

## Variations in oxygen and nitrogen stable isotopes in nitrate in an ice core of Tianshan Mountains

TAKEUCHI, Nozomu<sup>1\*</sup> ; OHTE, Nobuhito<sup>2</sup> ; FUJITA, Koji<sup>3</sup> ; VLADIMIR, Aizen<sup>4</sup>

<sup>1</sup>Chiba University, <sup>2</sup>Kyoto University, <sup>3</sup>Nagoya University, <sup>4</sup>University of Idaho

Nitrate is one of the common soluble ions in snow and ice of glaciers and is usually supplied as aerosols derived from natural or anthropogenic processes. Nitrogen and oxygen stable isotopes of nitrate can provide a means to determine its main source and microbial process including nitrification and denitrification in snow and ice. In this study, we analyzed nitrogen and oxygen stable isotopes of nitrate in selected depths of the ice core drilled from Grigoriev Ice cap in Kyrgyz Tien Shan Mountains of Central Asia in 2007. The ice core was 87 m from the surface to the bottom, and covered approximately 12700 years, which was dated with radiocarbon. Mean nitrate concentration was 288 ppb in this ice core. Nitrogen isotope of nitrate showed that it was distinctively higher in the 20th century, but lower before the 20th century, indicating that the source of nitrate changed from natural to anthropogenic in the 20th century. Oxygen isotope of nitrate showed that it generally varied from +70 to +80 ‰, but was remarkably lower ranging from +30 to +60 ‰ in 1960s and 6000-7000 bp. This suggests that nitrate was mostly atmospheric origin, but was occasionally derived from microbes on the glacier surface.

Keywords: ice core, stable isotope, nitrate, glacial microbe, central asia, tian shan mountains