$^{40}Ar/^{39}Ar$ and U-Pb SIMS zircon ages of Ediacaran dikes from the Arabian-Nubian Shield of South Jordan

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The ages of four Ediacaran dikes from the Arabian Nubian Shield (ANS) in south Jordan were constrained using $^{40}Ar/^{39}Ar$ for three simple dikes and U-Pb SIMS zircon from one composite dike. Amphibole from a porphyritic andesite dike yielded a plateau age of 594 ± 3 Ma; biotite from a porphyritic rhyolite yielded a plateau age of 600 ± 3 Ma, and a dolerite whole rock sample produced a complicated age spectrum with total gas age of ~580 Ma. The robust ages from the amphibole and biotite are interpreted as crystallization ages of the dikes, whereas the whole rock dolerite age is more challenging to interpret. This age is older than two published ages of dolerite from the same swarm: a 545 Ma K-Ar age and 561 Ma Rb/Sr whole rock isochron age, but it is younger than the host granite (~585 Ma). Our tentative interpretation is that ~580 Ma is the crystallization age of the dolerite. A U-Pb concordia age of 609 ± 6 Ma was obtained for zircon separated from the latite margins and from the rhyolite core of the composite dike. This age is interpreted as the crystallization age of the composite dike. These dikes represent different swarms as constrained from the field relationships and as confirmed from the absolute ages. The three older dikes intrude the late to post collisional granitoids of the Aqaba Complex and display a subduction related character as evidenced from the strong Nb-Ta anomaly. The youngest dike generation, which is represented by the dolerite dike, truncates the older dike swarms and the within plate A-type granite of the Araba Complex in Jordan. The within plate character of the dikes is supported by the absence of the Nb-Ta anomaly and the high field strength elements tectonic discrimination plots. These dike swarms were feeders of an extensive center of volcanic activity and their ages constrain the transition from the collisional stage to the final cratonization of the ANS.