

THE CRUSTAL HISTORY OF MARGARITA ISLAND: AN INTERDISCIPLINARY CONTRIBUTION TO CARIBBEAN TECTONICS

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ABSTRACT

Using an interdisciplinary approach the pressure-temperature-deformation-time evolution for the crust of Margarita Island (Venezuela) has been established to allow comparison with current plate tectonic models for the Caribbean region. On Margarita twelve progressive stages of development can be assigned to the following tectonic settings: protolith evolution of the La Rinconada Group as Aptian/Albian (U-Pb zircon ages on probable plagiogranites) oceanic crust and associated mantle peridotites, as well as the Juan Griego Group as a complex of older Paleozoic continental basement (U-Pb ages on orthogneiss) and Mesozoic pelitic sediments; accretion and high-pressure metamorphism (500-600⁰ C; 10-14 kbar) of both units as the Margarita Complex in the deep level of a forearc at 100-90 Ma, followed by uplift and cooling (K-Ar cooling ages on phengite); intermediate crustal level of a volcanic arc (90-80 Ma, U-Pb zircon ages on post-accretion El Salado Granite); transform plate-margin setting at comparable level until 50 Ma, when a second episode of rapid uplift/cooling occurred (K-Ar cooling/crystallization ages on secondary phengite in granitoid intrusives and overprinted high-pressure schists; zircon fission-track ages; Rb-Sr thin-slab homogenization ages); basaltic/andesitic dykes as last magmatic activity 50 Ma (Ar-Ar ages on magmatic amphibole); transform plate-margin setting at shallow crustal level (50 Ma to present) characterized by deformation entirely in the brittle regime and block tectonics. This sequence is most compatible with that class of Caribbean plate tectonic scenarios that requires a Pacific origin for the Caribbean plate and eastward migration of the Margarita Complex and its correlatives along northern South America since the Cretaceous.