Canyons sous-marins et advection vers le talus continental du plancton néritique

Increased offshore advection of migratory neritic plankton may occur by the pathway of nearshore submarine canyons. The nocturnal distribution of migratory bentho-hyponeustonic crustacea was investigated in the axis and on both sides of three submarine canyons, over the continental shelf and slope of the northwestern Mediterranean. The three canyons arc frequently exposed to strong northerly and northwesterly winds blowing seaward. A horizontal surface haul and a vertical haul from bottom to surface were successively achieved with an OMORI plankton net over each depth, from the isobath 50 m to more than 1000 m, in the middle of the night. The Mysidacea Anchialina agilis, Haplostylus lobatus, Siriella clausii, Siriella norvegica and Leptomysis gracilis, and the Isopoda Eurydice truncata dispersed offshore along the axis of the canyons, far from the limits of their benthic habitat. In the three canyons, an accumulation of animals occurred over the top of the talweg (bottom line of a canyon), above 300 and 500 m. Animals were scarce on the shelf edge (200 m), above the lateral sides of the canyons. This accumulation in the canyons probably results from passive transport that depends on both the specific current regime of the nearshore canyons and the local hydrodynamism. The usual current regime in canyons consists of up and down flow near the floor with a prevalence of the down-canyon current. In the provencal canyons, the normal down-canyon current is strengthened by a refluxing current of the littoral vein of the EW Liguro-Provencal and, by strong northerly winds, by a discharge cur-rent. The prevalence of the down-canyon current tends to prevent animals transferred offshore at night from being carried back over the continental shelf during the day. In a northerly and northwesterly wind regime, the landward subsuperficial compensation current can induce an inshore transfer. Nevertheless, this transfer occurs solely during the morning and evening vertical migrations of the animals; it cannot compensate for the nocturnal surficial and diurnal near-bottom offshore transfers. The determination of the energetic balance of these shelf-margin transfers depends on accurate knowledge of: a) the local hydrodynamic conditions; b) the physiology, behaviour and survival ability of the benthic neritic species subject to pelagic conditions or strong bathyal hydrostatic pressures; c) the precise offshore diurnal vertical distribution of the species within the water column.

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