

## Vertical Fluxes of Particulate Material in a Frontal Zone off Corsica

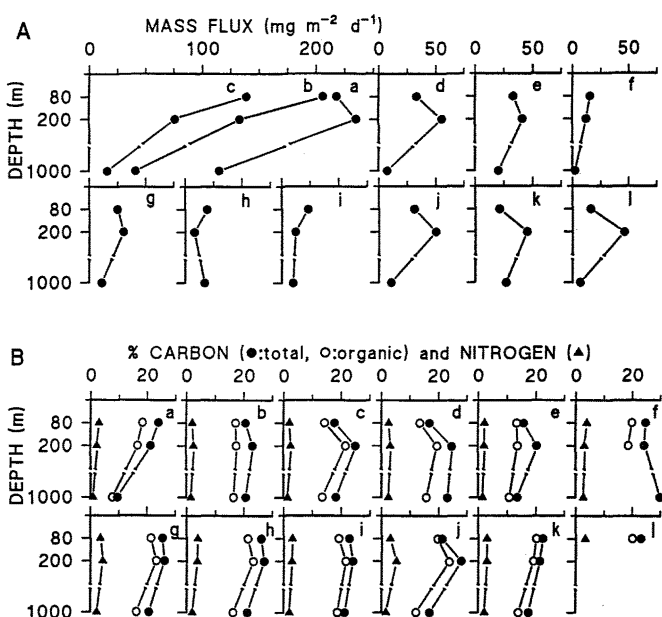
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As part of the DYFAMED programme in the Ligurian Sea, cylindrical sediment traps (PPS3, Technicap) were moored 15 nautical miles off Calvi, Corsica, at 80, 200 and 1000 m depth in 2100 m of water from June to November 1987. The mooring site was situated in the Liguro-Provencal front which is persistent throughout summer and fall. At that time of year maximum chlorophyll *a* concentrations (ranging from 0.3 to 0.4  $\mu\text{g Chl } a \text{ l}^{-1}$ ) are found at 60-80 m depth in June and 30 to 80 m depth in October (Hecq et al., 1986).

Mass flux integrated for 10 day collection periods and carbon and nitrogen composition were determined in the trap samples. In the upper 200 m, total mass flux was higher during June-July, exceeding 200  $\text{mg m}^{-2} \text{d}^{-1}$ , and thereafter decreased to approximately 20-50  $\text{mg m}^{-2} \text{d}^{-1}$  (Fig.1A). At 1000 m, the flux was generally lower than in the euphotic zone although it was relatively high (about 100  $\text{mg m}^{-2} \text{d}^{-1}$ ) at the beginning of the experiment. The pattern of carbon and nitrogen flux with depth closely followed that of mass flux except during the first period in which the increase in mass flux at 200 m was not associated with a concomitant increase in carbon and nitrogen fluxes.

**Figure 1.** Sediment trap observations at 3 depths, 15 NM off Calvi, Corsica. (A) vertical flux of particulate material for 10 day periods (a:22 June-2 July, b:2-12 July, c:12-22 July, d:22 July-1 August, e:1-11 August, f:11-21 August, g:11-21 September, h:21 September-1 October, i:1-11 October, j:11-21 October, k:21-31 October, l:31 October-10 November). (B) carbon and nitrogen composition in % dry weight of particles.



The carbon (total and organic) and nitrogen content of the particles was not correlated with total mass flux (Fig.1B); increases in mass flux were associated with either increases or decreases of C and N content. Mean values for total and organic carbon and nitrogen were consistently lower at 1000 m, although this relationship was not statistically significant. In the upper 200 m particles were normally less enriched in carbon and nitrogen at 80 m. Most of the carbon in the particles was of biological origin; the organic fraction accounted for an average of 84% of the total carbon at 80 m, 82% at 200 m, and decreased to 78% at 1000 m. Organic C/N weight ratios also show a continuous trend, increasing from an average of 6.2 at 80 m, 6.4 at 200 m, to 7.9 at 1000 m. This observation suggests that fresh biological material produced close to the surface degrades during its descent through the water column.

The higher flux of particles with lower carbon-nitrogen content noted during the period 22 June-2 July appeared to be due to a particle input associated with strong winds, exceeding 70  $\text{km h}^{-1}$ , that were present for several days before the sampling started. On the other hand, the fluctuations in mass flux observed thereafter are most likely related to biological activity in the upper layers of the water column.

**Reference:**

Hecq, JH, Bouquegneau, JM, Djenidi, S, Frankignoulle, M, Goffart, A and Licot, M (1986). Some aspects of the Liguro-Provencal frontal ecohydrodynamics. In: Nihoul, JCJ (ed.), Marine Interfaces Ecohydrodynamics, Elsevier Oceanography Series 42, 257-271.