

HQR023-P06

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## Optically stimulated luminescence dating of sediments from the Lake Balkhash area, Kazakhstan

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The lake level of Lake Balkhash of Kazakhstan has been fluctuated by the changes in the hydrological and/or climatic environments through the Late Quaternary. It is thought that some landforms have been formed in response to the lake level changes of the Balkhash. However, only a few numerical ages have been obtained from the landforms and sediments from the area, and the lack of the age constraint has prevented studies of precise geomorphic development and terrestrial paleoenvironmental reconstruction. This study applied the optically stimulated luminescence (OSL) dating to fluvial terraces, sand dunes, and gravel bars around Lake Balkhash in order to establish their chronology. Twenty samples for OSL dating were taken from nine localities. The emerged gravel bars are especially important landforms, because they are the direct indicators of higher lake levels than the present Lake Balkhash. Along the lower reach of the River Repsy which flows into southeast shore of Lake Balkhash, fluvial terraces are classified into at least three surfaces (lower, middle, higher terraces). The middle surface occupies the broadest area among these terraces.

Fine grain quartz was extracted from all samples. The OSL measurements of these quartz samples were conducted by using the single aliquot regenerative-dose (SAR) protocol to calculate equivalent dose ( $D_e$ ) values. The dose rates of the samples were calculated from U, Th and K concentrations which were obtained by neutron activated analysis.

The results of the OSL dating indicate that one of the gravel bars from the lakeshore was formed at 24.5 ka, and the formation of the fluvial middle terrace had occurred at 9.1 ka. Three OSL ages obtained from the lower and the middle fluvial terrace deposits were in agreement with calibrated AMS<sup>14</sup>C ages from nearby the OSL samples, which supports that the OSL ages in this study are reliable. In addition, the age of emerged gravel bar (24.5 ka) indicates that the lake level of the Balkhash had been higher during the Last Glacial Maximum. All these chronological data will contribute significantly to the reconstruction of the paleoenvironment in the Lake Balkhash area.

Keywords: Lake Balkhash, gravel bars, fluvial terraces, sand dunes, OSL dating