

[T13D-0255 Stratigraphy and tectonics of the Enriquillo-Plantain-Garden Fault in the Jamaica Passage, northern Caribbean Plate](#)

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The northern E-W boundary of the Caribbean Plate is primarily left lateral and has evolved through the Cenozoic from transtensive to transpressive. The southern branch of this boundary, the Enriquillo-Plantain Garden Fault (EPGF), traverses southern Haiti through the Jamaica Passage to Jamaica. Damaging earthquakes occurred in Haiti in 1751, 1770, 2010 and 2021, and in Jamaica in 1692 and 1907, yet the Jamaica Passage segment has little known seismicity with no large historic events. The EPGF in the Passage follows a 2-3 km deep trough that is less oblique to the plate motion, and was imaged previously by the 2012 HAITI-SIS seismic cruise. We present the results of an NSF-funded RAPID cruise carried out in January 2022 to the Jamaica Passage, that investigated the EPGF with a hi-res multichannel seismic system collecting >650 km of data and 47 sediment cores. We observe prominent scarps along the EPGF consistent with large seismogenic displacements, and discovered widely distributed event deposits in the cores (McHugh et al. abstract). Imaged Neogene shortening structures verge southward, and are consistent with reactivation under compression. Shortening decreases from east to west. The Matley (eastern) and Navassa (central) sub-basins feature imbricate thrusting along their northern flanks, and the Morant (western) sub-basin features open folding flanked by unfolded sediments in its central part. At the depths imaged by our data, the strain is mostly partitioned: The EPGF is sub-vertical with no consistent vertical offsets, thus accounting for only sinistral motion sub-parallel to the fault, while shortening is directed across the basins. Structures point to two distinct stress components: a regional one that drives transpression, and a spatially variable one close to the EPGF, possibly in response to minor bends along this fault. Extensional and contractional structures are superimposed at distinct times on the north flank of the EPGF, as expected of a fault that translates relative to the causative fault bends. This is an important feature related to the major fault bend west of the Morant Basin, marking the transition between the Passage and the Jamaica segment of the EPGF. The results will help us better understand the

tectonics of the region and its earthquake history, and to assess the hazard for future events.

