

Abstract This paper presents new ID-TIMS U–Pb zircon and titanite ages from the El-Sibai gneiss complex in the Eastern Desert of Egypt. The zircon data support previous studies, indicating that the protoliths of the gneissic (oldest) units in the area were emplaced during the East African orogeny, and do not represent an older pre-Neoproterozoic, reworked cratonic basement. The crystallization ages of three compositionally distinct orthogneiss protoliths are c. 685, 682 and 679 Ma, respectively. A U–Pb titanite age from one orthogneiss overlaps with the protolith age, indicating that the gneisses did not undergo post-magmatic high-temperature metamorphism. The gneissic textures of the rocks are therefore interpreted to reflect syn-emplacment deformation. This, and evidence for static amphibolite facies metamorphism in country-rock metavolcanics, lead us to conclude that the gneisses of El-Sibai do not represent an exhumed middle crustal gneiss dome, but are part of the island arc affined allochthon into which they were emplaced synchronously with NW-ward nappe translation. We also report ages from rocks cross-cutting the gneisses and the surrounding island arc affined assemblages that yield the hitherto youngest robust pre-Cretaceous intrusive ages in the Eastern Desert. The dated rocks are an anorthosite and a cross-cutting syenogranite giving ages of c. 541 and 540 Ma, respectively. We consider this late magmatic pulse to be anorogenic, most likely reflecting a separate extensional event involving asthenospheric upwelling and decompression melting of the mantle.

Keywords East African orogeny · Neoproterozoic · U–Pb Geochronology · Egypt · Eastern Desert · El-Sibai gneisses · Cambrian magmatism