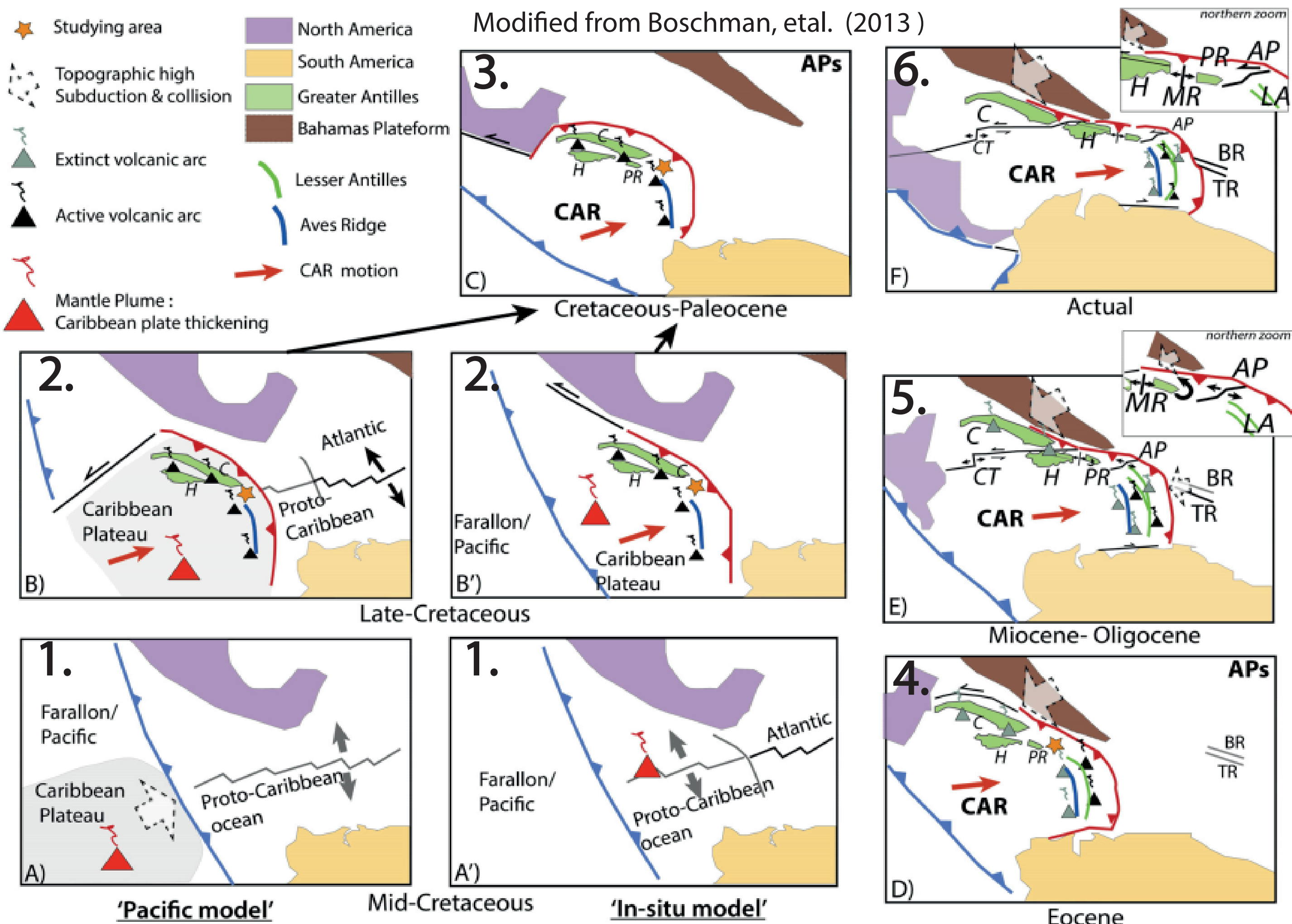


# Compilation of radiometric age dates from the Great Arc of the Caribbean: Evidence for an in situ or Pacific-derived Caribbean Plate?

## Abstract

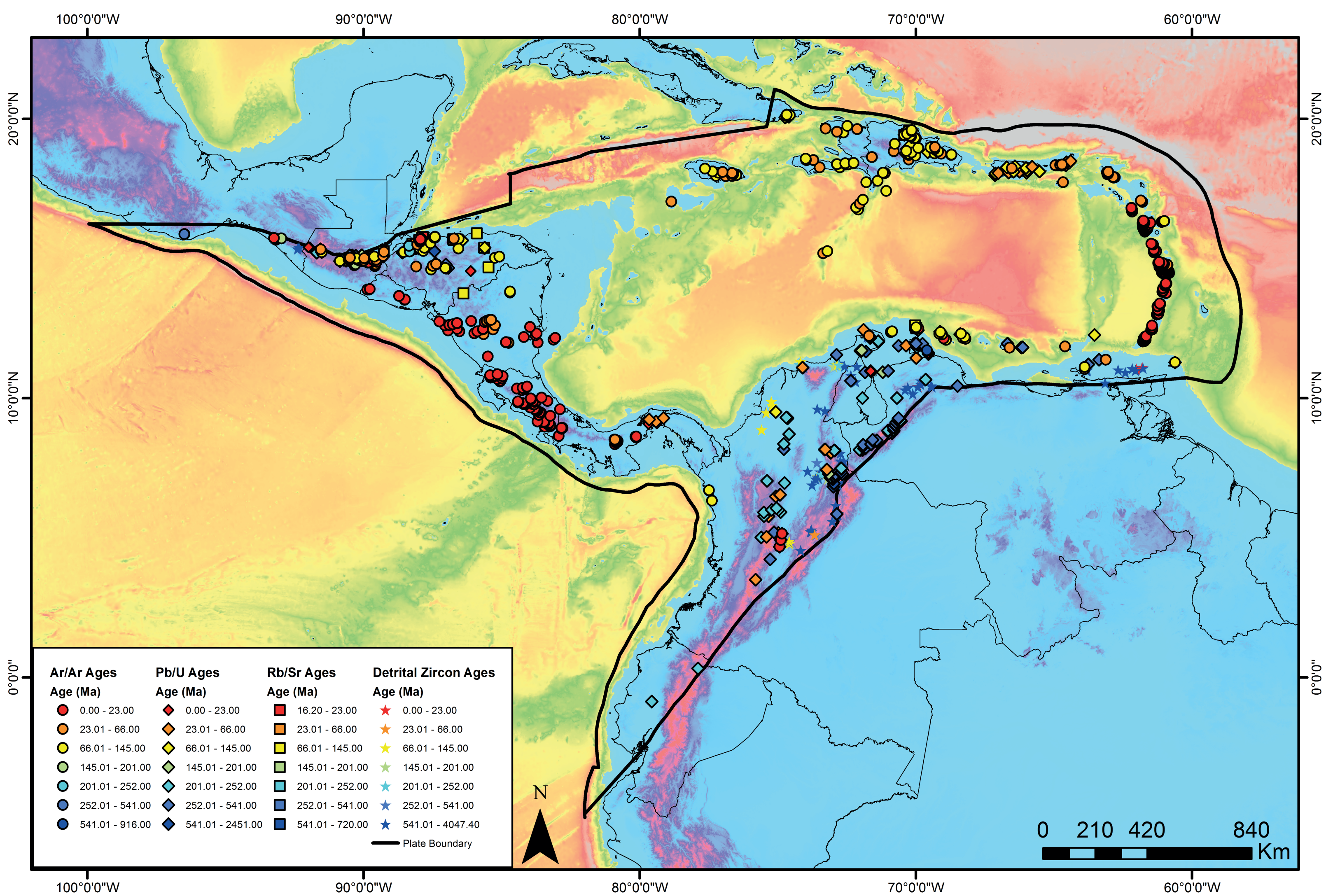
I have used GIS to compiled ~1500 radiometric dates from Cretaceous to Paleogene, island arc related rocks in the circum-Caribbean that most workers agree formed a single, continuous “Great Arc of the Caribbean”. All radiometric dates are taken from the published literature that provide precise location information and radiometric parameters for three different, dating systems: Ar-Ar, Rb-Sr, and U-Pb. The goal of the compilation is to test two, differing models for Caribbean plate evolution: an in situ arc that was static between the North and South American plates - or a highly-mobile and far-traveled, Pacific-derived arc. The “Great Arc of the Caribbean” which can be followed as a semi-continuous feature from northern Colombia, along the Aves Ridge, and through the Virgin Islands, Puerto Rico, Hispaniola and Cuba. One challenge for the study is the dependence of arc ages on the amount of deformation and uplift: for example, the Hispaniola arc segment has experienced greater amounts of Neogene deformation and uplift and therefore exposes older levels of the Great Arc. For this reason, I emphasize the youngest, arc-related dates in each arc segment as a way to track the location of either the static position of the Caribbean plate (in situ plate model) or the eastward-moving Caribbean plate (Pacific-derived plate model). Ages in the 700-km-long island of Cuba show no particular directional pattern with younger Paleogene ages superimposed on areas of older Cretaceous ages. Two arc segments show good west to east younging progressions with a lateral change from Cretaceous to Paleogene arc ages and include: 1) a 300-km-long segment from Puerto Rico through the Virgin Islands; and 2) a 500-km-long segment from northern Colombia to the Lesser Antilles arc. The age progressions yield roughly the same rate of west-to-east plate motion inferred from subsidence and from plate models and therefore supports the Pacific origin of the arc.

## 1. ‘Pacific’ vs. ‘In-Situ’ models



Two alternate geodynamic reconstructions for the Caribbean Plate since Mid-Cretaceous: the ‘Pacific model’ (A-B) from Pindell and Kennan (2009) and Boschman et al. (2014), the ‘in-situ’ model (A’B’) from Meschede and Frisch (1998) and James (2009).

## 2. Map of radiometric and detrital ages



## 3. Tectonic reconstruction of the Caribbean plate with radiometric ages for each stage

