A detailed geomorphologic analysis, based on multibeam bathymetry, parametric analysis of acoustic profiles, and various photographs, has allowed identifying the morphostratigraphic processes in the Avilés Canyon region. The main objective has been to recognize the detailed seafloor morphology and characterize the processes generating these morphological features. Five physiographic domains have been recognized in the studied sector of the Cantabrian margin, corresponding to narrow continental shelf, complex upper and abrupt lower slope, continental rise, and complex canyon system incised from shelf to rise.

The continental shelf is generally narrow (15 to 58 km wide) along the Cantabrian margin, feature characteristic of the Cantabrian margin. The maximum water depth is 670 m, with a variable gradient between 0 and 8.3º in the shelf break, located at 44° N latitude. The shelf break displays an irregular edge and seafloor with many folded and fractured outcrops and deposits as a consequence of an intensive tectonic activity and comprises the flat high (marginal platform) known as Canto Nuevo. The 62% of the continental shelf correspond to sediment seafloor without notable features. The steepness of the continental shelf, complex upper and abrupt lower slope, continental rise, and complex canyon system incised from shelf to rise.

The upper slope presents a regular variable gradient between 3.2º-25º, and is cut by a complex system of narrow rectilinear gullies. Two major domains have been identified: an eastern domain with a complex physiography between 200 and 3500 m water depth, with a low density of gullies and the noticeable Agudo de Fuera High and La Gaviera hanging canyon; and a western domain down to 500 and 2900 m water depth characterized by a high density of gullies. The Avilés canyon system, with its tributaries, display from continental shelf where are located their headwalls to upper... with the continental rise. The sharp pathways changes indicate a tectonic control. The canyon walls are affected by...