

PORE CLOSE-OFF REGIONS OBSERVED IN POLAR FIRN/ICE
CORE SAMPLES (ABSTRACT)

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The transformation of snow and firn to ice is defined by the acquisition of "zero permeability" and takes place at a density of about 0.8 g/cm³. The observation of depth intervals for the transformation are important for understanding age difference between air-bubble and ice matrices. A qualitative measure of permeability was obtained by using a continuous air-suction system which was applied to a microtomed plane of each core sample. With this experimental method, each data point was resolved in 1.6 cm increments. Core samples were prepared from the G6 (73°S, 40°E), S25 (69°S, 41°E) and Byrd (80°S, 120°W) cores. The results show characteristic layering structure existing within the pore close-off region, consisting of alternative permeable and impermeable layers. Depth interval obtained for the pore close-off region of the G6, S25 and Byrd cores are 69.5–77.8, 36.5–48.2 and 49.9–56.5 m respectively. These figures correspond to the age difference between air-bubble and ice structure of 538–702, 85–171 and 287–391 years respectively. The existence of layer structure in the pore close-off region indicates that air-bubble age also changes with depth in a similar fashion, *i.e.* high-frequency age fluctuation overlaps the long-term trend with depth. Age profile to be obtained from experiments depends on sample length along the vertical direction of each core, even though the sampling can be done continuously with depth. The minimum lengths of ice samples to eliminate the above age fluctuations are estimated as 2, 3.5 and 2 m for the G6, S25 and Byrd cores respectively.

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