

### Seasonal Changes in Mass Flux and Fecal Pellet Sedimentation at Monaco

J.-L. TEYSSIE, J.-C. MIQUEL and C.-V. NOLAN

I.A.E.A., International Laboratory of Marine Radioactivity, 19, Av. des Castellans, MC 98000 (Monaco)

Since January 1989 a sediment trap (0.125 m<sup>2</sup> aperture) has been deployed 3 nautical miles off Monaco at 80 m depth (120 m above the bottom). Mass and fecal pellet fluxes have been measured weekly and variations in the pellet composition determined (Fig 1). High mass fluxes are associated with rainfall and high wind speed from SE and NW rather than with phyto- and zooplankton abundance (meteorological data kindly provided by "Sémaphore de Ferrat"; plankton data provided by M. Boisson, CSM Monaco). The highest pellet fluxes, both in number and in mass, occurred in november-december where they accounted for a maximum of 51% of the total mass flux. At this time salp pellets (2-4 mm) dominantly contributed to the high mass flux of pellets whereas ovoid pellets (200-400 μm) were by far the most abundant by number. The latter presumably have been produced by amphipods since their exuviae were collected in the trap in great numbers as well during that time (Fig 1b). Cylindrical pellets of various sizes, as produced by copepods and euphausiids, were more consistently present throughout the year though they also showed a fall-winter maximum. Despite the relatively few samples obtained during the spring phytoplankton and zooplankton blooms it seems that few fecal pellets were in fact sinking out of the water column at those times. This surprisingly low contribution of the pellets to the vertical mass flux at the time of maximum zooplankton abundance supports the hypothesis that coprophagy and coprorhexy (Lampitt *et al.*, 1990) indeed may play an important role in preventing losses from the pelagic zone. The possibility that the abundance of sinking pellets in winter is due to a fall-winter zooplankton bloom not previously recorded and/or to a resuspension of settled particles during stormy weather is being investigated.

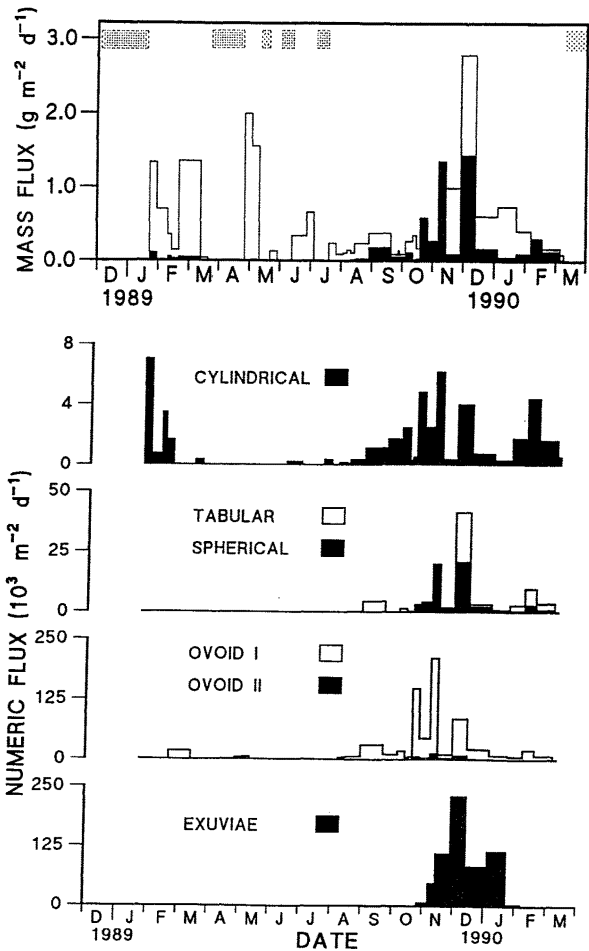


Figure 1. Vertical fluxes at a depth of 80m 3 NM south of Monaco during 1989. (a) Mass flux (excluding swimmers). The contribution of fecal pellets (solid areas) to total mass flux (open histograms) is estimated by the product of abundance of each pellet type and their respective mean dry weight. No data are available for those periods indicated by shading. (b) Flux of various types of fecal pellets (numbers) and of exuviae. Pellet types were determined by microscopy and are tentatively classed as cylindrical (copepods and euphausiids), tabular and spherical (salps), ovoid I (copepods and amphipods) and ovoid II (copepods and amphipods).

#### Reference:

Lampitt, RS, Noji, T & von Bodungen, B (1990). What happens to zooplankton faecal pellets? Implications for material flux. *Mar.Biol.* 104, 15-23.