Tectonic inheritance in rifting: example from western Indian passive margin near Mumbai, India

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Onland and offshore studies revealed that the northern part of western Indian passive margin (WIPM) near Mumbai is sheared (Misra et al. 2014, in press). We analyse the influence of the pre-existing anisotropies during rifting in the western Deccan volcanics/Traps, near Mumbai. Western Dharwar Craton (WDC) underlies the western Deccan traps. Therefore, anisotropies in the WDC is expected to control the rift-related structures in the Deccan Traps. We studied lineaments on 30m resolution ETM+ images and topographic maps on the WDC and the Deccan Traps. The lineaments were plotted in rose diagrams, and were grouped according to specific tectonic region for both the Deccan Traps and the WDC. Lineaments of the WDC trend NNW-SSE to NNE-SSW. These lineaments correspond to foliations and shear zones. The Chitradurga Shear Zone trends NNW-SSE. Some lineaments rarely trend NW-SE. In the western Deccan Traps, lineaments trend mostly NNW-SSE to NNE-SSW in the N. NW-SE lineaments increase in place of the NNW-SSE to NNE-SSW ones near 19° N latitude. S of 18° N latitude, the lineaments are ~ N-S. E of the Western Ghats Escarpment (WGE), no preferred trend is shown. Ground truth study revealed most of those lineaments to be dykes. Few are shear zones and fractures. Those are characterised on the topographic maps as elevated, usually > 25:1 in length:width and straight for > 5 km. Those are typically curvilinear depressions. At many locations, dykes intrude shear zones. We infer that the pervasive NNW-SSE to NNE-SSW foliation/schistosity planes of the WDC influenced faults within the Deccan Traps along which few dykes emplaced. The overall trend of lineaments and dykes match the schistosity trends of the WDC. The NW-SE trending lineaments of the Deccan Traps may be (*i*) inherited from the WDC, or (*ii*) a new set of rift-related faults later developed. The ~ 120° trending Kurduwadi Lineament, which is the reactivated Precambrian Wadi fault, juxtaposes against a bend of the WGE near Malsej Ghats. The Kurduwadi Lineament/Wadi fault is possibly a discrete anisotropy that caused a bend in the rift bounding fault.