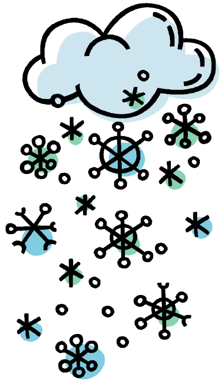
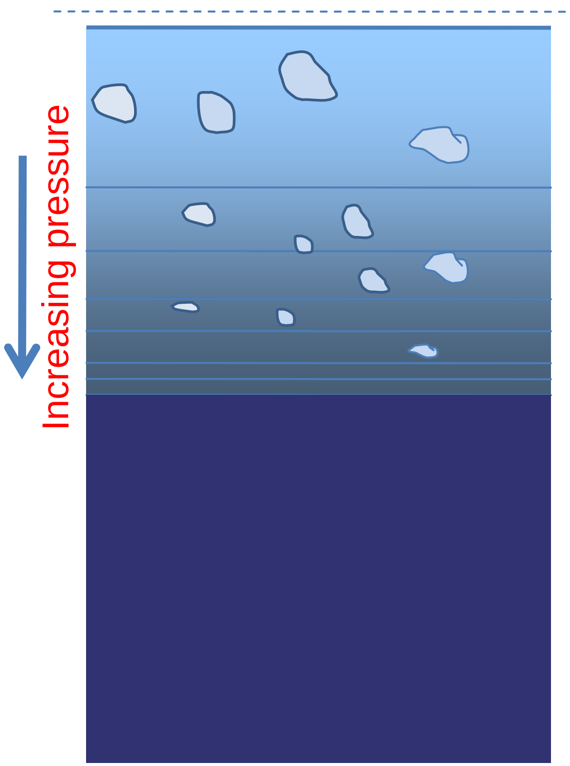


Adsorption of CO_2 to snow: up to 40 mg/kg
(in air: 350 ppm CO_2 = 0.6 mg/L):

Assuming a specific weight of 1 dm^3 snow as 0.1 kg/L, it consists of 10 Vol-% of snow-ice and 90 Vol-% of air. Thus, a dm^3 snow may contain a total carbon dioxide content of which 4 mg is adsorbed and 0.54 mg comes from the air between the snow flakes – explaining the high values found in ice cores by the gas extraction over long time in the molten state.



Deposition

Compaction to firn, air bubble closure (when?)

Chlathrate formation (CO_2 ~ 5 atm) $\rightarrow$ [$CO_2 \cdot 5\,H_2O$]

preferred diffusion of CO_2 into the ice matrix

(N_2, O_2 at ~ 20 atm)

Carbonic acid formation

$$CO_2 + H_2O \underset{< 1\,a}{\overset{> 100\,a}{\rightleftharpoons}} [CO_2 \cdot H_2O] \underset{< 1\,a}{\overset{> 100\,a}{\rightleftharpoons}} H^+ + HCO_3^-)$$

N_2, O_2 non-reactive: **selective depletion** of CO_2

Primary bubbles disappear.

Upon drilling and horizontal storage of ice cores, expansion and back diffusion of N_2, O_2 and CO_2 (and slow decomposition of carbonic acid) into secondary bubbles occurs, at different rates.