

## **Gneiss-charnockite transformations in the Palghat region of southern India: a consequence of hypersaline liquids?**

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Recent field and petrological studies in south Indian granulite belt have shown that fluids play a decisive role in the lower crustal processes and granulite growth. The change of fluid composition from H<sub>2</sub>O-rich in amphibolite-facies condition to H<sub>2</sub>O-poor in granulite-facies condition has been well documented. The transitions of hydrous amphibolite-facies assemblage of biotite ( $\pm$ amphibole/garnet) gneiss to an anhydrous granulite-facies assemblage of garnet-orthopyroxene gneiss along restricted zones (0.25 to 1m and at times to few meters) of shears, fractures and foliation planes in Kerala khondalite belt (KKB) and Palghat regions have emphasised fluid channelled mineral-fluid reactions as determinants in changing the metamorphic aspects of the rock within the lower crustal conditions.

In this paper, development, controls and effects of fluids related to incipient charnockite formation at Nemmara in Palghat are evaluated in the context of the recent experimental work and observation that hyper saline fluids are consequential to granulite-facies metamorphism. Several different examples of metamorphic changes, melting and potash metasomatism following dehydration in gneissic domains by the reaction of biotite+quartz  $\Rightarrow$  orthopyroxene+K-feldspar+liquid are discussed in characterising the transition from high to low XH<sub>2</sub>O gradients. The study reiterates that various types of gneiss-charnockite transitions in rocks of broadly similar bulk compositions are due to varying development and action of fluids, and between different bulk compositions due to varying aspect of fluid-rock interaction. We examine further Nemmara charnockite formation as a case for less observed but well recognised hypersaline brines as granulite facies liquids.