



Correlation between the density variation of the Dome Fuji (Antarctica) shallow ice cores and the sunspot number

A. Hori (1), H. Narita (1) and T. Hondoh (1)

(1) Inst. of Low Temperature Science, Hokkaido Univ. (hori@hms.lowtem.hokudai.ac.jp)

Ice core analyses have been carried out for paleo-climatic and paleo-environmental reconstructions. dating of ice cores is still one of the most important problem. Bender (2002) reported a good correlation between $\delta(O_2/N_2)$ and insolation. This suggests that dating of the ice core can be carried out using $\delta(O_2/N_2)$ data obtained directly from the ice core itself because solar insolation can be theoretically calculated. However, it is not cleared how insolation affects the $\delta(O_2/N_2)$. Ikeda-Fukazawa and others(2003) proposed a model to explain the fractionation of air in firm caused by the difference in the diffusion in ice between O_2 and N_2 . We measured the high-resolution density profile of the Dome Fuji (Antarctica) shallow ice cores by the X-ray transmission method to investigate its densification process. The density profile with the spatial resolution of 1 mm was obtained continuously from near the surface to 40 m depth. We compared the density variation of the Dome Fuji shallow ice cores and the sunspot number and found a correlation between them. To investigate the periodicity of the density variation, we carried out Fourier analyses of the density variation profiles. In the power spectra, peaks around 10 years were observed, which almost agrees with the periodicity of about 11 years in the sunspot number variation. This suggests that the structure of the Dome Fuji shallow ice cores was affected by the solar activity.

Bender, M. L. (2002), Orbital tuning chronology for the Vostok climate record supported by trapped gas composition, *Earth and Planetary Science Letters*, 204, 275-289.

Ikeda-Fukazawa, T. and 4 others (2003), Gas fractionation mechanism in polar ice sheets: new implications from the Dome Fuji ice core data, *EuroConference: Polar Regions and Quaternary Climate*, San Feliu de Guixols, Spain.