

Shallow ice cores from the western Cwm of the Khumbu Glacier of Mt. Everest in Himalayas drilled in 1980

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Two shallow ice cores have been drilled on the Western Cwm of Khumbu Glacier of Mt. Everest in winter of 1980 by the Japanese winter climbing expedition of Mt. Everest led by a famous climber, Naomi Uemura. The cores were successfully transported in frozen state to a cold room of National Institute of Polar Research in Japan. Since then, the ice cores have just been stored for a long time -without any analysis. In 2016, we recognized the cores and decided to restart the analysis. In this study, we reported the description of stratigraphy and results of stable isotope and soluble ion analyses. The ice cores were analyzed Core1 drilled at 6100 m a.s.l. and 8.83 m in length, and Core2 drilled at 6400 m a.s.l. and 4.06 m in length. The visual stratigraphy of the cores revealed that the two cores have a distinct stratigraphy. Core1 showed that 98% of the length were the granular snow and 2% were the refrozen ice layer. A dust layer was observed at a depth of around 7.3m. In contrast, In Core2 showed that, 15% of the length were the granular snow and 85% were the ice layer. The sand and gravel layers was observed frequently in the core, in particular at a depth of 0.40~0.60 m, 1.2m, 3.4~4.0 m. The results suggest that Core1 consists of continuous snow layers without significant melt, while Core2 consists of abundant refrozen ice layers and affected by avalanche snow from the south wall of Mt. Everest. The mean Hydrogen and oxygen isotope ratios were -126.4 and -17.6 permil for Core1, -163.3 and -21.5 permil for Core2. The lower isotope ratio for Core2 is probably due to the snow of lower isotopes supplied from the high elevation of the south wall by avalanche. The soluble ion composition were also distinctive between the two cores. Core1 was dominated by Na⁺ and Cl⁻ while Core2 was dominated by Ca²⁺. The difference was also due to debris supplied from the wall and effect of melt and refrozen of the snow.

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