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Volcanic outcrops of southeast Ethiopia and the Ogaden Dyke Swarm

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A new map of Tertiary volcanics occurrences in the Ogaden region of southeast Ethiopia and adjacent areas of Somalia has been prepared. Outcrop areas, mapped using satellite images and helicopter-[U+2010]supported field work in 2008, are more widespread than previously recognized, while magnetic and drill data reveal the vast subsurface extent of the magmatism. Several spectacular 'meandering' outcrops, over 100 km long, are undoubtedly exhumed canyon-[U+2010]filling flows and magnetic data show that many other apparently isolated outcrops are actually part of similar flows, the bulk of which are now subsurface. Age dating and well intersections show several volcanic episodes, with the major outpouring occurring across a broad peneplain in the Oligocene.

Geological and aeromagnetic mapping, and 40Ar/39Ar age dating, reveal a dyke swarm extending SSE from the southern Afar margin more than 600 km across the Somali Plate, and coeval with dyke injection in the Red Sea rift at ∼25 Ma. The Ogaden Dyke Swarm, which occurs in an area historically considered remote from the impact of the Afro-[U+2010]Arabian rifting and volcanism, appears associated with the Marda Fault and marks a zone of crustal dilation along the Red Sea trend across the Horn of Africa. Contemporaneous rifts, also trending WNW/ESE and over 120 km long, occur in NE Somalia, confirming the predominantly NE/SW-[U+2010]directed crustal stress regime in the Ogaden and adjacent region at this time.