Evolution of Paleo-Mesoarchean Granite-Greenstone and Neoarchean-Paleoproterozoic Stratigraphy of the Dhajhori Basin, Singhbhum Craton, Eastern India.

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The Singhbhum Craton, in eastern India, is composed primarily of the Singhbhum Granite batholith (SBG) and narrow greenstone belts associated with Banded Iron Formations called the Iron Ore Group (IOG). Volcanic rocks in IOG can be geochemically subdivided into three groups [1]. Ultramafic-mafic cumulates in greenstone contain bedded chromitites and PGE mineralization in a breccia unit intruded by gabbro [2]. The SBG was emplaced during two distinct phases: from 3440 to 3330 Ma (older phase: SBG-A) and from 3200 to 3050 Ma (younger phase: SBG-B). The SBG contains enclaves of metasedimentary rocks (called the Older Metamorphic Group or OMG) and TTG gneisses (called the Older Metamorphic Tonalite Gneiss or OMTG). Acid volcanics from the southern IOG belt have been dated at 3507 ± 2.3 Ma zircon age by SHRIMP [3], which is older than the two SBG phases, as well as, the major and younger component of the OMTG. Therefore, OMG enclaves, considered as the oldest supracrustal rocks in the region might be derived from IOG rocks [4]. The OMTG and SBG-A are petrographically and geochemically similar but OMTG is known to contain components as old as $3660 \pm$ 79 Ma.

The Singhbhum Granite massif is flanked to the north by the Neoarchean-Mesoproterozoic volcani-sedimentary fold belt, whereas the Singhbhum Shear Zone (SSZ) flanks the northern margin of the craton and the Dhanjori basin having more volcanic components. A quartz-pebble conglomerate (QPC) and volcani-clastics bearing unit at the base of the Dhanjori basin and intruded by the Mayurbhanj Granite, has been named Phuljhari Formation. The Dhanjori sequence with quartzitepolymictic conglomerate at its base, unconformably overlies the Phuljhari Formation and the Mayurbhanj Granite. The Dhanjori Group is broadly 2.6-2.1 Ga in age. Detrital zircons from the Phuljhari Formation QPC have yielded oldest chemical ages of 3.09-3.04 Ga thus fixing the upper age limit of the formation. The 3.09 Ga old zircons reported from the Mayurbhanj Granite, which is intrusive into the Phuljhari Fm., therefore appears to be xenocrystic in nature [5]. A fine grained variety of the Mayubhanj Granite, close to its intrusive contact with the Phuljhari Fm., has recorded strong impress of acid magmatic event around 1.0-0.8 Ga reflected by lower intercept U-Pb zircon ages. The upper intercept age of ~2.8 Ga might record the inherited age of protolith to the Mayurbhanj Granite and correspond to widespread granite magmatic activity affecting the margin of the Singhbhum Craton. 2.2-2.07 Ga old Soda Granite was emplaced along the Singhbhum Shear zone, which was also associated with Cu and U mineralization and affected by 1.0-0.08 Ga old thermal perturbation.

Detrital Au-U bearing QPC in the Phuljhari Formation represent Neoarchean sedimentation at the margin of the peneplained craton. The Dhanjhori Group comprising mafic-ultramafic volcanics and siliciclastics was hosted in rift induced intracratnic basin around Neoarchean–Palaeoproterozoic threshold.

Keywords: Archaean-Proterozoic crustal evolution, Geochronology, Singhbhum Craton, Neoarchaen QPC, Singhbhum Granite, Mayurbhanj Granite, Eastern India.

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