

NEW GEOCHRONOLOGICAL CONSTRAINTS ON THE CRUSTAL HISTORY OF MARGARITA ISLAND

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ANSTRACT

Detailed isotopic dating of petrologically well-characterized samples has allowed us to clarify key aspects of the crustal history of Margarita Island. U-Pb study of zircons from orthogneiss exposed on Macanao Peninsula has yielded Carboniferous crystallization ages. This is the first indication of pre-Mesozoic continental crust from the Island of Margarita. Magmatic zircons from the Guayacán Orthogneiss of eastern Margarita (Paraguachoa), which has suffered high-pressure metamorphism, yield ages of 105-115 Ma, thus for the first time providing concise data on the maximum age for this high-pressure collision event.

In the past, the large spread of K-Ar ages ranging from 100-30 Ma obtained on Margaritian rocks has been a serious interpretational problem. Detailed study of white mica from various units has therefore been carried out. They now clearly indicate two major cooling events at 80-90 Ma and at 50-55 Ma. Lower ages are found only for very fine-grained white mica in localized shear zones. All other ages are spurious results due to the mixing of heterogeneous white mica populations. The 80-90 Ma ages reflect the rapid uplift and cooling after the high-pressure metamorphic event that has affected Margarita as a whole. The second concentration of ages at 50-55 Ma is due to another major uplift/cooling event that terminated an episode of greenschist overprinting at midcrustal level. The Rb-Sr thin lab technique for testing homogenization was applied to the Paleozoic Macanao Orthogneiss and also shows that the last major episode of isotopic re-equilibration occurred at this time.