

BUBBLE VOLUMES IN FIRN-ICE TRANSITION LAYER OF ICE
CORES FROM POLAR ICE SHEETS (ABSTRACT)

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The air bubble formation process has been studied experimentally by using five ice cores from the Greenland and Antarctic ice sheets. Bubble volumes in firn-ice samples were measured by a classical method based on the Boyle-Charles law for an ideal gas. The relation between total bubble volume per unit mass (V_b : bubble volume) and the bulk density of samples (ρ) was examined. It was found that V_b starts to increase rapidly at a bulk density of 0.763 to 0.797 Mg/m³. This density (ρ_{ib}) seems to be correlated with the ice temperature in the ice sheets; ρ_{ib} increases with decrease of ice temperature. V_b shows its maximum value in the density range between 0.819 and 0.832 Mg/m³. The corresponding porosity of the density ranges between 0.110 and 0.097. This porosity seems to not correlate with ice temperature nor with accumulation rate at the coring site. These characteristics of firn density probably affect the amount of entrapped air in polar ice (total air content).

(Received January 5, 1994)