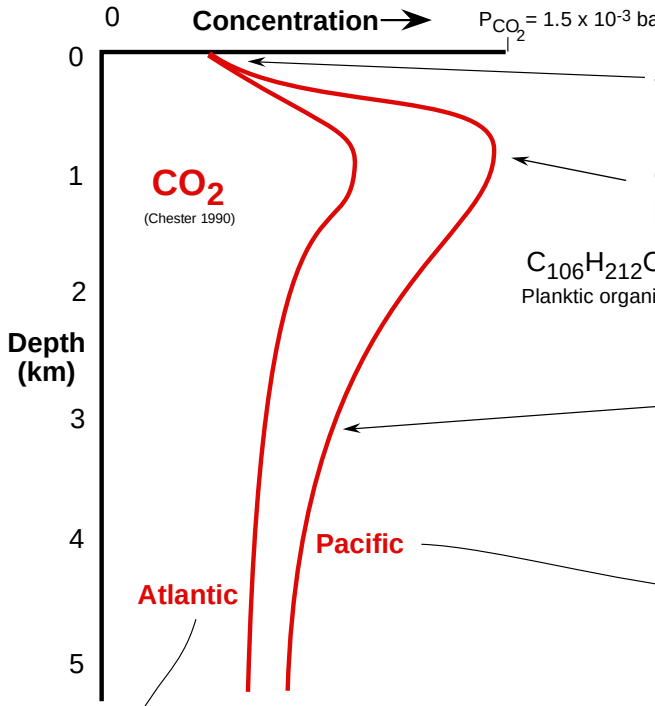
Variation in concentration of solutes in the oceans III: carbon dioxide (CO_2)



Concentrations of CO_2 in near-surface water are small because of exchange with the CO_2 -poor atmosphere at the sea surface, and because of downward mixing by waves and eddies.

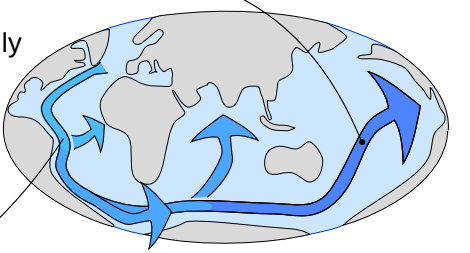
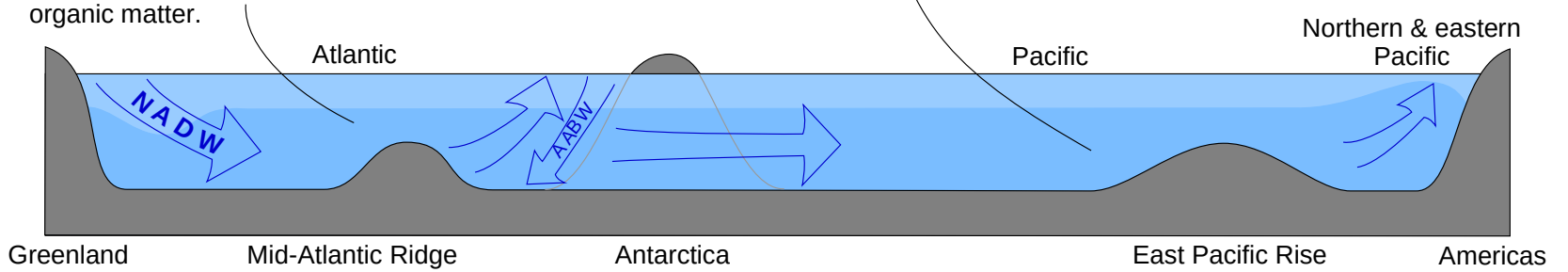
Concentrations of CO_2 just below the thermocline are relatively large because oxidation of sinking organic particles produces CO_2.

$$C_{106}H_{212}O_{106}N_{16}P + 127.25\,O_2 + 9.5\,H_2O \;\text{-->}\; 106\,CO_2 + 106\,H_2O + 19\,H^+ + 16\,NO_3^- + PO_4^{3-}$$

Planktic organic matter — Carbon dioxide

Concentrations of CO_2 in abyssal waters are more than those in surface waters because oxidation of sinking organic particles produces CO_2.

Concentrations of CO_2 in deep waters of the Pacific are typically greater than those in the Atlantic because Pacific deep water has had more time to accumulate CO_2 from oxidation of organic matter.



Concentrations of CO_2 in deep waters of the Atlantic are typically less than those in the Pacific because Atlantic deep water was more recently CO_2-poor surface water and hasn't had time to accumulate CO_2 from oxidation of organic matter.