

Accurate chronology and climatic reconstruction around MIS 11 (interglacial period ~400,000 years ago) from Dome Fuji ice core, Antarctica

*Kenji Kawamura^{1,2,3}, Ikumi Oyabu¹, Shuji Aoki⁴, Takakiyo Nakazawa⁴, Ayako Abe-Ouchi^{5,3}, Fuyuki SAITO³

1. National Institute of Polar Research, Research Organization of Information and Systems, 2. SOKENDAI (The Graduate University of Advanced Studies), 3. JAMSTEC, 4. Tohoku University, 5. University of Tokyo

Marine Isotope Stage (MIS) 11 is characterized by long duration of glacial termination and interglacial, with higher sea level than today, despite moderate atmospheric CO₂ concentration and small variations in northern summer insolation (due to small orbital eccentricity). To investigate the roles of different forcings (e.g. orbital variations and greenhouse gases) on climate and ice sheets (sea level), paleoclimatic proxy records need to be accurately dated and precisely synchronized with each other. An accurate chronology for the past 360 ky was constructed through orbital tuning of O₂/N₂ ratio of trapped air in the Dome Fuji and Vostok ice cores with local summer insolation (Kawamura et al., 2007), and its improvement has been underway (Oyabu et al., this session). We have also been extending the O₂/N₂ chronology to older periods by analyzing the second Dome Fuji ice core, and constrain the timing and duration of the past interglacial periods.

Marine sediment cores from northern North Atlantic region exhibit millennial-scale variations, including abrupt climatic shifts and bipolar seesaw, during glacial periods and terminations in various proxy records (e.g. sea surface temperature and ice-rafted debris). By correlating the millennial-scale changes recorded in the marine sediment cores with those in the Dome Fuji ice core (CH₄ concentration and δ¹⁸O of ice), it may be possible to transfer the Dome Fuji chronology to the marine cores from the North Atlantic. We first attempted to correlate planktonic δ¹⁸O and IRD records from the marine core ODP 980 with the Dome Fuji CH₄ around MIS 11 and constrain the durations of interglacial periods recorded in the marine core, with some success. However, the current resolution of the Dome Fuji gas records (~2000 years on average) is not sufficient to undoubtedly identify all millennial-scale events, thus we will start new measurements to improve the resolution. In the presentation, we will show the results of the new measurements and synchronization, and discuss the timing, duration and mechanism of climatic changes over Termination V and MIS 11.

Keywords: Ice core, MIS 11, interglacial period, Dome Fuji