

ACC022-02

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## Accurate chronology of the Dome Fuji deep ice core based on O<sub>2</sub>/N<sub>2</sub> ratio of trapped air

Kenji Kawamura<sup>1\*</sup>, Yuto Kikuchi<sup>2</sup>, Shuji Aoki<sup>2</sup>, Takakiyo Nakazawa<sup>2</sup>

<sup>1</sup>National Institute of Polar Research, <sup>2</sup>Tohoku University

Chronology of the first Dome Fuji deep ice core for the past 340 ka had been improved by orbital tuning of measured O<sub>2</sub>/N<sub>2</sub> to calculated local summer insolation, with accuracy better than ~2 ka. The O<sub>2</sub>/N<sub>2</sub> ratio is depleted relative to the atmosphere because of physical fractionation during bubble close-off, and the amplitude of this fractionation is linked to the magnitude of snow metamorphism, which in turn is controlled by local summer insolation. It permits comparisons between Antarctic climate, greenhouse gases, astronomically calculated orbital parameters, and radiometrically-dated sea level and monsoon records. Here, we completed the measurement of O<sub>2</sub>/N<sub>2</sub> ratio for the second Dome Fuji ice core from 2,400 m to 3,028 m (340-700 ka) at ~2 ka resolution, with much improved core storage practice and mass spectrometry. In particular, the core had been stored at about -50 °C until the day of air extraction except during transportation, in order to prevent molecular-size dependent fractionation due to gas loss during storage. The precision of the new O<sub>2</sub>/N<sub>2</sub> data set is improved by a factor of 3 over the previous data from the first core. Clear imprint of local insolation is recognizable in the O<sub>2</sub>/N<sub>2</sub> data towards the deepest depths. We will present the new chronology based on the orbital tuning of O<sub>2</sub>/N<sub>2</sub> data, and discuss climatic implications.