



The preserved plume conduits of the Caribbean Large Igneous Plateau and their relation with the Galápagos hotspot back to 90 Ma

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Remnants of the Caribbean Large Igneous Plateau (C-LIP) are found as thickened zones of oceanic crust in the Caribbean Sea, that formed during strong pulses of magmatic activity around 90 Ma. Previous studies have proposed the Galápagos hotspot as the origin of the thermal anomaly responsible for the development of this igneous province. Particularly, geochemical signature relates accreted C-LIP fragments along northern South America with the well-known hotspot material.

In this research, we use 3D lithospheric-scale structural and density models of the Caribbean region, in which up-to-date geophysical datasets (i.e.: tomographic data, Moho depths, sedimentary thickness, and bathymetry) have been integrated. Based on the gravity residuals (modelled minus observed EIGEN6C-4 dataset), we reconstruct density heterogeneities both in the crust and the uppermost oceanic mantle (< 50km).

Our results suggest the presence of two positive mantle density anomalies in the Colombian and the Venezuelan basins, interpreted as the preserved plume material which migrated together with the Proto-Caribbean plate from the east Pacific. Such bodies have never been identified before, but a positive density trend is also observed in the mantle tomography, at least down to 75 km depth.

Using recently published regional plate kinematic models and absolute reference frames, we test the hypothesis of the C-LIP origin in the Galápagos hotspot. However, misfits of up to ~3000 km between the present hotspot location and the mantle anomalies, reconstructed back to 90 Ma, is observed, as other authors reported in the past.

Therefore, we discuss possible sources of error responsible for this offset and pose two possible interpretations: 1. The Galápagos hotspot migrated (~1200-3000 km) westward while the Proto-Caribbean moved to the northeast, or 2. The C-LIP was formed by a different plume, which – if considered fixed – would be nowadays located below the South American continent.

