

## Characteristics of lake sediment from Olgoy, Orog and Boontsagaan in Mongolia and comparison to meteorological data

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The Olgoy, Orog and Boontsagaan lakes are located in Valley of the lakes which stretches from Gobi-Altai to Khangai mountains. This area affected by the Westerlies modulated by the North Atlantic Oscillations (NAO) (Visbeck, 2002), and the East Asian summer monsoon which associated with the El Nino-Southern Oscillations (ENSO) and the Inter-tropical convergent zone (ITCZ) (Tudhope et al., 2001).

The sediment cores were collected from these three lakes in 2014-2016 by Sateke plastic corer and were sliced into 1.0cm intervals from the top. 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, 1956-2016, Galuut station). The mean annual temperature ranges from 2°C to 5°C below zero. The monthly average for July and January is +16°C and -20°C, respectively. The mean precipitation per year is 205 mm in that area.

The water content 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 (H<sub>2</sub>O<sub>2</sub>) 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 both of whole sediment and the mineral fraction with SALD2200 laser diffraction particle size analyzer. The chronology of sediments was established by <sup>210</sup>Pb measurement.

From the result of the unsupported <sup>210</sup>Pb, sedimentation rate was about 0.5 cm and 0.3 cm per years in Orog and Olgoy lakes. According to the comparison between sediment characteristics and climate condition, precipitation is correlated to biogenic silica and whole grain size with correlation coefficient 0.65 and 0.52, respectively, in Orog lake. Further comparison in Olgoy lake showed that temperature and precipitation are related to organic carbon and biogenic silica with values 0.26 and 0.24, respectively. In a short time scale, wetter years accompany high amount of biogenic silica and coarse grain size. Based on this relationship, the concentration of biogenic silica (Bsi) can be used as an indicator of precipitation.

Keywords: lake, sediment characteristics, climate condition