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Evolution of deformation through the Sub Pyrenean Zone in the Corbières fold–thrust belt inferred from structural analyses and from magnetic and acoustic fabrics investigations : implications on the pretrophysical properties of the Eocene deposits.

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A study of the folded foreland of the Corbières fold and thrust belt integrating structural analyses and petrophysical measurements (magnetic and acoustic fabrics) have been conducted in order to investigate the relationship between deformation and petrophysical properties of rocks along a N-S regional cross sections. Balanced cross sections have been constructed within the Mesozoic cover and its Paleozoic substratum from undeformed zone where Eocene deposits lie uncomfortably on the substratum in the north (the Montagne Noire), to the Paleozoic Massif of Mouthoumet overthrusting toward the north the upper cretaceous to upper Eocene deposits in the south. Samples were collected all along this cross section mainly in the Carcassone Molasse deposits of Bartonian age and in the Eocene deposits in the vicinity of the Mouthoumet Thrust. Results of magnetic fabric (anisotropy of magnetic susceptibility) and acoustic fabric (anisotropy of P-waves velocity) investigations show that rocks have undergone an increasing deformation toward the hinterland. This internal deformation appears to be recorded before the folding because magnetic fabric exhibits magnetic foliation parallel to the bedding in the undeformed foreland and magnetic foliation normal to bedding toward the hinterland. Only in the vicinity of the North-Mouthoumet fault, the magnetic fabrics were influenced by the thrusting. Acoustical fabrics are more complicated to interpret, probably as a result of a strong influence of sedimentary inheritance on the P-wave velocity record. All of these results are discussed in order to make the relationship between the distribution of the void space (microcracks and porosity), the petrofabric of rocks, and the evolution of deformation during folding and thrusting.