

The paleo environmental research in southern part of Mongolia by lake sediment analysis

*Uyangaa Udaanjargal¹, Noriko Hasebe¹, Davaadorj Davaasuren², Makoto Sambo¹, Yukiya Tanaka³, Keisuke Fukushi¹

1. Kanazawa University, 2. National University of Mongolia, 3. Kyunghee University

Lake Boontsagaan, Orog and Olgoy are located in the Valley of the Lakes, Gobi-Altai transition zone, which stretches from central to western Mongolia. The surface area of the lake is 252 km² for Boontsagaan, 140 km² for Orog lake and 1,79 km² for Olgoy lake. The sediment cores were collected from these three lakes in 2014-2016. The sedimentary features (e.g., water content, grain density, grain size, chemical composition) and ages (RI measurement) were analyzed and correlated to meteorological data of the area (annual temperature, precipitation and wind 1975-2015, Bayankhongor station).

The mean annual temperature was 1.5°C, mean precipitation is 205 mm and average daily temperatures reached to 15–20°C (www.ogimet.com/gsohc.phtml).

Totally 6 sediment cores were collected from these three lakes in different locations by Sateke plastic corer and were sliced into 1.0cm intervals from the top. The content of water was measured directly by drying a given amount of the sediment at 105°C (Lambe and Whitman, 1969; Dringman, 2002). Samples of 50 mg were dried at 77°C for 24 hours and were then treated by 10% hydrogen peroxides (H₂O₂) for 24 hours to estimate organic matter concentration. Calcium carbonate in the sediment was dissolved by 1-N hydrochloric acid and concentration was calculated. Analysis of the biogenic silica content follows the method described in Mortlock and Froelich (1989). Grain size was measured for whole sediment and mineral fraction with SALD2200 laser diffraction particle size analyzer. The chronology of sediments was established by ²¹⁰Pb measurement. We collected outcrop sediment and analyzed by OSL dating method. These outcrops consist of paleo lake deposit and are indicative of high lake water level.

From the result of the unsupported ²¹⁰Pb, sedimentation rate of Olgoy lake was about 0.5 cm per year for last 40 years. Sedimentation was faster before that. Physical and chemical properties of sediments are compared to meteorological data to interpret the effect by the local climate change. OSL ages indicate the time when water level was high.

Keywords: lakes, sediment feature, climate data