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Opening of the Equatorial Atlantic Ocean and paleogeographic evolution of West Africa since the Early Mesozoic

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We have produced a series of paleogeographic / paleostructural maps at the scale of continental West Africa and its offshore basins since 200 Ma. An objective of the work is to evaluate the space-time relationships between transform / oblique rifting and opening of the Equatorial Atlantic Ocean and long-wavelength deformation and basin evolution of the African continent. The specificity of our mapping protocol is the distinction being made between today's preserved intracratonic and continental shelf sediments and their potential lateral extension at the time they were being deposited (as they are systematically eroded along basins' margins). We have compiled the available original structural, stratigraphic and sedimentological pulications as well as interpretations of seismic and well data along the African Equatorial margins. Dominant depositional environments and their extent, active structures, magmatic occurrences and low-temperature thermochronological constraints are the main elements of the maps.

Development of the Equatorial Atlantic margins (form Guinea to Benin) begins along the NW trending Guinea-Liberia/Foz do Amazonas segment, which subsides during the Late Triassic-Early Jurassic and is rifted since the Barremian. Syn-rift stage occurs in two phases during the Aptian-Albian, allowing trapping of fluvial-lacustrine sediments. Reconstruction of the syn-rift fault pattern allows refining the pre-rift continental fit. After Late Albian continental breakup, the African Equatorial margins undergo mainly marine flooding episodes, clastic sedimentation and transform faults reactivation. During the Early Cretaceous, the intracratonic domain is a large alluvial plain that will be occupied by the 'Trans-Saharian Seaway' during Late Cretaceous transgressions and covered by the Paleogene transgressions after closure of the seaway. Starting in the Late Eocene, fragmentation of the intracratonic basin led to the isolation of the present-day basins as a result of the growth of the Hoggar hot-spot swell (development of the basin-and-swell topography). The paleogeographic maps reveal a continental marginal upwarp, which represents the main source for the margin and intracratonic basins' clastic sediments. Longitudinal variations in the wavelength and flooding history of the upwarp suggest variations in the sense (outward and inward) and magnitude of sediment fluxes, which are modulated by the interplay of vertical movements of the margin and adjoining intracratonic basin, as well as by mantle magmatism and erosion efficiency.