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Testing the linkage between the Galapagos hotspot and the Caribbean large igneous province (CLIP) based on a globally consistent plate kinematic model

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The Caribbean Sea is known for its complicated plate tectonic history. In this regard, a key element is the origin of the Caribbean large igneous province (CLIP) as it covers large parts of the Caribbean plate. It is characterized by thickened crust of up to ∼20 km and ocean drilling samples yield predominantly ages of 88-94 Ma. Most authors agree that the CLIP is underlain by former Farallon lithosphere that was trapped in between the diverging North and South American plates. Alternatively, so-called "in-situ" models suggest an autochthonous genesis of the entire Caribbean Sea. The suggestions for the origin of the igneous rocks that compose the CLIP are equally diverse: According to a widely believed theory, the plume head of the "paleo-Galapagos hotspot" could have been such a source and abundant geochemical evidence lends support for this idea. However, so far plate reconstruction models were unsuccessful to match the presumed location of the "paleo-Galapagos hotspot" with the area of the Farallon plate that now (presumably) underlies the CLIP at the appropriate time (88-94 Ma). This has led some authors to suggest asthenosphere inflow through slab windows as a potential mechanism for the creation of the CLIP. In even stronger contradiction, "in-situ" models view the CLIP as in parts stretched continental North and South American crust covered by volcanic extrusions that resulted from the divergence of these two major plates. Here, we resume this ongoing discussion and test the linkage between the "paleo-Galapagos hotspot" and the CLIP on the basis of a globally consistent plate tectonic model. We also suggest an age distribution of the presumed former Farallon lithosphere underneath the CLIP.