

Intraplate compressional deformation in West-Congo and the Congo basin: related to ridge-push from the South Atlantic spreading ridge?

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After the break-up and separation of South America from Africa and the initiation of the South-Atlantic mid-oceanic ridge in the Albian, at about 120 Ma, ridge-push forces started to build-up in the oceanic lithosphere and were transmitted to the adjacent continental plates. This is particularly well expressed in the passive margin and continental interior of Central Africa. According to the relations of Wiens and Stein (1985) between ridge-push forces and basal drag in function of the lithospheric age of oceanic plates, the deviatoric stress reaches a compressional maximum between 50 and 100, Ma after the initiation of the spreading ridge, so broadly corresponding to the Paleocene in this case (~70-20 Ma). Earthquake focal mechanism data show that the West-Congo margin and a large part of the Congo basin are still currently under compressional stresses with an horizontal compression parallel to the direction of the active transform fracture zones. We studied the fracture network along the Congo River in Kinshasa and Brazzaville which affect Cambrian sandstones and probably also the late Cretaceous-Paleocene sediments. Their brittle tectonic evolution is compatible with the buildup of ridge-push forces related to the South-Atlantic opening. Further inland, low-angle reverse faults are found affecting Jurassic to Middle Cretaceous cores from the Samba borehole in the Congo basin and strike-slip movements are recorded as a second brittle phase in the Permian cores of the Dekese well, at the southern margin of the Congo basin. An analysis of the topography and river network of the Congo basin show the development of low-amplitude (50-100 m) long wavelengths (100-300 km) undulations that can be interpreted as lithospheric buckling in response to the compressional intraplate stress field generated by the Mid-Atlantic ridge-push.

Wiens, D.A., Stein, S., 1985. Implications of oceanic intraplate seismicity for plate stresses, driving forces and tectonics. *Tectonophysics* 116, 143-162.