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High-pressure granulite facies metamorphism of Archean Bastar craton at the interface of Eastern Ghats Belt: Implications for cratonic subduction/underthrusting

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The Bastar Craton at the interface of Eastern Ghats Belt (EGB) contains a mélange of rocks from both the Archean cratonic domain and the adjacent Proterozoic mobile belt domain marking a broad shear zone, known as the Terrane Boundary Shear Zone (TBSZ). The TBSZ preserves a very rare occurrence of high-grade metamorphosed Archean cratonic rocks, whose ancestry has been constrained by Nd model ages. This study presents the petrological and geochemical characterization of mafic granulites and orthopyroxene bearing granitoids from the shear zone and its implications on the tectonic evolution of the craton – mobile belt boundary. Detailed petrographic, geothermobarometric and P-T pseudosection studies indicate that the Bastar cratonic rocks underwent high-pressure granulite facies metamorphism along a clockwise P-T path, reaching ~900°C and 9-10 kbar. The originally amphibolite facies rocks, metamorphosed through dehydration-melting of hornblende (mafic rocks) and biotite (felsic rocks), to attain the peak P-T conditions. We suggest that this high-grade metamorphism was due to the subduction/underthrusting of the Bastar Craton beneath the EGB, supported by the available seismic data, which resulted from far-field stress related to the Kuunga orogeny in an intraplate setting.