Themes 13: Tectonic Evolution of Gondwana (Poster)

Permo-triassic fold-and-thrust deformation at the margin of the Congo Basin, Central Africa, revealed by the 1849 m deep fully cored Dekese well

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The Congo basin in Central Africa is believed to have been initiated as a failed rift in the Neoproterozoic and to have evolved subsequently by thermal relaxation, but this evolution was affected by two regional compressional events. Seismic reflection data evidenced compressional structures in the axial part of the basin which are related to in the early Palaeozoic (Pan-African) and the late Permian-Triassic (Gondwana) regional tectonic events. Two fully cored ~ 2000m deep stratigraphic wells have been drilled in 1954-55 and one of them (the Dekese well) revealed highly tectonised (folded and faulted) glacial-lacustrine sediments of Late Carboniferous-Permian age overlain by undeformed sub-horizontal Jurassic and Cretaceous sediments. As the Dekese Well was drilled at the southern margin of the Congo basin, at the vicinity of the Kasai Archean cratonic block, this suggests interactions between the Kasai block and the Congo basin, which could not be seen on the seismic profiles.

In this work, we used structural measurements of bedding, slickensided faults and fractures as an attempt to reconstruct the associated stress field and the 1-D deformation geometry. Unfortunately the cores are not oriented, but the most of the Permian and older series are significantly inclined, allowing to use the bedding plane as a strike reference.

The structures observed can be explained by folding and faulting during a main compressional stage with a thrust faulting stress regime, and a later wrench-faulting reactivation under a strike-slip stress regime. The structural geometry is that of a series of internally faulted and tilted blocs, separated by brittle tectonic discontinuities marked by strongly deformed fault-rock. Deformation was mainly localised in the varval clay layers, and the massive diamictite in between being passively involved in the deformation.