
Cretaceous horsts on the Demerara Plateau (Guianas): insights from the DIADEM cruise

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Résumé

The Demerara Plateau is a submarine bathymetric high, 230 km long and 170 km wide, located north of French Guiana and Suriname shelves. It is bordered by both the Jurassic Central Atlantic and Cretaceous Equatorial Atlantic oceans. The eastern margin is a rift margin, the northern one is a transform margin, both formed during the lower Cretaceous. The Buteur Ridge and the pair Bastille Plateau / Juillet Block are reliefs located on these two margins, respectively. Here, the pre- and syn-rift Jurassic-Cretaceous rocks outcrop. Seismic profiles (vertical and wide angle) from the GUYAPLAC (2003), IGUANES (2013) and MARGATS (2016) cruises show that the 3800 m-deep Buteur Ridge is an acoustic basement ridge delimited by conjugated normal faults. The Bastille Plateau and the Juillet Block are also bounded by normal faults. They correspond to a horst with a planar top surface culminating at 3600 m, and a tilted block at bathymetric depths between 4700 and 4300 m, respectively. In 2016, the DRADEM cruise dredged the rocks outcropping at the sea floor. One azoic coarse-grained block of sandstone was retrieved on the Buteur Ridge and three rudstones with bivalve fossils were sampled on the Bastille Plateau. In early 2023, the oceanic cruise DIADEM took place on the same sites, using dredges and manned deep underwater dives (Nautile).

Two underwater dives and a dredge recovered highly-weathered basaltic rocks, which highlight the magmatic nature of the basement. The basalts are overlain by several layers of sandstones, possibly separated by a discordance on the Juillet Block, and limestones of various facies at the top of the Bastille Plateau. Dredging on the western slope of the Buteur

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Ridge yielded 87 samples of various silicilastic rocks, which are complemented with 8 more sandstones sampled during the underwater dive on the eastern slope of the Buteur Ridge. These new samples and the structural study carried out with the video recording of each deep dive provide new insights into the Cretaceous margins of the Demerara Plateau and the vertical movements associated with the rifting and post-rift evolution.

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Mots-Clés: Demerara Plateau, DIADEM cruise, Equatorial Atlantic, cretaceous horsts, rift margin