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## **Superimposed Tectonothermal Events from Bhavani Layered Complex: A Northern Extension to the Pan African Event from the SGT**

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The South Indian granulites can be broadly divided into the Northern Granulite Terrain (NGT) and the Southern Granulite Terrain (SGT) separated by the broad east–west trending Bhavani–Cauvery Shear System (BCSS). Contrasting opinions exist as to the nature of crustal amalgamation that led to the accretion of the SGT to the NGT. We present here fresh observations on the tectono-metamorphic evolution of the Bhavani Layered Complex (BLC) that occurs south of the Bhavani Shear zone well within the BCSS.

The polydeformed and polymetamorphosed BLC occurs as dismembered en echelon lenses and slivers of widely varying dimensions within the extensively sheared hornblende–biotite gneiss and biotite gneiss of the Bhavani Cauvery Shear System. The BLC is constituted of dismembered metapyroxenite, chromitite, metagabbro, amphibolite, metamorphosed gabbroic anorthosite, minor anorthosite and altered dunite.

Structural and petrographic studies coupled with geothermobarometric analyses and reconstruction of metamorphic P–T paths in course of the present work suggest at least three deformation events ( $D_{1-3}$ ) and four episodes of superposed metamorphism in the BLC. The earliest metamorphism ( $M_1$ ) is represented by an isobaric cooling history with development of garnet<sub>1</sub> at around 750°C and 9.5 kbar.  $M_1$  was followed by a decompression event, also in granulite facies ( $M_2$ ) with development of sapphirine–orthopyroxene–plagioclase symplectite around garnet<sub>1</sub>. Reconstruction of the phase stability fields in the NCFMAS system suggests isothermal decompression from 750°C, 9.5 kbar to 750°C, 7.5 kbar. Thus the overall P–T path in  $M_1$  and  $M_2$  from the BLC is anticlockwise. In contrast,  $D_2$  related shear zone development was accompanied by prograde metamorphism in a clockwise P–T trajectory in amphibolite facies ( $M_3$ ) leading to growth of garnet<sub>2</sub> followed by its breakdown into hornblende–plagioclase symplectite.

Our observations from the BLC thus suggests an early anticlockwise (ACW) granulite facies P–T path overprinted by later clockwise (CW) amphibolite facies path. Based on extant geochronological data on the BLC and adjoining units, we relate the ACW event to the 2.5 Ga granulites with similar history from the adjoining Nilgiri hills and the shear related  $M_3$  amphibolites to a late Pan African tectonothermal event (521–491 Ma). Our observation shows that in accordance with the model suggested by, for example [1], the Bhavani–Attur shear zone or the Bhavani–Cauvery shear system represents an early Palaeoproterozoic suture that played an important role in the late-Archaean–early Palaeoproterozoic super-accretion event. A later Pan African granulite event overprinted this Palaeoproterozoic event in the SGT but is absent from the NGT. The amphibolites of the BLC record the northernmost limit to this later event.

*References:*

- [1] Brandt, S et al. (2014) Precambr Res 246: 91–122

