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Unexpected post-breakup altitude of the distal continental margin of the Demerara Plateau (French Guiana): New constraints from LA-ICP-MS U-Pb calcite dating

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The Demerara Plateau is a submarine bathymetric high, 230 km-long and 170 km-wide, lying between 1000 and 3000 m-depth, and located north of French Guiana and Suriname shelves. On its northeastern border, the Bastille Plateau is a 16 km-long, 9 km-wide relief, at the intersection of the Cretaceous transform and divergent margins of the Demerara Plateau. It represents a crucial witness for understanding the early stages of the Equatorial Atlantic opening. Seismic profiles from GUYAPLAC[a] (2003) and MARGATS[b] (2016) cruises reveal that the Bastille Plateau is a continentward tilted block with a planar top surface culminating at bathymetric depths of 3650 m, 15 km from the continent-ocean boundary. In 2016, the DRADEM[c] cruise dredged the rocks outcropping along the northern slope of the Bastille Plateau, retrieving mostly trachy-basalts and a single rudstone sample. During the DIADEM[d] campaign (2023), a dredge on the southern slope and two *Nautile* submarine dives confirmed that the Bastille Plateau was almost entirely made up of magmatic material. Three pelagic carbonates were sampled during one *Nautile* dive and came directly from the top of the Bastille Plateau, between 3745 m and 3685 m-depth.

We combine petrology with absolute U-Pb dating on calcite for the rudstone, and biostratigraphic dating of the pelagic carbonates deposited at the top of the Bastille Plateau to constrain the chronology of the rifting of the Equatorial Atlantic along the Demerara Plateau. We interpret the rudstone as deposited on a subaerial unconformity surface, similar in seismic lines to the post-rift unconformity. U-Pb analyses on calcite date this post-rift unconformity as Mid-Albian and constrain a continental break-up at 106 ± 9 Ma. Unexpectedly, post-rift subsidence did not follow the break-up, with marine transgression occurring circa 103 Ma on the Demerara Plateau, but later than 98 ± 3 Ma on the Bastille Plateau, closer to the continent-ocean boundary, possibly in

relation with the vicinity of the Sierra Leone hotspot. Biostratigraphic ages indicate that subsidence was rapid from the Cenomanian onward, resulting in the early establishment of a deep-sea current acceleration zone along the outer margin of the Demerara Plateau.

[a] https://doi.org/10.17600/3010050

[b] https://doi.org/10.17600/16001400

[c] https://doi.org/10.17600/16001900

[d] https://doi.org/10.17600/18000672