

The P-T- deformation path for a mid-Proterozoic low- pressure terrain: the schist belt of Nigeria.

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#### ABSTRACT

In the Proterozoic Schist Belt of Nigeria, lenticular bodies of metabasites and metaultramafites are frequently intercalated within staurolite bearing metapelitic schists. Field textural and geochemical evidence suggest that the mafic- ultramafic derived from a thick, structurally differentiated basaltic sill that contained doleritic portion in its interior.

The 800km long N-S trending belt has been affected by at least two mid- Proterozoic tectonic cycles D1 and DII, associated with two metamorphic events M1 and MII. The dominant metamorphic- structural features formed during the DII and MII affected both the sedimentary successions and the granites that intruded, and reworked most D1 and M1 effects.

Mineral assemblages in the mafic ultramafic rocks testify to a metamorphic overprint under amphibolite facies conditions. Thermodynamic modeling in the system CMFASH leads to an estimated P-T range of 1.5 – 3kbar and 550-620° C for the metamorphic peak assemblage talc- olivine- chlorite- Ca- amphibole- orthoamphibole. Moreover the pelitic rocks surrounding the mafic ultramafic units garnet frequently occurs together, often in equilibrium with biotite, staurolite and rarely chlorite. Garnet biotite geothermometer yields a temperature of 580 - 640° for the garnet- biotite-staurolite assemblage. Peak metamorphic mineral assemblages and retrograde mineral assemblages in amphibolite facies shear zones show the same metamorphic zonation, suggesting they formed in response to the same thermal event. If this is true, the implication is that a thermal perturbation external to the crust was maintained for a considerable period of time in the Proterozoic terrain of Nigeria.