

Verification of ice-mineralization process: formation of authigenic carbonates in alkaline lakes during freezing condition in south Mongolia.

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Alkaline lakes have functions of absorption of atmospheric CO₂ to natural water and fixation of dissolved carbonate by mineralization. Therefore, it has been considered that alkaline lakes located in arid area inside the continents play important roles in carbon cycle on the earth surface (Finley et al., 2015; Fukushi and Matsumiya, 2018). Generally, formation of carbonate minerals was caused by evaporation of lake water under dry environment. However, alkaline lakes in cold inland area are frozen in winter. Frozen lakes cannot evaporate because it is isolated from the air.

Freezing of lake water causes the increase of the ion concentrations because almost most of the ions are excluded from ice to solution. Inland closed lakes don't have inflow and outflow rivers of which situation is almost same with evaporation. Therefore, the mineralization can be also caused by freezing process.

In this study, we have examined "ice-mineralization" process in the alkaline lakes from the observations of water chemistry from summer to winter in Mongolia.

Keywords: carbonate, alkaline lake, mineralization