

ACC029-04

Room:102

Time:May 26 12:30-12:45

Characteristics of Isotope and Chemical Composition in the Fedchenko Glacier, Pamirs

Shun Amemiya^{1*}, Nozomu Takeuchi¹, Koji Fujita², Sumito Matoba³, Sachiko Okamoto², Evgeny Podolskiy²

¹Chiba Univ., ²Nagoya Univ., ³Hokkaido Univ.

Analysis of soluble chemical ions in ice cores can reveal various environmental information in the past, such as atmospheric circulation and land cover. In this study, we analyzed the oxygen stable isotope and soluble chemical ions in shallow ice cores drilled on Fedchenko Glacier located in Central Pamirs. The glacier is the largest mountain glacier in this region and the thickest part of the glacier ice is more than 600m. The two ice cores, 5 m and 10 m in depth, were collected at middle of the glacier at the elevation of 5,000 m in 2009.

The stratigraphy of the cores, show that it was composed of the firm, ice, and dust layers. Based on the dust layers, which is formed in every spring, the 5 m and 10 m cores covered three and seven years, respectively.

The oxygen stable isotope ratio showed a clear seasonal variation in the upper part of the 10 m core, but no significant changes in the lower part and in the 5 m core. The seasonal signals in the lower part had probably removed by intra-glacial meltwater.

The concentration of major chemical components revealed that Ca, Cl, SO₄, and Na were the four most dominant species and they accounted for more than 80 % (w/w) in the measured ions. The chemical profiles in the core showed the distinct peaks in the upper part of the core. The chemical components of each peak were divided into two categories: Type 1 was composed of Ca, NO₃ and SO₄, and Type 2 was composed mainly of Cl, SO₄, Na and Ca. Comparison with stable isotope ratios, Type 1 was corresponding to the event in summer, while Type 2 to the event in winter. Based on the seasonal atmospheric circulation change in this region, Type 1 components are likely to be derived from the vast arid regions in northeast side of the glacier, carried by the northeasterly wind in summer, and Type 2 components are likely to be derived from the western Asia blown by the southwesterly wind in winter.

Keywords: Fedchenko Glacier, ice core, stable isotope ratio, soluble chemical ions