

The difference in dislocation density between the glacial and of interglacial ice of the Dome Fuji, Antarctica, investigated by the X-ray diffraction measurements

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Ice becomes soft by adding some impurities to it in laboratory experiments.¹⁾ In polar ice sheets, the glacial ice contains more impurities than the interglacial ice. Therefore, the glacial ice is considered to be deformed more than the interglacial ice. On the other hand, some impurities are contained as mineral inclusion particles in ice and these particles can disturb the dislocation movement. In this case ice would become hard due to the impurities.

We conducted X-ray diffraction measurements of the two ice samples taken from 1776 m (interglacial) and 1840 m (glacial) depths of the Dome Fuji ice core. We decomposed the profiles into several components and estimated dislocation density from the widths of the components.²⁾ The estimated dislocation density of both samples was about $2 \times 10^{10} \text{ m}^{-2}$. We did not find distinct difference between them. The crystal size of the glacial ice sample was larger than that of the interglacial one. The grain boundary is known to also disturb the dislocation movement. This may affect the observed results. We will discuss more in detail.

References

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- 2) A. Hori, M. Oguro, T. Hondoh, and V. Y. Lipenkov, Ice lattice distortion along the deepest section of the Vostok core (Antarctica) from X-ray diffraction measurements, *Annals of Glaciology*, 39, 501-504, 2004.