Premières observations sur la morphologie et les processus sédimentaires récents de l'Éventail celtique

During the SEDIFAN 1 cruise we surveyed the bathymetry and the acoustic properties of the surface sediment of the Celtic Deep Sea Fan. We also collected Kullenberg cores in order to study recent sedimentary processes. From the bathymetry survey it is relatively easy to recognize the main areas of modern fan. The upper fan included a large sedimentary ridge which constitutes the right levee of the prominent meandering Whittard valley. After its confluence with the Shamrock valley the course of the Whittard valley is abruptly deflected to the south. At a short distance to the south the valley divides into two upper-fan channels, the Celtic channel to the west being the deeper one. This point constitutes the centre of a radiating pattern which is developed on a 150 degrees quadrant and a radius of about 100 km. The acoustic imagery displays contrasted features, related to change in lithology within the first metre beneath the sea bottom and to the sea floor roughness. The Austell ridge exhibits a contrasted pattern of elongated areas with high and low acoustic backscattering levels. This pattern is related to the development of abyssal dunes, the amplitude of which is of metric order. Particularly remarkable is a lobe-shaped low back-scattering area in the western part of the middle fan, also noteworthy are a lineated facies to the west and a braided facies to the east of the fan. The laminated silty-clayey sequences deposited on the Whittard ridge and on the Trevelyan levee were deposited during the deglaciation. We interpret these as turbidity currents overflow deposits from the Whittard valley. At the end of isotopic stage 3 and during stage 2, the English Channel was a large plain flooded by the Channel River. During this period a broad delta developed at 100 m below the present-day depth and a wide spectrum of material was bound to be supplied to the deep sea and contributed particularly to the deposition of the Whittard ridge silty-clayey sequences. The stage 2 deposits are characterized by rhythmic levels enriched in monosulfides. These types of deposits are common in areas affected by fluvial discharges. Excluding the sedimentary ridge and the channel levees the surface deposits sampled with the Kullenberg corer are sandy. These sands are deposited in various contexts on the interfluve between the western and eastern channels and at channel mouths. They were emplaced during high sea level stands as a result of high energy gravity processes. The precise sources of these sands have not yet been identified, however benthic foraminifers from included ooze pebbles have living depths of between 500 and 1 000 m. The gravity processes which eroded this marry ooze may have been triggered on the upper slope. The Celtic shelf is presently a high energy platform where the conjunction of storms and spring tides call lead to enhanced sediment transport from near-shore to the deep sea. The relict or palimpsest deposits of the glacial delta also constitute a large reservoir of sandy material which can also be subject to reworking., Le programme Enam 2 (European North Atlantic Margin) concerne l'étude des processus sédimentaires quaternaires du Spitzberg au golfe de Gascogne. Dans le cadre de ce programme, la reconnaissance de l'Éventail profond celtique était l'objectif de la campagne Sedifan 1 au cours de laquelle nous avons établi la morphologie de l'éventail et obtenu une image acoustique des fonds sédimentaires. La morphologie permet de mettre en évidence une organisation en éventail. On note aussi le développement remarquable d'une ride sédimentaire au niveau de l'éventail supérieur. Les sédiments prélevés révèlent la présence de dépôts sableux, témoins d'une activité récente qui pourrait être liée à l'importance de l'hydrodynamisme sur les Grands Bancs de la plate-forme celtique.

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