

The DYFAMED-BENTHOS survey was established at the DYFAMED permanent station in December 1990 to investigate benthic to pelagic coupling, and particularly benthic biological (with special emphasis on metazoan meiofauna) and biogeochemical responses to varying particulate organic matter inputs to the sea bed.

The DYFAMED permanent station (43°24'N -7°52'E) in the northwestern Mediterranean (>2300 m) is relatively close to land (28 nautical miles off Nice) but presents many of the characteristics of the open ocean with a strong surface seasonal signal and essentially vertical particle fluxes. It is the study site of the on-going French JGOFS DYFAMED Observation Service, providing comprehensive background water column data. During the benthic survey that comprised different phases based on sediment sampling resolution (see Guidi-Guilvard, 2002), sediment samples were collected monthly to bimonthly for 5 consecutive years between 1993 and 1997. Here, are shown data from the first 3 years of the "high frequency survey" (1993-1995).

MATERIALS and METHODS

Study site and sediment sampling

The DYFAMED coring site is centered around 43°24.61'N - 7°51.67'E at a depth of 2347 ± 6 m, and is located on the side of the median fan valley of the Var Canyon. Surface sediment was sampled from January 1993 and to October 1995 first using a *SMBA* Multiple corer (Barnett et al., 1984), and from November 1993 on, a *Bowers and Connelly* Maxicorer (*Ocean Scientific International* <<http://www.oceanscientific.com>>) which is smaller than the former and thereby more manageable on small research vessels. Both devices can be equipped with a set of eight 60-cm long core tubes with an inner diameter of 9.5 and 9.8 cm, respectively. Shipboard positioning was carried out using DGPS (Differential Global Positioning System) which can yield horizontal accuracies of 1 to 10 m. In an attempt to minimise spatial variability, the bottom target aimed at for coring was a ~200-m diameter circle in which over 80% of the corer casts were achieved. During the 3 years of survey, 25 benthic cruises were successful in sampling sediment at an average time interval of 40 days (range = 10 to 99 days). On each cruise, from 1 to 3 corer casts were achieved, yielding a total of 44 corer casts for the entire period.

Sample analyses

On each cruise a basic set of subsamples was obtained from the sediment cores in order to document both the recent particle deposit (in the upper 0.5 cm of sediment) and the possible reactions of the metazoan meiobenthos (in the top 10 cm of sediment).

Grain size analyses were performed according to Buchanan (1984) for silty sediments by wet sieving. *Porosity* which provides a measure of interstitial volume, was calculated according to Giere

et al. (1988) after weighing a known volume of wet and dried (80° C) washed sediment. *Sediment-bound chloroplastic pigments*, which represent a measure of the sedimented primary organic matter, were estimated using a Turner Designs fluorometer after extraction of chlorophyll *a* and phaeopigments in 90% acetone (Lorenzen, 1966). Phaeopigments are expressed as chlorophyll *a* equivalents and the sum of both is referred to as chloroplastic pigment equivalents (CPE). Carbon and nitrogen (N) were analysed with a *Leco* CHN-analyser. The Organic carbon (orgC) fraction was measured in subsamples treated with 1 M phosphoric acid for removal of carbonates. Carbonate content (CaCO₃) was calculated as inorganic carbon times 8.33. *Metazoan meiofauna* was subsampled to a sediment depth of 10 cm using 60-ml cut-off syringes with an inner cross section area of 6 cm². Subsamples were preserved in borate-buffered formaldehyde (4% final concentration), stained with Rose Bengal and kept at ambient temperature until subsequent extraction of organisms larger than 40 µm using Ludox TM (McIntyre and Warwick, 1984). After a thorough wash on the sieve, the residue was examined under an *Olympus SZH* stereo microscope (96 x) and the metazoans identified to the major taxon level.

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