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TITLE: Spatial distribution of sedimentation-rate increases in Blanes Canyon caused by technification of bottom trawling fleet

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ABSTRACT:

A detailed study of 15 sediment cores from Blanes Canyon and its immediate surroundings (NW Mediterranean Sea) was conducted to compare historic sedimentation rates and evaluate the possible impact of bottom-trawling intensification on the sedimentary regimes over the past 50 years. The canyon axis and flanks, as well as the adjacent open slope, were sampled at water depths ranging from 300 m to 2200 m. Grain size, dry bulk density, and ^{210}Pb concentration profiles were measured to assess possible changes in sedimentation rates over the last century and their temporal and spatial relationship to bottom trawling effort. Sedimentation rates in the upper canyon axis (900–1200 m) had the highest rates of $0.9\text{--}2.1\text{ cm-yr}^{-1}$, quantified since the 1970s. Farther downcanyon, sedimentation rates increased two to five times after the 1970s, from $0.1\text{--}0.2\text{ cm-yr}^{-1}$ to $0.2\text{--}0.8\text{ cm-yr}^{-1}$, which coincides with a rapid growth of the total engine power of the fishing fleet operating in the study area. The enhanced sedimentation rates occur downslope of the main fishing grounds and decrease downcanyon as the distance from trawling grounds increases. These results highlight the ability of bottom trawling to resuspend bottom sediments, leading to net erosion of the canyon rims and flanks. In turn, large volumes of sediment are advected towards the canyon's interior, ultimately increasing sediment deposition along the canyon axis. Natural sedimentation rates at similar along-canyon distance from shore in the untrawled continental slope (900–1500 m) and in the lower canyon axis (1500–2200 m) are comparable ($0.08\text{--}0.20\text{ cm-yr}^{-1}$), suggesting distance from coastal sediment sources as the main control on regional sedimentation in deeper parts of the margin. While submarine canyons have been regarded as preferential cross-margin conduits for sediment dispersal, they can also potentially function as modern depocenters for trawling-induced sedimentation.

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