Deep structure of the Demerara Plateau and its two-fold tectonic evolution: from a volcanic margin to a Transform Marginal Plateau, insights from the conjugate Guinea plateau

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Transform marginal plateaus (TMPs) are flat intermediate depth structures which origin and relationships to adjacent oceanic lithospheres remain poorly understood. We focuss on the Demerara and Guinea conjugate TMPs at the junction of the Jurassic Central Atlantic and the Cretaceous Equatorial Atlantic Oceans by analyzing wide-angle velocity models (Demerara) and adjacent industrial seismic lines in order to explore their deep structures. The Demerara 30 km thick crust is subdivided into 3 layers, including a high velocity lower crust. The velocities do not fit values of typical continental crust but instead correspond to volcanic margin or Large Igneous Province type crusts. We propose that the continental lower crust is intruded by magmatic material and that the upper crustal layer is made of extrusive volcanic rocks of the same magmatic origin, forming seaward dipping reflector (SDR) sequences. N-S composite lines combining Demerara and Guinea reveal the spatial extent of the SDR complex but also a preexisting basement ridge separating the two plateaus. This SDR complex emplaced during hotspot (Sierra Leone) related volcanic rifting preceding the Jurassic opening of the Central North Atlantic and forming the entire Demerara-Guinea Jurassic volcanic margin. It was then reworked during a non-coaxial Cretaceous second phase of rifting splitting the Jurassic volcanic margin in two parts conceivably along the inherited basement ridge. Opening occurs in a transform mode for the northern Demerara and southern Guinea margins when Rifting of the eastern part of the Demerara plateau occurred along the eastern limit of the Jurassic SDR complex, forming its present-day eastern divergent margin. The Demerara and Guinea plateaus were then individualized on each side of the Equatorial Atlantic. This study also highlights the major contribution of thermal anomalies such as hotspots and superposed tectonic phases in the story of other TMPs.

Mots-Clés : Georgia Taille 9

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