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The continuation of the Arabian-Nubian Shield and the Mozambique Belt into East Antarctica: Implications of Gondwana Assembly

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The Arabian–Nubian Shield is a collage of mostly juvenile oceanic island arc terranes, back arc basins, and rare slivers of older continental crust that crops out in the eastern Arabian Peninsula and north east Africa. Characteristic of these rocks are $\epsilon_{Nd}(t) > 0$, Nd model ages < 1.5 Ga, and peak metamorphic ages > 600 Ma. Rocks with the same characteristics can be traced along strike to the south through Tanzania, southwest Madagascar, Sri Lanka and into East Antarctica. Collectively these regions represent a vast amalgam of intra-oceanic terranes that coalesced in the paleo-Mozambique ocean during the Neoproterozoic.

The geologic evolution of this region is two-phase. The first occurred between 650 Ma and 600 Ma when the disparate terranes of the Arabian–Nubian Shield, and its southern extension, were fused into a single intra-oceanic landmass. The second occurred between 580 Ma and 520 Ma when this landmass was sandwiched between the colliding pre-Gondwana Indian and African plates. The differences in tectonic process – arc and micro-continent accretion 650–600 Ma, and 580–520 Ma continental collision – is reflected in the differing metamorphic histories preserved for these two intervals.

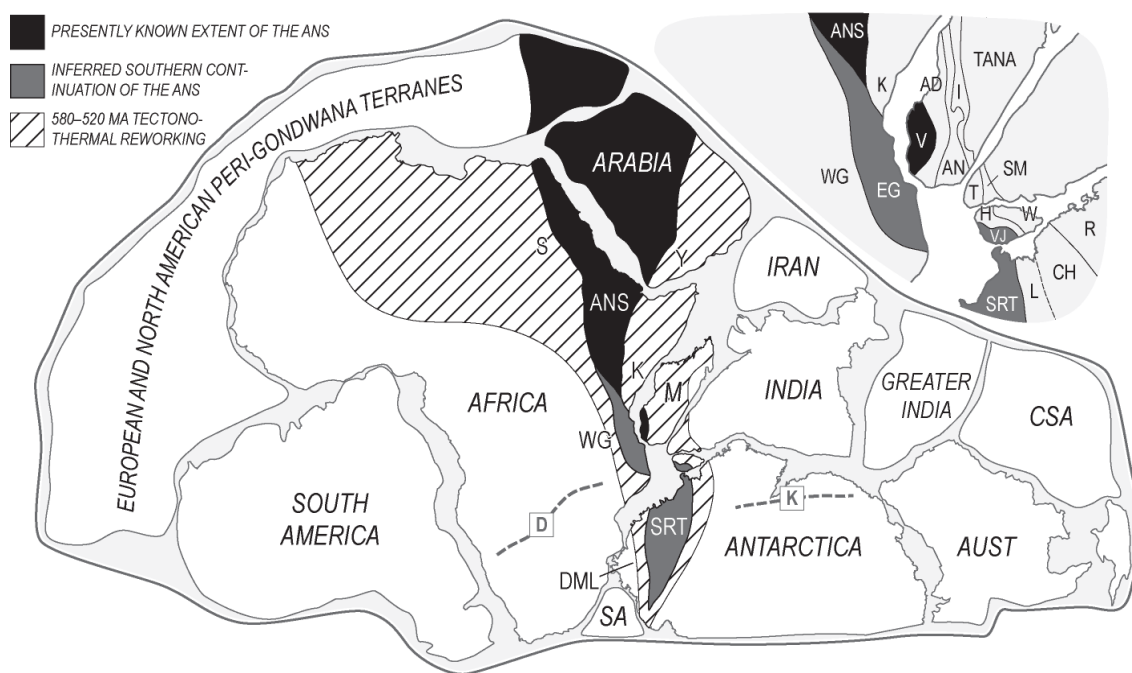


Figure 1. Reconstruction of Gondwana illustrating the known and inferred extent of the Arabian–Nubian Shield and the area overprinted by 580–500 Ma deformation and metamorphism associated with the

East African–Antarctic Orogen. Heavy dashed lines labelled D and K trace the 540–490 Ma Damara and Kuunga sutures. Inset top right shows the internal terrane boundaries of southern Madagascar and adjacent areas. Abbreviations to both figures are: AD = Androyen domain, AN = Anosyen domain, ANS = Arabian Nubian Shield, CH = Cape Hinode Complex, CSA = Central and southeast Asian terranes, DML = Dronning Maud Land, EG = Eastern Granulites, H = Highlands Complex, I = Ikalamavony domain, K = Kenya, L = Lützow-Holm Complex; M = Madagascar, R = Rayner Complex; S = Sudan, SA = South Atlantic terranes, SM = South Madurai Block; SRT = Sør Rondane-Toast Complex, T = Trivandrum Block, TANA = Antananarivo domain, VJ = Vijayan Complex, W = Wannu Complex, WG = Western granulites and Y = Yemen.

