

Isothermal uplift of metapelites and mafic granulites of Manaparai, Southern Granulite Terrain, India

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The late-Proterozoic granulites of Manaparai, located south of Palghat-Cauvery suture zone are composed of mafic granulites, metasediments, pyroxenite, charnockite and anorthosite, hosted in migmatitic gneisses. Calc-silicates, quartzites, cordierite-garnet-, hypersthene-garnet+sapphirine- and sillmanite-corundum bearing metapelites are the major metasedimentary units. Coexisting garnet-biotite-silimanite-quartz define the reaction: $\text{Fe-Cord} = \text{Alm} + \text{Sill} + \text{Bt} + \text{Qtz}$., while hypersthene-cordierite rich linear zones suggest the reaction: $\text{Gt} + \text{Bt} + \text{Plag} + \text{V} = \text{Opx} + \text{Cord} + \text{L}$. Tweeku and conventional geothermobarometric methods yield metamorphic T of 890-950°C and P of 7-8 Kb. Bt-Qtz symplectite rims around Opx indicate dehydration equilibria under low $a_{\text{H}_2\text{O}}$ (~ -0.01 to -0.03), while Opx-Plag+Mt symplectite rims. as well as rims of Ca-rich Plag. around embayed garnets suggest a near isothermal decompression. The core-rim P-T trend points to 3 to 5 kb decompression at higher temperatures. That the terrain was subjected to rapid tectonic exhumation at higher temperatures is also indicated by the preservation of high Gt-Opx temperatures in the mafic granulites, coexistence of Sill and Qtz and the development of various symplectite and rim assemblages around Gt and Opx in the metapelites.