

Processes controlling very low sedimentation rates on the continental slope of the Gonone-Orosei canyon system, NE Sardinia—terrestrial and oceanic significance

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Abstract

© 2014, Springer-Verlag Berlin Heidelberg. The narrow shelf and upper slope immediately above the Gonone canyon head off NE Sardinia represent areas of very low sedimentation rates. Along the sides of the canyon head (1,600 m water depth), the sediment deposits are homogeneous but show alternating light-grey intervals rich in carbonate and dark-grey ones rich in organic matter, possibly related to distal turbidite processes. Deposits older than 50,000 years are already encountered at core depths of 2.50 m, the sedimentation rates varying from 6–21 cm/10³ years in the lower parts of two cores and from 1.5–3 cm/10³ years in the upper parts. At about 35,000 years BP, both cores show a simultaneous drop in sedimentation rate by a factor of 3, probably in response to local mechanisms of channel avulsion. Lithological, mineralogical and geochemical properties reveal the environmental factors which are responsible for the extremely slow sediment accumulation. The southernmost sector of the coast, and partly also of the shelf, consists of Jurassic limestones which supply only small amounts of fine-grained material transported in suspension. During the last sea-level highstand, the accumulation of the Cedrino River pro-delta remained restricted to the coast, the low siliciclastic sediment yields resulting in poor shelf sediment trapping. The present morphology of the canyon head prevented the occurrence of gravity processes in the deeper part of the canyon system, including the coring sites. Accordingly, deposition was mainly fed by hemipelagic material of planktonic origin, together with only moderate terrigenous inputs. On a wider late Pleistocene timescale, seismic data indicate the occurrence of a coarse-grained, layered turbidite facies, implying a very different architecture of the canyon drainage system probably prior to 60,000 years BP.

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