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Block Rotation Induced Compression in the Extensional Domain of the Angolan Margin

Gravity-driven deformation above salt on passive margins is the major mode of deformation of post-salt sediments. Whereas this process generally gives birth to a structural zonation, extensional landward and compressional seaward, discrepancies can however arise. Hence, evidence of compressional deformation occurs in the extensional domain of the Angolan margin, to the south of the Congo delta fan. Slope parallel seismic lines show grabens and rollover structures. Conversely, strike parallel seismic lines present growth folds. This is obviously related to a regional scale decrease in sedimentary thickness away from the Congo delta.

As the rate of gravity gliding and the characteristic wavelength or spacing of structures are direct functions of sedimentary loading, one can expect structural changes to occur along strike due to thickness variations. This hypothesis has been tested using scale models involving a lateral variation of sedimentation rate. The models show that the rate of gliding is higher in the thicker part. In the extensional domain, blocks undergo a rotation about a vertical axis due to differences in gliding rate between the thick and thin parts of the model and growth folds develop at rotating block boundaries. The resulting structural pattern is compared to the configuration observed in the Angolan margin.

Passive markers, as for example turbiditic channels, could possibly be used to quantify such block rotations.