

Lake level changes of Lake Olgoi, Mongolia, reconstructed by analyses of paleo shoreline sediments and their IRSL dating.

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Numerous paleo-lake shorelines exist in Mongolia as a record of past severe water level fluctuations. These water level fluctuations were caused by past climatic changes. Mongolia is located at the interface of three climate systems: the Siberian High Pressure, the East Asian Summer Monsoon, and the Westerlies, and the climate varies greatly depending on which climate system dominates.

Lake Olgoi is located in the Valley of Gobi Lakes in southern Mongolia. The lake was formed by tectonic uplift and is known to have experienced significant inflow in the past. When the lake level became high around the middle of Holocene, the flooding through the nearby Galuut Canyon occurred, but the exact time and cause of this flooding event is unknown.

In order to reconstruct lake area reduction process, sediment's geophysical characteristics and major element analysis were carried out on core samples collected from the lake paleo-shorelines. Samples from the higher lake shoreline were dated using infrared stimulated luminescence (IRSL Dating) of K-feldspar to determine the age when the lake level was high.

Paleoenvironmental reconstructions confirm that Lake Olgoi underwent a transition from a wet to semi-dry to wet to semi-dry. This is consistent with the results obtained from the sediment core analyses collected from the current Lake Olgoi bottom. The highest water level was reached at approximately 5,000 years ago. This water-level increase event should be associated with the onset of the wet climate due to the northward shift of the East Asian summer monsoon associated with increased solar radiation, thawing of permafrost and melting of glaciers. The high-water level would have caused the flooding, and the water level was dropped rapidly to a level where environmental conditions were suitable for shell fish habitation. The layer in which shell fossils were found is dated as approximately 3,500 years old

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