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Contrasts on the 3D Geometry and Architecture of two Turbidite Systems in the Ainsa Basin. South-Central Pyrenees, Spain

The Eocene Ainsa Slope Complex, which developed in a foredeep to piggy back basin setting, hosts a number of turbidite systems. These are several hundreds of metres thick and several kilometres wide and long, made of different types of channel-fills and associated overbank, splay and slump-sheet elements. Two of these turbidite systems, being stratigraphically consecutive, similar in dimensions, and namely Ainsa and Morillo, have been reconstructed in 3D from outcrop data. The reconstruction process involved commercial software packages and in-house produced algorithms destined to: 1) georeferencing, 2) resolving the 3D structure of the area, an anticline and flanking synclines; 3) restoring structure at different times on the evolution of the turbidite systems, and 4) reconstructing the architecture of each of the systems.

The reconstructed Ainsa turbidite system shows a growth-wedge geometry due to the interplay of intrabasinal anticline growth with a passively flexured foreland basin margin. Channel-fill axes occur as stepped forelandwards and/or distributed around synclinal fairways. The model for the Morillo turbidite system differs from the Ainsa model in that channel-fills stacked vertically and in that architectural changes occur in down slope direction from channel to splay. These differences can be explained by means of a reduction of tectonically induced gradient and changes in the degree of confinement.