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INTRACRATONIC EVOLUTION AND TECTONIC STRESS IN THE CONGO BASIN

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The Congo Basin has a long and complex evolution starting in the Neoproterozoic and governed by the interplay of tectonic and climatic factors, in a variety of depositional environments. The broad, long-lived and multi-event intracratonic sedimentary depression known as the "Congo Basin" or "Cuvette centrale" developed within the large Congo craton that formed as the result of the amalgamation of a series of Archean blocks that have been welded together by Eburnean-aged mobile belts. The Congo basin appears to evolve in a succession of different geodynamic processes, rather than under a single process operating continuously over 800 Ma.

A re-examination of the stratigraphic and age constraints allows to propose an update view of the tectono-stratigraphic of this huge basin. As proposed initially by Daly et al. (1992), the Neoproterozoic rift origin of the basin and its later reactivations by compressional inversion as the result of far-field orogenic events is confirmed and detailed. We have used additional field, borehole, neotectonic and seismotectonic data to highlight the tectonic stress evolution within the basin and its marginal parts. We compiled outcrop fracture and fault-slip data acquired recently in the field, in the Bas-Congo, Katanga and Western Tanzania regions, and also consigned in old field reports from the archives of the MRAC. We analysed the fractures sampled in the Dekese and Samba fully cored ~2000 m deep exploration wells drilled in the center of the basin. We collected historical and instrumental seismological data, focal mechanisms, hot springs and water fall location as evidences for active tectonics. These data have been integrated together with their geological and morphological background.

We show that the Congo basin was affected several times in the geological past and is still affected by compressional tectonics. A first – and probably the most intense – compressional inversion was caused by the collisional events that affected the margin of the Congo Craton at the end of the Pan-African cycle. These deformations are mainly documented within the basin in the seismic profiles. A second compressional inversion likely occurred in the early Mesozoic but its precise age is not well constrained. It is documented by numerous reverse to strike-slip fractures in the Dekese well, affecting the Permian series. Reported for the first time here, low-angle reverse dip-slip fractures are also found in the middle Cretaceous sediments of the Samba well (Bokungu formation), until the base of the late Cretaceous (Kwango formation) which was not affected. This event can be possibly be related to the Senonian basin inversion and rejuvenation that affected a large part of Africa north the equator and was previously unreported in the Congo basin (Guiraud & Bosworth, 1997). Presently, the Congo basin is still tectonically active, under the combined influence of the Mid-Atlantic ridge push forces and the East African rift system gravitational potential energy forces (Delvaux & Barth, 2010).

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