

Drastic environmental changes recorded in the core deposits of Balkhash Lake, Kazakhstan

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To reconstruct environmental evolution in Ili Delta and Balkhash Lake areas, Kazakhstan, we have continued geological, geomorphological and paleoenvironmental researches under the Ili project, RIHN, since 2007(Endo et al.,2010). Following the results of lake level change in the last 2000 years using 2007 core in the western part of Balkhash Lake, we took several cores in 2009 in the easternmost part of the lake, where is the deepest part of the lake. These 2009 cores cover almost Holocene, and have been analyzed using pollen, diatom, and ostracod, and also geochemical and magnetic properties. These provide us continuous environmental records, which are combined with geological and geomorphological evidences in the land survey along Lepsi and Ili rivers to discuss the environmental evolution especially in mid Holocene in central Eurasia.

Location of two cores, 0901 and 0902, is in the easternmost part of Balkhash Lake, in the deepest part of the lake, about 20 m in depth. Cores are 5.67 m and 5.80 m in length, composed of whitish, massive clayey horizons, and blackish to brownish laminated silt/clay, partly sandy layers.

Both cores can be divided into three main sedimentary units of A, upper, B, middle and C, lower. In the core 0901, the unit A of 0-1.1 m and unit C of 4.0-5.6 m consist of massive whitish clayey sediments, and the unit B of 1.1-4.0 m is the alternations of finely-laminated sediments including sandy layer from 2.6 to 3.0 m. In the core of 0902, three units show the same character as 0901 core but the thickness is a little different, the unit A of 0-2.1 m, the unit B of 2.1-4.85 m, the unit C of 4.85-5.8 m. Both units A and C show high Ca, while unit B relatively low Ca, high Fe and Si. Especially in 0902 core, fine gypsum crystals are rich in the 3.55-3.68 horizon of the unit B, probably suggesting rapid desiccation of the lake floor. In this case, the lake level must be 20 meters lower than the present level.

The unit B of the cores is characterized by special lithology, frequent changes in diatom and ostracods, arid land vegetation like desert, decreased pollen from coniferous forest, suggesting dominance in highly lowered lake level, and warm and dry climate. It ranges from 6000-5500 to 3500 years ago, corresponds to the mid Holocene hyper arid stage, recently recognized in various regions.

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