

## **The Structure and Evolution of the Guyana Basin**

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### **Abstract**

The Guyana Basin, offshore northeastern South America, formed during the Jurassic opening of the Central Atlantic. The continent-ocean margins of the basin vary in character from a passive extensional volcanic margin at the Demerara Plateau in Suriname, through oblique extension at the Suriname/Guyana border, to a transform margin in northwestern Guyana. The width of the transition from continent to ocean reduces from over 200 km in Suriname to less than 50 km in NW Guyana. At the northwestern margin of the present-day basin, Jurassic crust is being subducted beneath the Barbados accretionary prism. The northeastern basin edge is an ocean-ocean margin where Cretaceous ocean crust was juxtaposed during the oblique opening of the Equatorial Atlantic. Plate reconstructions and maps from 3D seismic data imply that early seafloor spreading began with NNW–SSE extension between 190–160 Ma and that relative plate motion later changed to NW–SE. The portion of magmatic material in the basin floor decreases to the northwest, exposing mantle. The position and geometry of the onshore Takutu Graben suggests that it formed as a failed arm of a triple junction associated with Jurassic rifting. The graben likely captured the Berbice River during post rift subsidence, focusing sediment entry into the Guyana Basin and providing components for a successful hydrocarbon system. Berriasian to Aptian age compression, preceding opening of the Equatorial Atlantic, formed crustal scale thrusts and folds along the northeastern margin of the basin, along with minor fault inversion within the basin. The hydrocarbon discoveries of the prolific Liza trend lie just outboard of inverted basement faults suggesting a link to the structure of the transform margin.