Paleoproterozoic Continental Intraplate Mafic Magmatism and its Contemporaneous Global Links: Evidence from the Southern Part of the Bastar Craton, Central India

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1. INTRODUCTION

* Continental intraplate mafic magmatism: crucial lithospheric processes
* Mantle melting, continental fragmentation
*Intracratonic sedimentary basin
*Crustal growth distal from plate boundary

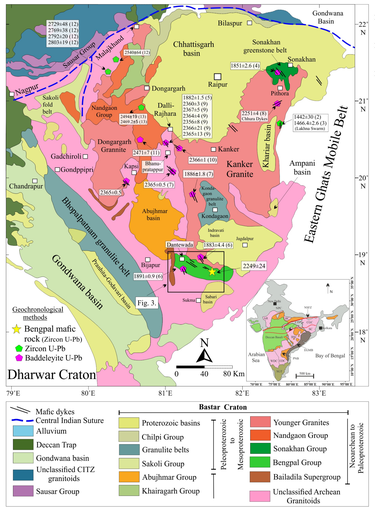


Fig. 1: Geological map of the Bastar Craton (after Ramakrishnan and Vaidyanadhan, 2010)

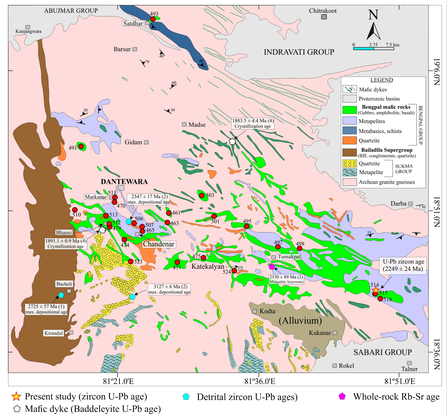


Fig. 2: Geological map of the southern part of the Bastar Craton (after District Resource Map of Dantewada, GSI)

2. OBJECTIVES

* Petrogenesis of the Bengpal mafic rocks
* Processes of crustal growth distal from the plate boundary
* To deciper its global correaltion and tectonic setting

3. FIELD OBSERCATIONS AND PETROGRAPHY

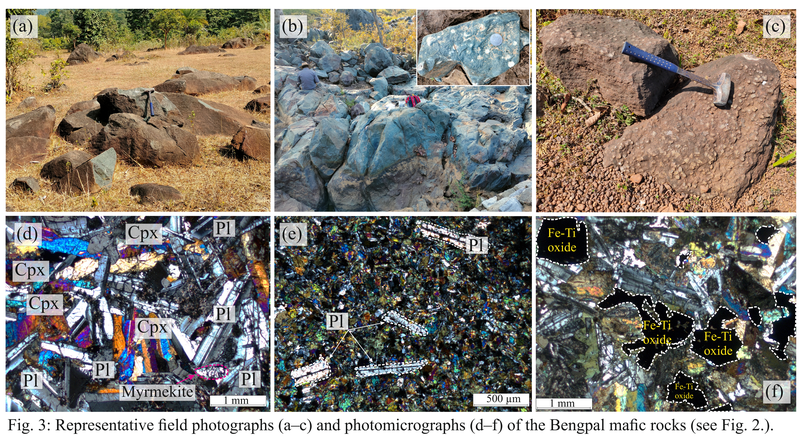


Fig. 3: Representative field photographs (a–c) and photomicrographs (d–f) of the Bengpal mafic rocks (see Fig. 2.).

4. GEOCHEMICAL RESULTS

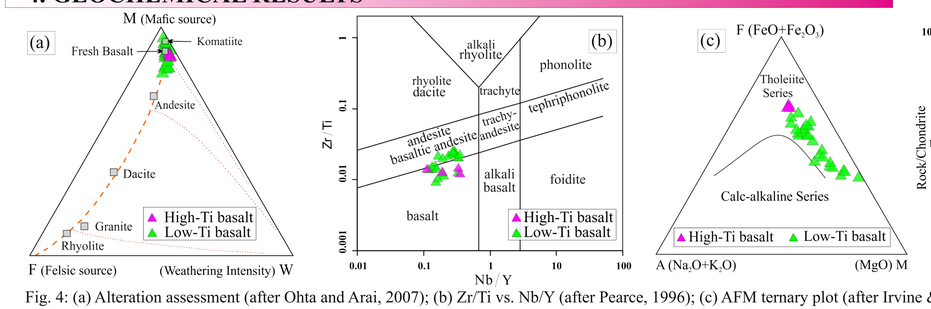


Fig. 4: (a) Alteration assessment (after Ohta and Arai, 2007); (b) Zr/Ti vs. Nb/Y (after Pearce, 1996); (c) AFM ternary plot (after Irvine & Baragar, 1971); (d) Chondrite normalized (Boynton, 1984) REEs plot , and (e) primitive mantle (Sun & McDonough, 1989) normalized multi-elementals (spider diagram) plots for the Bengpal mafic rocks, southern part of the Bastar Craton.

5. DISCUSSION

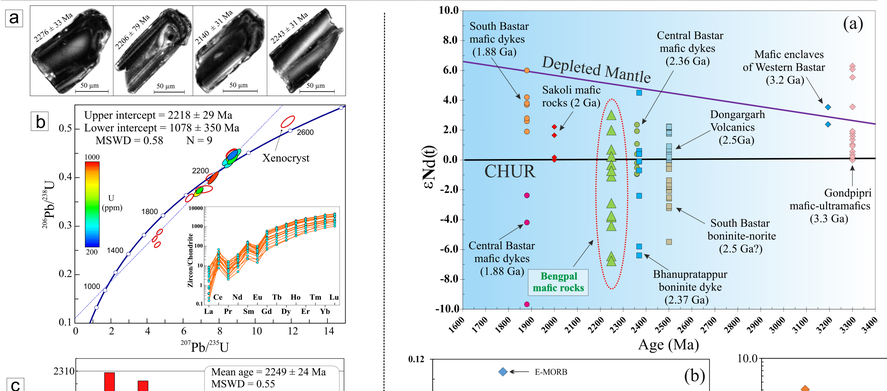
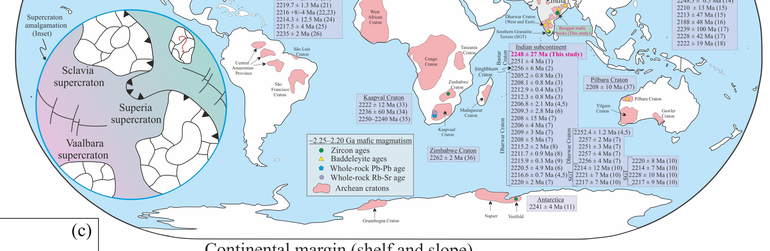


Fig. 5: (a) Representative Cathodoluminescence (CL) images of zircons, (b) concordia diagram, and (c) mean age calculation from mafic rock (CM514) of the Bengpal Group, southern part of the Bastar Craton.

Fig. 6: Mantle source identification (a) εNd(t) versus age diagram, (b) Ce/Y vs. Nb/Zr plot, and (c) Nd/Sm vs. Ce/Pb plots.

Fig. 7: **Global distribution of ~2.25–2.20 Ga mafic magmatism**; inset shows the probable early Paleoproterozoic supercraton configuration (after Bedle et al., 2021; Bleeker, 2003).



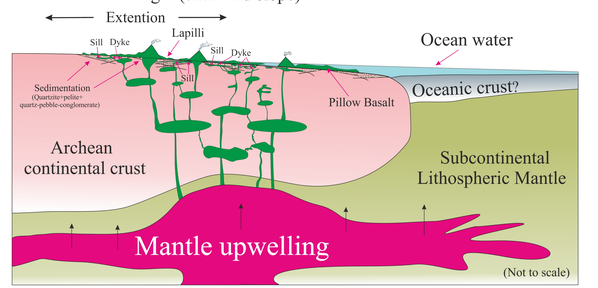


Fig. 8: Conceptual cartoon showing the probable tectonic setting for the early Paleoproterozoic (~2.25 Ga) continental intraplate mafic magmatism in the southern part of the Bastar Craton.

6. CONCLUSIONS

* Tholeiitic basalt to basaltic andesite (high- and low-Ti) volcanic rocks
* ~2.25 Ga (early Paleoproterozoic) mafic rocks are derived from depleted shallow spinel-lherzolite mantle followed by crustal contamination
*Stable continental margin setting and probably linked with ~2.25 Ga global mafic magmatism

Acknowledgement

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