

Bioturbation at the water-sediment interface of the Thau Lagoon: impact of shellfish farming



Quantifying of sediment reworking processes provides new insights into benthic ecosystem functioning of the Thau lagoon, an important European shellfish farming area. In order to evaluate bioturbation rates of surface sediments, profiles of ^7Be (half-life: 53 days) and ^{234}Th (half-life: 24.1 days) were measured in cores collected since December 2001 to December 2006. Several sites were selected to sample the diversity of the Thau lagoon: C4, T10, and T11 in the middle of the lagoon, C5, T7 and T8 nearby oyster farming, T2 and T4 in the western edge, T12 in the eastern part closed to industry. ^{234}Th in excess ($^{234}\text{Th}_{\text{ex}}$; i.e. supplied to sediment by settling particles) and ^7Be both show seasonal variations in activities and in penetration within sediment. Taking into account the moderate sedimentation rates of the Thau lagoon, sites (0.1–0.4 cm per year), the penetration of both short-lived radionuclides to variable depths, from 1 up to 8 cm, indicates efficient biological mixing of upper sediments. Bioturbation rates (Db) to the distribution of excess ^{234}Th ($^{234}\text{Pb-Db}$) and of ^7Be ($^7\text{Be-Db}$) range between 1 and 35 $\text{cm}^2 \text{y}^{-1}$, depending on site

and season. Surface sediment mixing of the Thau lagoon is primarily controlled by the quality of particle input, i.e. the food supply to the benthic fauna, mainly governed by the hydrological and seasonal conditions. But locally shellfish production is a key parameter that influences bioturbation through biodeposition.

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