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Curie point depth estimation of the Eastern Caribbean

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In this paper we present an estimation of the Curie point depth (CPD) on the Eastern Caribbean. The estimation of the CPD was done from satellite magnetic anomalies, by the application of the Centroid method over the studied area. In order to calculate the CPD, the area was subdivided in square windows of side equal to 2°, with an overlap distance of 1° to each other.

As result of this research, it was obtained the Curie isotherm grid by using kriging interpolation method. Despite of the oceanic nature of the Eastern Caribbean plate, this map reveals important lateral variations in the interior of the plate and its boundaries. The lateral variations observed in CPD are related with the complexity of thermal processes in the subsurface of the region.

From a global perspective, the earth′s oceanic provinces show a CPD's smooth behavior, excepting plate boundaries of these oceanic provinces. In this case, the Eastern Caribbean plate's CPD variations are related to both: Plate's boundaries and plate's interior. The maximum CPD variations are observed in the southern boundary of Caribbean plate (9 to 35 km) and over the Lesser Antilles and Barbados prism (16 to 30 km). This behavior reflects the complex geologic evolution history of the studied area, in which has been documented the presence of extensive mantle of basalt and dolerite sills. These sills have been originated in various cycles of cretaceous mantle activity, and have been the main cause of the oceanic crust′s thickening in the interior of the Caribbean plate.

At the same time, this thickening of the oceanic plate explains the existence of a Mohorovičić discontinuity, with an average depth greater than other regions of the planet, with slight irregularities related to highs of the ocean floor (Nicaragua and Beata Crests, Aves High) but not similar to the magnitude of lateral variations revealed by the Curie isotherm map.