and Northern Mongolia regions for the period 2010-2050 year

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The method of scanning X-ray fluorescent analysis using synchrotron radiation [1,2] investigated sediment cores of Lake Teletskoe (Mountain Altai) [3] and lake Telmen (Northern Mongolia) [4].

The method of constructing the forecast includes the following steps:

1) Geochemical analysis of lakes bottom sediment cores with resolution 0.1 mm. It corresponds to the time resolution $\sim 0.2\text{-}0.3$ year (sedimentation rates are equal 0.51 mm/year for Teletskoe Lake and 0.64 mm/year for Telmen Lake).

2) Creating a time series of geochemical indicators of climate change. We used the following geochemical proxies: Ti, Br, Rb, Sr, Mo contents and X-ray density.

3) Calibration transfer functions on the regional meteodata during the last 80-120 years. Regression equation such as: climate parameter = function (proxy) were calculated.

4) Reconstruction of climatic parameters on the depth of the core. Annual temperature and precipitation change for the Altai region (0 - 3000 years ago) and Northern Mongolia region (0 – 2000 years ago) have been reconstructed with step 0.2-0.3 year.

5) A Fourier analysis showed the same frequency of climate change for both regions. Have been identified as the main periods (frequency): 2000, 1000, 660, 500, 400, 330, 270, 200, 155, 125, 105, 80, 45, 30 and 10 years. The sum of 15 sinusoid correlates with the reconstruction of annual temperature in the time period of 1000-2000 years, with the coefficient 0.89.

6) Based on the discovered periodicities forecast the environment change for the period 2010-2050 was calculated. According to our estimates at this time is expected sharp fall of annual regional temperature.

The study was funded by grant 07-05-92103 from the Russian Foundation for Basic Research, by grant 91 from the Siberian Branch of the Russian Academy of Sciences.

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