



Chronology and evolution of a fluvial/canyon connection around the Last Glacial Maximum: The Bourcart canyon head (western Mediterranean)

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Deeply incised canyons have been described in the Gulf of Lions since the end of the 19th century. Recently, the role of axial incision, as a pathway of high-density flows initiated within streams and cutting across the main thalweg of canyons, has been proposed as a mechanism for canyon evolution, in this area and elsewhere (Baztan et al., 2005).

In this study, we used a large data base of very-high resolution seismic profiles in order to determine the precise architecture of the Bourcart (Aude) canyon head. The accurate 3D geometry of the buried and recent incisions through the Bourcart canyon head allows us to draw the pattern of canyon connections with shelf incised valleys. Furthermore, time constraints (and relation with sea-level changes) were obtained through the correlation with the Promess 1 drill site situated in the vicinity of the Bourcart canyon, and with long piston cores retrieved on the continental shelf in the same area. Our results demonstrate the direct connection of fluvial system(s) to present (and buried) axial incisions, and show the progressive evolution of seismic facies from typical "valley-fill" to typical "confined channel-levee" systems. Streams from the East (possibly the Rhone), then from the West (possibly the Agly) of the Gulf of Lions successively fed the canyon head. An important phase of deposition occurred within the canyon head at the onset of sea-level rise, probably in relation with increased water and sediment flux from the Pyrenees during the early Deglacial period. We hypothesize that, during this period, Pyrenean streams seasonally experienced very high-concentration sediment loads, capable of generating high density (probably hyperpycnal) flows in the canyon head. Only such high-concentration flows may explain the meandering pattern of axial incisions observed at very shallow depths, within the canyon head.

Reference: Baztan, J. et al., 2005, Marine and Petroleum Geology, 22, 805-826