



New ages and geochemical data for Gorgona Island, Colombia: Indication of a ~30 Ma long history of heterogeneous mantle melting in the formation of the Caribbean Large Igneous Province

L. Serrano Durán (1), **L Ferrari** (1), M. López Martínez (2)

(1) Centro de Geociencias, UNAM, Campus Juriquilla, Qro., Mexico, (2) CICESE, Ensenada, B.C., Mexico (luca@geociencias.unam.mx / Fax: +52 442 2381129)

The huge Caribbean Large Igneous Province (CLIP) is the remnant of one or more oceanic melting anomalies active during the late Cretaceous in the Pacific realm. The CLIP has been traditionally ascribed to the initial outburst of the Galapagos plume in Late Cretaceous. However, plate reconstruction as well as geologic and geodynamic arguments exclude the Galapagos hotspot from being the source of the CLIP (Pindell et al., 2006, *Geologica Acta*) and also cast doubt on the genesis of the province as a result of a mantle plume. In an alternative model the CLIP would be related to the opening a large slab window beneath the Great Caribbean Arc where it intersected the proto-Caribbean ridge in Turonian to Campanian times (Pindell et al., 2006).

Here we present new geochronologic and geochemical data on Gorgona Island, located 50 km west of the Pacific coast of Colombia. The island is formed by an igneous complex which includes komatiites, peridotites, gabbros, picritic basalts and breccias, affected by reverse and oblique faulting with a general E to NE vergence. Previous datings on basalts yielded ages of 88.9 ± 1.2 Ma (Ar-Ar) and petrologic studies showed a large spread in radiogenic isotopes and incompatible trace element ratios. Gorgona was interpreted as the product of a mantle plume with different reservoirs and whose present expression would be either the Galapagos or the Salas y Gomez hotspot. Using Ar-Ar laser step heating we obtained reliable plateau and/or isochron ages which fall within those reported for rocks sampled in situ in the Caribbean large igneous

province (CLIP) (~ 92 -65 Ma). Only one basaltic sample yielded an age comparable with those reported in the literature. Two basalts intercalated with komatiites and a gabbro yielded younger ages (~ 75 – 62 Ma), similar to those of rocks exposed along the western coast of Colombia. Our high quality trace element data for Gorgona show substantial differences with respect to the Sala y Gómez hot spot but overlap those from the more primitive rocks of the CLIP. Considering our new ages, the Gorgona suite displays a secular variation from more enriched to more depleted terms. We propose that Gorgona represents a piece of the CLIP accreted to the Colombian margin and that the suite was produced by several pulses of magmatism with progressively higher grades of mantle melting in a ~ 27 Ma interval. Our results do not agree with the formation of the CLIP as the product of the initial activity of a mantle plume but seems to be better explained by a progressive opening of a slab window in an oceanic subduction system.