A note on uranium mineralization in the Neoproterozoic calcitic phosphorite from Ramtirth, Bhima basin, Gulbarga district, Karnataka

Bhima basin, a Neoproterozoic Purana basin, with an area of 5000 sq km, mostly in northern Karnataka, gains importance in view of uranium potentiality, due to the discovery of significant radioactive zones at Ukinal and Gogi along the Gogi–Kurlagere fault, on the southern margin of Bhima basin[1].

This note presents the first account of uranium mineralization at Ramtirth (N16°58'30" lat.: E77°11'00" long.) in brecciated calcitic phosphorite along the Wadi–Ramtirth fault. Ramtirth is located 30 km northeast of Yadgir in Gulbarga district, Karnataka and is approachable by a jeepable road from Yadgir. Stratigraphically, the mineralization is confined to the Lower Bhima Group of sediments.

The sediments of the Bhima basin overlie the early Precambrian granite–greenstone terrain of the Eastern Dharwar Craton in the south and underlie the late Cretaceous–Paleocene Deccan basalts in the north. They are composed mainly of limestone, shale and conglomerate[2].

The Ramtirth area occupies the southern margin of the Bhima basin (Figure 1). Near Ramtirth, limestone of Lower Bhima Group (Shahabad Formation), underlain by ferruginous/calcareous shales is disrupted and brecciated along the faulted contact. The trend of the host rock is N140° to N165°, dipping 35° to 45° due east (Figure 1).

Uranium mineralization occurs in the calcitic phosphorite intimately associated with the brecciated limestone along the faulted contact. Due to faulting, the host rock is crushed and occurs as scree on the hill slope. The mineralization is traced intermittently over a strike length of 250 m and width of 10 m. The host rock is very fine grained and contains mainly collophane (with some admixed quartz as impurity) and lesser micrite (calcite) and chert with intermittent bands rich in ore minerals. The ore minerals are mainly of limonite (spread as tiny rounded grains), anatase as small patches, and pyrolusite. Solid state nuclear track detection (SSNTD), transmitted and reflected light microscopic studies of the mineralized rock have demonstrated that the main source of uranium (in adsorbed form) is collophane, with minor contribution from that associated with limonite and chlorite. Chemical analysis of the mineralized rock ($n = 11$) is as follows: CaO: 28.94 – 40.28 wt.% ($\bar{x} = 35.74$, $\sigma_n = 5.35$); SiO_2: 14.98 – 30.81 wt.% ($\bar{x} = 22.24$, $\sigma_n = 5.63$); Al_2O_3: 2.91 – 6.39 wt.% ($\bar{x} = 3.59$, $\sigma_n = 1.49$) and P_2O_5: 18.44 – 28.73 wt.% ($\bar{x} = 23.98$,

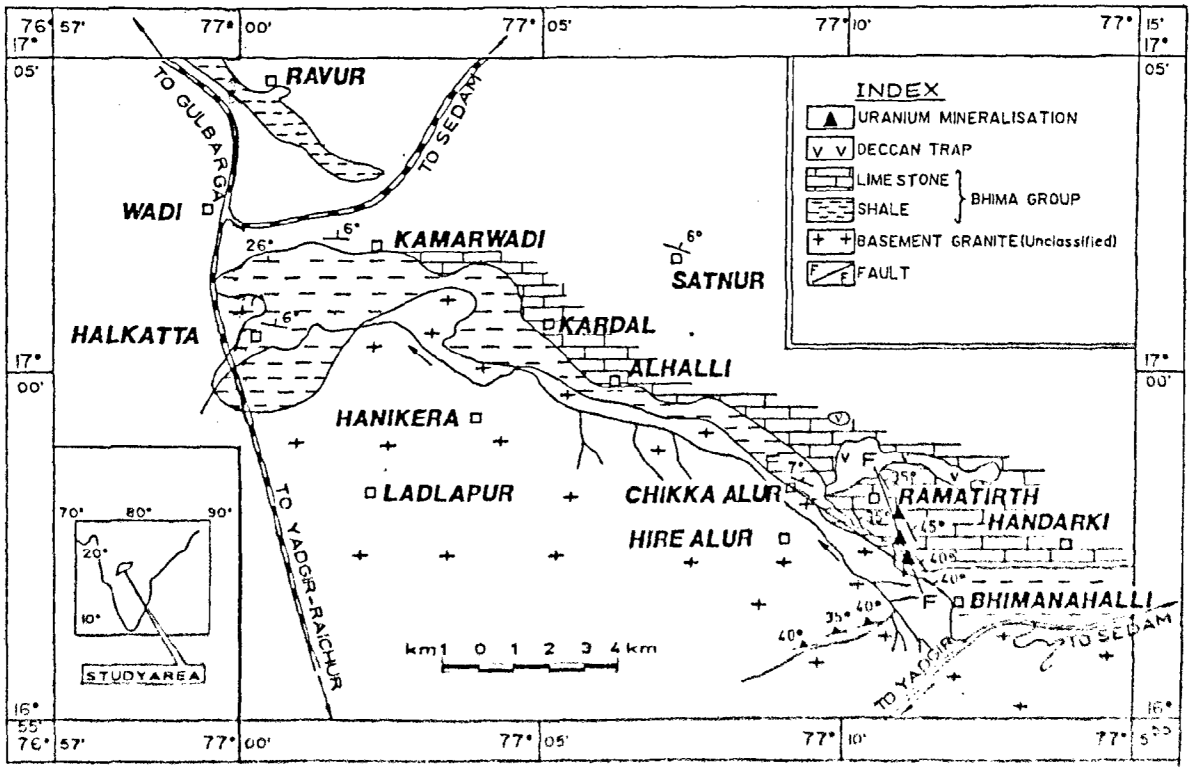

Figure 1. Geological map of Ramtirth area, Gulbarga district, Karnataka

$\sigma_n = 3.081$. Its uranium content 0.007 to 0.0867 ($\bar{x} = 0.03$, $\sigma_n = 0.029$) has positive correlation ($r = +0.3652$) with P_2O_5.

Based on the field and petromineragraphic aspects given above, the uranium mineralization is both lithologically and structurally controlled. In the light of this discovery and the earlier reported uranium mineralization at Ukinal and Gogi, the Bhima basin, especially the faulted and unconformity contact between the fertile basement granite and its overlying limestone, warrants detailed radiometric checking.

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2. Kale, V. and Peshwa, V. V., Field Guide Special Publication, Geological Society of India, Bangalore, 1995.

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