

## Geochemical properties of Lake Khargal sediments in northern Mongolia

ALEXANDER ORKHONSELENGE<sup>1,2</sup>, SARAH J FOWELL<sup>2</sup>, NANCY BIGELOW<sup>2</sup>, JOSHUA BARNA<sup>2</sup>, DASHTSEREN GERELSAIKHAN<sup>1</sup> AND CAMILLE HENINGER<sup>2</sup>

<sup>1</sup>National University of Mongolia

<sup>2</sup>University of Alaska Fairbanks

Presenting Author: orkhonalex@gmail.com

Lake sediments preserve valuable information regarding geological, geomorphological, hydrological, and sedimentological processes in the lake basin and allow us to infer these processes with geochemical tracers. The weathering index is one of the most important geochemical proxies for reconstructing regional climate changes. The degree of chemical weathering of sediments in the Lake Khargal basin can be used as a proxy for climatic conditions in northern Mongolia. In this study we present geochemical characteristics of Lake Khargal sediments to reconstruct provenance, tectonic setting, source area weathering and source rock compositions. In terms of the provenance and tectonic setting, the Lake Khargal sediments include intermediate igneous rock from an oceanic island arc (ARC) source, felsic igneous rock from a passive margin (PM) source, and quartzose sedimentary rocks from an active continental margin (ACM) source. The chemical index of alteration (CIA) and the chemical index of weathering (CIW) indicate a low degree of weathering. Major element compositions in the lake sediments are predominantly semimetals, alkaline earth metals and transition metals. A geochemical classification plot of  $\log[\text{SiO}_2/\text{Al}_2\text{O}_3]$  vs.  $\log[\text{Fe}_2\text{O}_3/\text{K}_2\text{O}]$  shows that the Lake Khargal sediments are mostly composed of greywacke with Fe-sands, while the binary plot  $\text{Al}_2\text{O}_3$  vs.  $\text{TiO}_2$  indicates basaltic to granitic (mafic to felsic) source rocks. The A-CN-K ternary plot shows that the Lake Khargal sediments were derived from source rocks enriched in plagioclase, gabbro, tonalite and granodiorite. Low CIA values suggest that the lake sediments were derived from fresh basalts, granites and granodiorites. The chemical maturity of Lake Khargal sediments based on a correlation between  $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3+\text{K}_2\text{O}+\text{Na}_2\text{O}$  records a shift from humid to arid climate in the drainage during the Holocene.