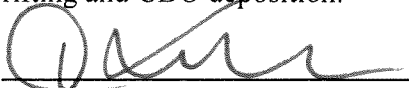


PRE-CENOZOIC TECTONO-METAMORPHIC EVOLUTION OF THE CYCLADIC BASEMENT, IOS ISLAND, GREECE

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ABSTRACT

The Cycladic Basement is one of three major HP-LT units exposed in the highly distended back arc of the retreating Hellenic subduction zone of the southern Aegean Sea. Together with the metasedimentary Cycladic Blueschist Unit (CBU), the Cycladic Basement forms the hearts of Miocene metamorphic core complexes (MCCs) in the southern Cyclades, such as Ios Island located ~20 km N of Santorini. While the Cycladic Basement and the CBU record the tectono-metamorphic evolution of the Hellenic subduction zone from Paleogene subduction to Miocene exhumation, prior to our work, the Cycladic Basement lacked robust constraints on its pre-subduction magmatic, tectonic, and paleogeographic evolution. Zircon U-Pb crystallization ages for the granitic core of the Ios MCC are 335-308 Ma, suggesting long-lived emplacement of Carboniferous plutons related to arc magmatism into Peri-Gondwanan crust already sutured to Eurasian terranes, as evidenced by both inherited zircon cores with a distinct Gondwanan detrital zircon (DZ) age signature and growth rims with ages of ~335-308 Ma and DZ signatures of Basement lower Paleozoic (~560-354 Ma) host-rock paragneisses and garnet-mica schists with Gondwanan provenance. Interestingly, DZ U-Pb dating revealed a distinct discontinuous post-plutonic sedimentary unit (~290 Ma) in the Basement complex overlying the denuded Carboniferous plutonic rocks and Paleozoic metasedimentary units. This overlap unit coupled with apatite U-Pb data, recording rapid early Permian cooling of Basement orthogneisses, suggests an episode of post-Variscan rifting. In summary, these new results elucidate the pre-Mesozoic history of the Cycladic Basement and show that it represents a peri-Gondwanan fragment composed of lower Paleozoic metasedimentary rocks, intruded by voluminous Carboniferous arc magmatism, and rapidly exhumed in the Permian, prior to Triassic rifting and CBU deposition.

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