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# Characterization and Formation of longitudinal pinch-out geometries in turbidite systems: the P̈iera Cava syncline (Annot Sandstone Formation)

Laurent Daghdevirenian (1), Sébastien Migeon (2), Jean-loup Rubino (3), and Christian Gorini (4)

(1) Upmc, Géoazur, 06560 Valbonne, France (daghdevirenian.laurent@gmail.com), (2) Upmc, Géoazur, 06560 Valbonne, France (migeon@geoazur.unice.fr), (3) Total CSTJF, 64018 Pau cedex, France (jean-loup.rubino@total.com), (4) Upmc, ISTEP, Paris VI, 75252 Paris cedex 05 (christian.gorini@gmail.com)

The Grès d'Annot sandstones of Late Eocene/early Oligocene is a well-known example of turbidite accumulations deposited in a foreland basin setting. In such settings, turbidite systems are usually laterally control by syntectonic activity generating lateral pinch-outs of the infilling accumulation against the basin walls. Such tectonic activity together with progradation and retrogradation stages of the whole turbidite system could also lead to local disconnection between the continental-slope and the basin deposits and to the formation of sealed potential sand-rich reservoirs. The aim of the work is to better constrain how turbidite systems pinch out longitudinally, in both upstream and downstream directions and to characterize some typical lithofacies evolutions.

Our work focused on the Peîra Cava syncline (Maritime Alps, France) where particles are sourced from the Maures, Esterel and Corso-Sarde mountains and flow towards the north following structurally-controlled conduits. Thirty lithological logs 100-m thick were acquired following the western N170-trending side of the syncline. Correlations made between the various sections allowed reconstructing the topography of the top of the blue marls that existed before the emplacement of the turbidite accumulation. This reconstruction revealed the occurrence of two types of longitudinal pinch-out geometries against relatively high-slope angles, and trending either downcurrent or upcurrent.

The strongest evolution of depositional facies is observed close to upstream pinch-out surfaces. Here, turbidite deposits thin and fine longitudinally while cohesive debris-flow deposits stop over distances as short as 200 m. Then, going upward in the serie above the pinch-out surface, both turbidite and debris-flow deposits are lesser affected and finally become continuous.

These observations allowed defining a depositional model for gravity flows within a confined basin. It revealed similarities with the "fill and spill" model by Sinclair and Tomasso (2002), characterized by several stages of infilling. In a first stage, a pre-existing topography consisting in several depressions 1-2 km long controlled the longitudinal-facies evolution by blocking the highest-concentrated flows along their reverse-slope flanks. As the depression is infilled, flows are able to overtop the reverse-slope flank to settle down in the following depression. Once the pre-existing topography is buried, channelized bodies prograde within the basin with alternating incision and by pass processes.

This work allowed us to better constrain the formation of longitudinal pinch-out surfaces during the first stages of a basin infilling and the impact of a pre-existing topography on the the deposition of thick sand-prone basin accumulations.