ESTIMATING OCEANIC CARBON UPTAKE
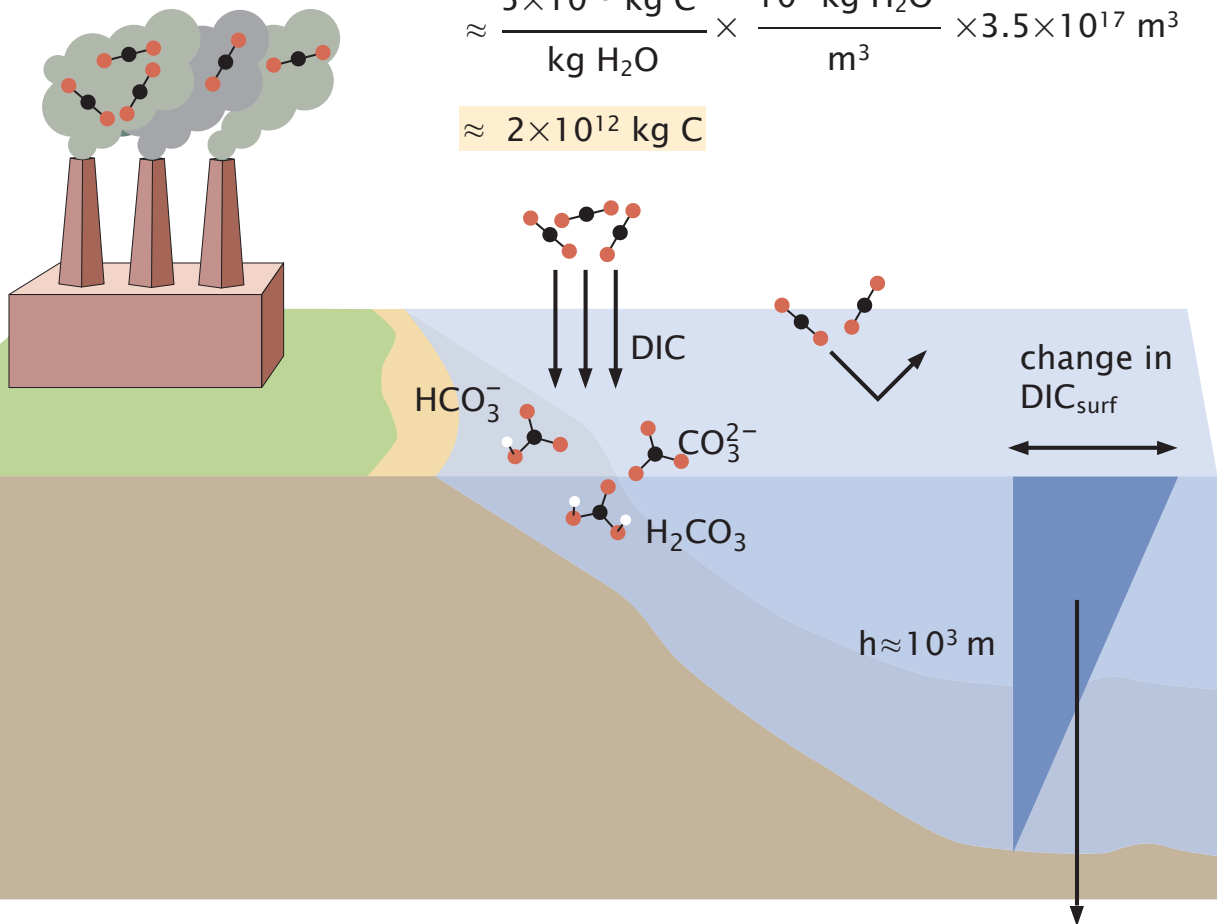
$$\text{change in DIC}_{surf} = \frac{C_{CO_2} \text{ growth}}{C_{CO_2}} \times \frac{DIC_{surf}}{R} \approx \frac{2 \text{ ppm}}{420 \text{ ppm}} \times \frac{2 \times 10^{-5}}{10} \frac{\text{kg C}}{\text{kg H}_2\text{O}} \approx 10^{-8} \frac{\text{kg C}}{\text{kg H}_2\text{O}}$$

$$\text{change in m}_C = \text{change in DIC} \times h \times \rho_w \times 0.7 \times A_{earth} \approx$$

$$\approx \frac{5 \times 10^{-9} \text{ kg C}}{\text{kg H}_2\text{O}} \times \frac{10^3 \text{ kg H}_2\text{O}}{\text{m}^3} \times 3.5 \times 10^{17} \text{ m}^3$$

$$\approx 2 \times 10^{12} \text{ kg C}$$

$$\text{change in DIC} \times h \approx \frac{\text{change in DIC}_{surf} \times h}{2} \approx h \times 5 \times 10^{-9} \frac{\text{kg C}}{\text{kg H}_2\text{O}}$$