

Variations in nitrate stable isotopes in ice cores from two glaciers in central Asia

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Nitrogen and oxygen stable isotopes of nitrate in ice cores from two alpine glaciers of different geographical locations in central Asia were analyzed. One ice core was drilled in 2002 on Dunde Ice Cap located in Qilian Mountains in China (DUC), another was drilled in 2007 on Grigoriev Ice Cap located in Tianshan Mountains in Kyrgyz Republic (GGC). Variations in the stable isotopes for approximately 150 years from the mid-19th Century to the present were compared between the two cores. The concentrations of nitrate in the two ice cores showed no remarkable trend in the last 150 years and no significant difference between the two ice cores. However, the nitrogen stable isotopes of nitrate showed the distinctive variations between the two ice cores. The isotope of both cores generally decreased in the last 150 years, the values of nitrogen isotope differed particularly in 19C and mid 20C, and the timing of decrease was earlier in GGC than in DUC. These different features suggest that nitrate was supplied on the glaciers from each local source. The oxygen stable isotopes of nitrate were similar values and almost constant in both cores, but they showed declines in 1940s to 60s in GGC and 1980s in DUC. The declines of the oxygen isotopes is likely to show microbial growth on the glacier surface during the periods.

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