Geophysical Research Abstracts
Vol. 17, EGU2015-9816-1, 2015
EGU General Assembly 2015

Meso-Cenozoic Source-to-Sink analysis of the African margin of the Equatorial Atlantic

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The Transform Source to Sink Project (TS2P) objective is to link the evolution of the offshore sedimentary basins of the African margin of the Equatorial Atlantic and their source areas on the West African Craton. The margin consists in alternating transform and oblique margin portions from Guinea, in the West, to Nigeria, in the East. Such a longitudinal structural variability is associated with variation in the margin width, continental geology and relief, drainage networks and subsidence/accumulation patterns that we analyzed using offshore seismic data and onshore geology and geomorphology.

We compare syn- to post rift offshore geometry and long-term stratigraphic history of each of the margin segments. Transform faults appear to play a major role in shaping Early Cretaceous syn-rift basin architectures. Immediate post-rift Late Cretaceous sedimentary wedges record a transgression and are affected by the reactivation of some of transform faults. We produced A new type of inland paleogeographic maps for key periods since the end of the Triassic, allowing delineation of intracratonic basins having accumulated material issued from erosion of the marginal upwarps that have grown since break-up along the margin. We use offshore and onshore basin analysis to estimate sediment accumulation and integrate it in a source-to-sink analysis where Mesozoic onshore denudation will be estimated by low-temperature thermochronology.

Cenozoic erosion and drainage history of the continental domain have been reconstructed from the spatial analysis of dated and regionally correlated geomorphic markers. The stationary drainage configuration of the onshore domain since 30 Ma offers the opportunity to correlate the detailed onshore morphoclimatic record based on the sequence of lateritic paleolandsurfaces to offshore stratigraphy, eustasy and global climatic proxies since the Oligocene. Within this framework, we simulate quantitative solute / solid erosional fluxes based on the calibration of landscape / weathering chronologies, which are compared to the offshore sedimentary record (architectures and volumes) deduced from interpretation of serial seismic lines.