

**Abstract** The Neoproterozoic Atud diamictite in Wadi Kareim and Wadi Mobarak in the Eastern Desert of Egypt and the Nuwaybah formation in NW Saudi Arabia consist of poorly sorted, polymictic breccia, with clasts up to 1 m of granitoid, quartz porphyry, quartzite, basalt, greywacke, marble, arkose, and microconglomerate in fine-grained matrix. Stratigraphic relations indicate that the diamictite was deposited in a marine environment. Integrated field investigation, petrographic study and U–Pb SHRIMP zircon ages demonstrate that the Atud and Nuwaybah are correlative. The distribution of zircon ages indicate that ~750 Ma ages are dominant with a significant component of older materials, characterized by minor Mesoproterozoic and more abundant Paleoproterozoic and Neoarchean ages. Some matrix and metasedimentary clast zircons yield ages that are a few 10s of Ma younger than the age of the youngest clast ( $754 \pm 15$  Ma), suggesting Atud/Nuwaybah diamictite deposition ~750 Ma or slightly later, broadly consistent with being deposited during the Sturtian glaciation (740–660 Ma). The Paleoproterozoic and Neoarchean clasts have no source within the ensimatic Arabian–Nubian Shield. The distribution of the pre-Neoproterozoic ages are similar to the distribution of the pre-Neoproterozoic ages in Yemen and Saharan Metacraton, suggesting that these clasts have been transported hundreds of kilometers, maybe by ice-rafting. The Atud diamictite may represent important evidence for Cryogenian “Snowball Earth” in the Arabian–Nubian Shield.

**Keywords** Arabian–Nubian Shield ·  
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U–Pb SHRIMP zircon