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## Dissolved elemental fluxes in sinking particles: estimating the ratios of total C:N:P:Si:Ca in flux

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Fluxes at the base of the upper mixed layer often show deviations in the C:N:P ratios of paticles from the classical Redfield Ratio. This may be interpreted as non-Redfield behaviour of a system, however it often contradicts biogeochemical estimates of the ratios in which these elements are remineralised in the mesopelagial. The ratios of N:Si and POC:PIC are also important, since both silica and carbonates serve as ballast for sinking and the POC:PIC ratio at the base of the winter mixed layer determines the ultimate sequestration of atmospheric  $CO_2$  into the ocean.

Using samples from traps deployed at different depths in the North Atlantic the total flux of carbon, nitrogen, phosphorus, silica and calcium was determined by accounting for the dissolved phase in the trap cup supernatent. Large, variable proportions of these elements were found in supernatent water that are thought to represent the dissolved phase transported in interstitial spaces of sinking particles. At the base of the winter mixed layer, for example, an average of 29 % of total carbon, 46 % of total nitrogen, 87 % of total phosphorus, 50% of total silica and 7 % of total calcium are found not in particles but in the overlying water of sample jars. By accounting for these particle-associated dissolved elemental fluxes, the system is seen to export in the Redfield Ratio of C:N:P. Corresponding corrections in the POC:PIC ratio when accounting for this dissolved component increases the estimated sequestration capacity of the system 3-fold. The implication of this for measurement and interpretation of elemental fluxes is discussed.