



## **A new tectonic model for the Lesser Antilles: Evidence for a buried arc in the eastern Caribbean**

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Kevin Burke played a major role in the development of the “Pacific origin model” of Caribbean tectonics. The emplacement of the Caribbean plateau between the Americas, behind a series of north and east facing subduction zones known as the Great Arc of the Caribbean (GAC) throughout the Late Cretaceous and Paleogene is now widely accepted as the fundamental mechanism for the long-term evolution of the region. However, within this framework there are still many areas whose structure and tectonic history are poorly constrained. We present a compilation of new (collected in 2017) and historical marine magnetic anomaly and seismic data. We combine this with constraints from published geochronological and geochemical data in order to propose a new tectonic model for the Eastern Caribbean.

We interpret phases of both arc retreat and advance along the eastern plate boundary with significant implications for the crustal affinity of the modern day Lesser Antilles Arc, Grenada and Tobago Basins, with clear evidence for east-west orientated back-arc spreading either side of the Aves Ridge (a now extinct Late Cretaceous segment of the GAC). It was previously recognised that in the north the arc migrated from the Aves Ridge to the islands of the Limestone Caribbees during the Eocene. We now suggest that this easternmost magmatic front extended the full length of the current arc, below the modern day Barbados accretionary prism. This outer arc went extinct as a result of westward arc advance and formation of the modern-day Lesser Antilles, subdividing the previous backarc basin into the southern Grenada and Tobago Basins during the Oligocene. Globally, whilst slab retreat and backarc spreading in oceanic subduction systems are commonplace, arc advance is rare. To our knowledge this is the first known example of wholesale arc advance in an intra-oceanic setting and may help explain along arc variations in Lesser Antilles geochemistry. The back and forth motions of the arc are probably expressions of the constraints the two Americas impose on this isolated subduction system rather than of variations in subducting plate buoyancy.