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ABSTRACT

**The circum-Caribbean Mid-Eocene event: A result of increased
Atlantic Ocean spreading rates?**

Daniel M.Trümpy¹⁾ and Cees CWM van Oosterhout²⁾

*1) Shell Venezuela S.A., Caracas, Venezuela, 2) Shell International Exploration and
Production Company, Rijswijk, The Netherlands*

In the circum-Caribbean domain, as well as in the northern Andes and in the Gulf of Mexico, the Paleocene to Middle Eocene is a time of increased, partly violent, tectonic activity as reflected in the record of the coeval sedimentation. This activity was characterized on the Caribbean southern rim by accretion in Venezuela (Villa de Cura), turbidite, “wildflysch” and olistostrome deposition in Trinidad (Central Ranges and offshore Tobago), and significant tectonic events in Colombia, where the growth of the Central Cordillera culminates and ends in the Lower Eocene and the Eastern Cordillera begins to rise in the Late Eocene. The Scotland sands in Barbados may, pending on their exact age, also be related to this event.

The Paleocene to Middle Eocene time is also a period at which the ABC part of the Aves Island Arc (assuming the Aves Ridge being an extinct Island Arc) becomes accreted to the Colombian/Venezuelan sector of the South American continent in the south, whilst accretion also occurs in the northern sector (Cuba). The mobility of the Island Arc at that time is thus severely restricted.

Also during the Paleocene to Middle Eocene, a dramatic increase in Atlantic spreading rates is observed. In the northern Atlantic, the acceleration is compensated by Eocene rifting in the Labrador and Norwegian Seas. Intense volcanism in the Central Andes documents accelerated subduction in the southern Atlantic. In the narrow Caribbean, however, systematic occurrence of massive resedimentation and tectonic accretion during the time of increased Atlantic spreading correlates to transpressural activity along the northern and southern transform systems bordering the Caribbean Ocean, ultimately leading to the abandonment of the Aves system and to the creation of a new Island Arc in the Windward Islands, either by slab rollback or by development of a new subduction zone east of the old Aves-related trench. Radiometric ages in the Los Testigos well (southernmost extension of island arc) confirm that onset of activity on the new Windward island arc is of Late Eocene age.

Plate tectonic models indicate a dramatic drop of the Atlantic spreading rate in the Caribbean (from 4 to 1 cm/yr) in the Middle Eocene at 48 million years (Lutetian), and a second dramatic event (change of azimuth with associated drop of spreading rate at 39.5 million years in the Bartonian). The first event is interpreted as the time when the Aves Ridge becomes inactive and the Caribbean becomes temporarily welded to North and South America. The second drop documents return to normal conditions at the eve of the Late Eocene with establishment of a new subduction zone and Island Arc east of the original Aves system, fringed by extension in the fore- (Tobago Graben) and back- (Grenada Basin) arc basins. The tomographic evidence of a second plate below the Caribbean observed in the Venezuela Basin thus could relate to a piece of remnant Atlantic Plate "floating" below the Caribbean Ocean after abandonment of the Aves system.