

Total air content (V) of Dome Fuji core during the last 30 kyr, and a new interpretation of V from the LGM to present.

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Total air content (V) of Dome Fuji ice core from 129.9 m to 749.2 m in depth (3,000 to 30,000 years BP) was measured by a barometric method, and found that the V decreased 0.006 cm³/g from the Last Glacial Maximum (LGM, ca. 21,000 years BP) to present. Traditional interpretation of the shift in V which assume present pore volume (V_c) and temperature at close-off (T_c) held in the glacial condition leads to about 970 to 1,140 m increase of the ice sheet at Dome Fuji from the LGM to present, which contradicts the available ice sheet modeling calculations. Other approaches suggested by previous studies also do not explain the shift. In this paper, using the relations for the shifts in V and δ18O in six Antarctic ice cores with simple assumptions, we estimate that the ice sheet elevation at Dome Fuji was increased about 120 to 140 m from LGM to present (ice sheet elevation at Dome Fuji was thinner in LGM than today). We also estimate the ice sheet elevation changes from the LGM to present at other deep coring sites as Vostok, Byrd, Law Dome (DSS, Site A) and D10. We also discuss the possible errors in our final estimations of ice sheet elevations in LGM.