
Demerara and Guinea plateaus: the key to understand the early stages of the rifting of the Equatorial Atlantic realm?

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Résumé

The kinematics of the rifting and initial oceanic opening of the Equatorial Atlantic ocean has almost been a blind spot in the reconstruction of the separation of Africa from America. It can likely be attributed to the absence of magnetic anomalies and the disruption of the fracture zones by both the volcanism and the Caribbean subduction. The only study devoted to this subject is the unpublished PhD of Campan(1995), whose results were since incorporated in all reconstructions. We propose a new kinematic reconstruction focused on the early rifting of the Equatorial Atlantic that relies on:
-Detailed mapping of the fracture zones at the connection between the Equatorial and the Central Atlantic and more specifically the interpretation of the Cretaceous-Jurassic Line (CJL). The CJL is the boundary between the Cretaceous oceanic crust formed in the Equatorial Atlantic and the Jurassic oceanic crust previously formed in the Central Atlantic. We have mapped the CJL on the north of the Demerara plateau as well as on the south-west of the Guinea plateau. The two parts of the CJL formed as a single structure that we interpret as a transform fault related to a first stage of opening. According to these observations, the CJL corresponds to the direction

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of
the early opening of the Equatorial Atlantic.

-And a new interpretation of seismic profiles from the margins of the Equatorial Atlantic together with geological observations (e.g. Soares Junior et al., 2011) that suggest two distinct rift phases during the lower Cretaceous. An older northern rift propagated from the Central Atlantic towards the South East to reach the present-day mouth of the Amazon River, and a southern rift propagated westward from the northern edge of the South Atlantic. Once these two rifts were connected, the kinematics of the South Atlantic prevailed and lead to a kinematic change between the Amazon mouth and the Central Atlantic. These two rifts phases can be accounted introducing intraplate deformation localized in the Amazon basin.

This new model of the Equatorial Atlantic rifting better respects the morphologies of the margins and the existing fracture zones, without generating large-scale intra-plate movements.

Mots-Clés: Kinematic reconstruction, Equatorial Atlantic, Cretaceous Jurassic Line, Two phases rifting, Demerara