

D-24: Recognition of a proterozoic dyke swarm in the high-grade terrain of Sri Lanka

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Numerous, highly deformed and metamorphosed, mafic bands within meta-granitoid rocks, some of which are charnockitized, were found in the E and SE of Anuradhapura, eastern Wannu Complex. These host meta-igneous rocks, derived from continental crust, may have intruded into the sediments, probably ~1000 Ma ago, before the beginning of all deformation and metamorphism. At many places, especially at Gatalagama, E of Galkulama, close to Ihalagama, at Elapatwewa, and at Dambagollewa, these mafic bands were parallel to the compositional layering in the host rocks. Careful observations revealed that these layer-parallel mafic bands were isoclinally folded, suggesting that they were once dykes which included the granitoids. The strike of the envelope of these isoclinal folds was a nearly E-W. At a few localities, where rocks were found to be fairly deformed, (e.g. Tihogama and Pahala Kayinattama), mafic layers vertically cross cut the layering in the host meta-granitoids. This cross-cutting and the layer parallel mafic sheets were recognised as components of a large dyke swarm. The present thickness of the dykes varied from a few mm to several tens of cm. Although the area affected by the inferred dyke swarm seemed to exceed 100 km², its full extent has yet to be determined.

The dykes had intruded the granitoids before their deformation and metamorphism, both had later been deformed and metamorphosed under granulite facies conditions. After the intrusion, both dykes and granitoids had experienced an extension parallel to the dykes, which led to the formation of boudins in the dykes which were more competent than the granitoids. The extension was followed by a dyke parallel shortening event forming folded boudins before the formation of close vertical folds with N-S axial planes in the dykes. In intensely deformed parts, the above features were not clearly visible and only layer-parallel mafic bands and lenses, extended boudins and detached isoclinal fold-hinges were seen. At these localities dykes had been brought into parallelism with the host rock layers by intense non-coaxial deformation through progressive rotation, probably during early thrusting. These dykes are probably the latter stages of a period of magmatism related to significant crustal extension, possibly in a rift-type environment that existed in the Proterozoic.