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DEPTH-AGE CALCULATIONS FOR LARGE POLAR ICE SHEETS (ABSTRACT)

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Ice cores contain important information on climatic conditions in the past. All data sets should be interpreted and discussed on the basis of a reliable core chronology. The uncertainly of ice core dating by a flow model increases for deeper parts of ice sheets. Nevertheless, in this pilot study we estimated a relation between depth and age at Dome Fuji Station, Antarctica, using the Dansgaard-Johnsen model (W. DANSGAARD and S. J. JOHNSEN: J. Glaciol., **8**, 215, 1969) with past accumulation rate changes taken into consideration.

The ice flow velocity profiles can be approximated and characterized with one parameter, h, the distance from the bedrock. The vertical strain rate is assumed to be constant from the surface down to the level $h=h^*$ and, further, decreasing linearly to zero at the bedrock. A value of 1200 m was adopted for h^* at Dome Fuji Station, which is the value used for the GRIP ice core analysis. Dome Fuji Station, Antarctica, and GRIP site, Greenland, are both located at the summit positions of the ice sheets and the ice thickness values are nearly equal to each other (about 3000 m). Depth-age calculations were also performed for $h^*=0$ to study the influence of parameter h^*. Depths for the Holocene/Wisconsin boundary were obtained as 376 and 370 m, respectively. This suggests that the Holocene/Wisconsin boundary is not so sensitive to the ice flow pattern at Dome Fuji Station.

Depths for the Wisconsin/Sangamon boundary were also calculated at the assumption that the accumulation rates during the Wisconsin age period was 1/2 (case 1) and 2/3 (case 2) of its present-day values. The resultant estimates were about 1450 m (case 1) and 1670 m (case 2), respectively. This confirms that the accumulation rate during a glacial period is a major factor which determines a depth-age relation at deeper levels in large ice sheets in ice flow modeling.

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