

## Review of Zircon Ages from Cuba and Their Geodynamic Interpretations

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There are only few reliable zircon ages using modern analytical methods for rocks from the various tectonic units in Cuba, and these are for the Escambray Massif (EM), the Mabujina Amphibolites (MAM), the Cretaceous Primitive Volcanic Arc (CPIA), the Cretaceous Calcalkaline Volcanic Arc (CCVA), in central Cuba; the Purial Massif (PM) of eastern Cuba; the Palaeogene Volcanic Arc (PVA) in southeastern Cuba, and the ophiolite melanges in Central and Eastern Cuba. The EM is a high-pressure continental terrane composed of Jurassic to Cretaceous rocks and accreted to the MAM in the late Cretaceous. Detrital zircons from a metagreywacke of the structurally lowest unit of the EM range in age between 594 and 1187 Ma and document derivation from a source characterized by both Grenvillian and Pan-African crust. This is in contrast to Jurassic clastic sediments in western Cuba that also show Grenvillian-age micas but lack the Pan-African ages. Detrital zircons from a glaucophane-bearing quartzite of the high-pressure EM unit are predominantly well rounded but also near-idiomorphic, and SHRIMP-ages define two distinct groups between 279 and 484 Ma and between 964 and 1506 Ma. The latter group reflects a Grenvillian provenance, whereas the younger group may indicate derivation from the Maya Block in Guatemala. Little rounded detrital zircons from an eclogite lens of the high-pressure EM unit yielded SHRIMP-ages between 201 and 256 Ma (latest Permian to latest Triassic), and we suggest that these characterize a pelagic sediment deposited on Jurassic oceanic floor and subsequently metamorphosed to eclogite-facies during intra-oceanic subduction. Island arcs rocks were dated from different sources in Central Cuba. Within the MAM a single zircon age of 133 Ma for a trondhjemitic gneiss is considered to represent the CPIA. A granitoid sample from the Manicaragua Pluton provided emplacement ages between 93 and 83 Ma which belong to the CCVA. Zircons from four CCVA samples of the Camagüey plutons yielded emplacement ages between 104 and 81 Ma. All these data suggest 20 million years of continuous CCVA granitoid magmatism. The Purial Massif (PM) is a strongly deformed complex metamorphosed to the greenschist- and blueschist-facies, and

considered to be the easternmost equivalent of the CCVA. A tonalite from the Yayabo River in the southern PM yielded a concordant zircon age of 113 Ma, correlatable with the CCVA in central Cuba. The PVA of the Sierra Maestra, SE Cuba, includes calc-alkaline tonalites and trondhjemites that were generated in an intra-oceanic arc for which zircon emplacement ages between 60 and 48 Ma were determined. These support the concept of separating a Paleogene from a Cretaceous volcanic arc in Cuba. Zircons from a plagiogranite fragment within the Northern Ophiolite Mélange S of Santa Clara yielded a concordant age of 86 Ma, establishing ocean crust to have formed in the Coniacian, within the same interval as arc magmatism in the CVA. Another age of 86 Ma was determined for a sheared felsic volcanic rock and a tonalite intruding late Cretaceous primitive island arc rocks tectonically emplaced within the North-eastern Cuban Ophiolites. This date confirms that PIA rocks in the Caribbean can be both early and late Cretaceous in age. Zircon xenocrysts of ~440 and 980 Ma ages in the CVA and PM rocks suggest an old crust component in the Cretaceous arc magmas that is best explained as material transferred from subducted sediments to the supra-subduction environment. The presence of this component in the EM and its apparent lack in the magmatic products of the early Cretaceous primitive island arc support models of a Pacific origin of the Caribbean plate.