

Shale tectonic and alluvial fans deposits from the Jaca foreland basin: the case of the Orosia-Cancias system (Spain)

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The Jaca basin (Spain) corresponds to the early south-western Pyrenean foreland depocenter fed by E-sourced deep marine turbidites then pro-delta shales during Eocene. It evolved as a piggy-back basin overfilled with continental N-sourced coarse sediments during its incorporation in the orogenic wedge from latest Eocene to Miocene times. The sedimentary response of this late-orogenic phase is characterized by the occurrence of several, km-scale large & thick alluvial fans confined by high amplitude but short wavelength, shale-cored anticlines.

New field observations and bed-to-bed mapping across the Orosia-Cancias alluvial fans associated with measurements of anisotropy of the magnetic susceptibility (AMS) within Eocene shales lead to : 1) reappraisal of the growth mechanism and kinematic of the shale-cored Yebra anticline and 2) the characterization of the subsidence history and the source-to-sink system of the associated alluvial fans.

The geometry of the Orosia-Cancias alluvial fans attests for their synchronous deposition with the growth of the tight Yebra anticline southward (Bartonian-Priabonian). The deformed magnetic fabric of shales in both limbs and within the welded hinge of the anticline is consistent with a shale withdrawal in response to a massive discharge of very coarse material within. It results a local modification of the sediment routing system and increasing subsidence allowing to the stack of conglomerates. The latest pulse of alluvial discharge in the Cancias fan eastward (Rupelian) is synchronous with the inhibition of the growth of the Yebra shale-wall.

This new tecto-sedimentary model for the evolution of the south-western Pyrenean alluvial deposits and associated shale-cored anticlines highlights the complex positive and negative interactions between. We especially shed light on the role of the early orogenic sedimentary inheritance preserved in the paleo-foredeep in the control of the subsequent deformation and sedimentary filling.

Mots-Clés : Foreland basin, shale tectonics, alluvial fans, tectonic-sedimentation interactions, South-Pyrenean Zone