

Mesoproterozoic Age of the Vindhyan Sediments, Central India from Glauconite Rb-Sr Systematics

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The basic issue raised by the two simultaneous and sensational reports in 1998 (Seilacher et al., 1998; Azmi, 1998) of essentially similar fossil evidence (worm tracks and small shelly fauna, respectively) of multicellular life in two Lower Vindhyan formations is the following. Were the two temporally adjacent formations (Chorhat and Rohtasgarh) laid before 1.1 Ga ago as believed so far or only in the Early Cambrian? The authenticity of either fossil is now suspect (Kerr, 1998, 1999). But the basic issue has become even more contentious, as a recently determined plateau Ar-Ar age of 617 Ma (quoted by Kerr, 1999) for a porcellanite rock below the above formations has been interpreted as its depositional age. Besides being grossly inconsistent with the 1.1 Ga Rb-Sr age of kimberlite intrusions elsewhere in this formation, this age will imply an absence of any sedimentary record for nearly 2.0 Ga over the 2.5 Ga old basement granite.

Vindhyan rocks should therefore be dated reliably to not only resolve the above discrepancies but also understand the biostratigraphic significance of many other megafossils reported from them (Venkatachala et al., 1996), reassess their hydrocarbon potential and correlate them with other major sedimentary basins in India. We have taken up Rb-Sr and Ar-Ar dating of glauconites and Pb-Pb dating of carbonates to at least set a firm minimum age of the earliest Vindhyan sedimentation. Given below are our preliminary Rb-Sr results on glauconites from Chitrakut area in Central India.

10-30 m thick Lower Vindhyan (Semri Group) deposits directly overlie 2.5 Ga old Bundelkhand granite near Chitrakut and are comprised of breccia, pellet limestone, stromatolitic limestone, shale and glauconitic sandstone (Singh et al., 1978). Published FT ages of glauconites from the last member vary from 1250 to 1000 Ma. Five mature ($K_2O > 7\%$), acid leached glauconite samples from the above set have highly radiogenic strontium and yield precise model ages between 1535 and 1410 Ma that are consistent with their stratigraphic position. Even these early results place the earliest Vindhyan sedimentation not later than 1500 Ma contradicting the very recent paleontological (Azmi, 1998) and geochronological (Kerr, 1999) evidences for an Early Cambrian initiation. They also indicate that the extensive (104,000 sq. km), voluminous (4000 m deep), unmetamorphosed and undeformed Vindhyan sediments could indeed hold fossil record of metazoan evolution, if any, well before the Cambrian Explosion.

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