Abstract

In the Neoproterozoic time, the Eastern Ghats Mobile Belt (EGMB), then a part of Antarctica, collided with the Indian Craton during the formation of the supercontinent Rodinia. The trend of the collisional interface swings from N-S in the south to WNW-ESE along the northern boundary of the EGMB. In the region where the trend changes, the northeastern part of the Bastar Craton (or the Bastar Cratonic Unit, BCU), the EGMB and the Rengali Province form a terrane tri-junction. The multiply deformed BCU comprises a variety of quartzofeldspathic gneisses (QFG) along with charnockite suite rocks, mafic granulites, amphibolite dykes/sills and meta-gabbros. Early granulite facies metamorphism (9.6±0.9 kbar, 848±55°C) estimated from mafic granulites in the BCU outlasted the first two events of deformation (D_{1BC}/D_{2BC}). Emplacement of mafic dykes and sills was followed by the third event of deformation (D_{3BC}) and amphibolite facies metamorphism (8.2±0.6 kbar, 754±50°C). The fourth event of deformation (D_{4BC}), represented by a sinistral shearing event, resulted in the amalgamation of the BCU with the EGMB along the Hatibari Shear Zone; D_{4BC} also operated within the amphibolite facies regime, but at lower P-T conditions (6±0.7 kbar, 632±60°C). Finally, a WNW-ESE trending, greenschist facies, dextral sense shearing event (D_{5BC}) transposed all earlier fabrics in the northern part of the BCU. In the EGMB unit, granulite facies metamorphism (>11 kbar, 880°C) and partial melting was synchronous with and outlasted the first two events of deformation (D_{1EG} and D_{2EG}) in khondalites, mafic granulites and QFG. Following D_{2EG}, the EGMB unit was exhumed, permitting deposition of sediments that were subsequently metamorphosed to a muscovite-bearing metapelite-quartzite association. Later, this unit experienced amphibolite facies metamorphism during D_{3EG} deformation associated with sinistral shearing along the Hatibari Shear Zone; D_{3EG} is therefore correlated with D_{4BC}. Post-D_{2EG}, pre-D_{3EG} granitic intrusions are unique to the EGMB unit. The coexistence of muscovite + quartz in these later metapelites and quartzites of the EGMB indicate that the grade of metamorphism during D_{3EG} deformation did not exceed middle amphibolite facies conditions (6.2±0.7 kbar, 632±50°C). AMS studies on the Hatibari Shear Zone suggest that sinistral shearing was accompanied by flattening deformation, and so this terrane boundary is interpreted to be transpressional in nature. The QFG in the Rengali Province underwent an initial fabric forming (S_{1RP}) deformation event (D_{1RP}), followed by open to tight folding (F_{2RP}), and finally, shearing (D_{3RP}) along WNW-ESE trending, steeply southwesterly dipping shear planes (S_{3RP}) with a greenschist facies mineralogy.

Precursors to the mafic schists intruded following D_{1RP}, they were foliated during D_{2RP} and were folded and sheared during the D_{3RP} event. The Rengali Province therefore differs lithologically, structurally and metamorphically from the EGMB to its south. D_{5BC} in the BCU is correlatable with D_{3RP} in the Rengali Province; thus, amalgamation of the BCU with the EGMB during D_{4BC}/D_{3EG} along the Hatibari Shear Zone pre-dates juxtaposition of these two units with the Rengali Province. The swing in the collisional interface is therefore a post-collisional event.

Keywords: *Bastar Craton; Rengali Province; Hatibari Shear Zone; EGMB*; *transpression; tri-junction.*