F-T AGES OF VINDHYAN GLAUCONITIC SANDSTONE BEDS
EXPOSED AROUND RAWATBHATA AREA, RAJASTHAN

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Introduction

The geology of western part of Vindhyan Basin in eastern Rajasthan has been described by Heron (1917, 1932, 1936) and Coulson (1927). Recently Prasad (1965, 1973, 1975) has worked out in detail the geology of the western part of the Vindhyan Basin in Rajasthan and Prasad (1984) classified the whole of Vindhyan Supergroup in Rajasthan into seven groups, viz., Satola, Sand, Lasrawan and Khorip Groups belonging to erstwhile Lower Vindhyan or Semri series and Kaimur, Rewa and Bhandar Groups belonging to Upper Vindhyan. This note presents F-T dating of the upper Vindhyan glauconitic sandstone beds exposed at Shreepura, Kolipura, Jawarkala and Jagpura localities around Rawatbhata area, Rajasthan. This unit is denoted as Govindgarh (Upper Rewa) Sandstone in the detailed geological map given by Prasad (1984). At all localities this sandstone bed overlies the green shale unit mentioned by Prasad (1984) as Jhiri shale. The sandstone is arkosic and conglomeratic consisting of pebbles of quartz, jasper, feldspar and iron-oxide.

Locality Description

i) Shreepura (24°58'18"; 75°28'57") is a village 17 km from Rawatbhata towards Singoli. On the main road there is a bridge over the bifurcation of Banmi river, underwhich this section is exposed along the river-banks. Here a thin layer (~1 cm) of Govindgarh Sandstone is seen over green Jhiri Shale. This sandstone bed, which is rich in glauconite has been collected for F-T dating.

ii) Kolipura (24°57'30"; 75°39'45") : This small hillock (~30 m in height) is 15 km northeast of Rawatbhata on the road towards Kota. The nearby village is called as Kolipura. Here, green Jhiri shale is overlain by thick bed (~10m) of Govindgarh Sandstone. The glauconite-bearing topmost part of this sandstone bed has been collected for F-T dating.

iii) Jawar Kala (24°58'12"; 75°39'18") : The samples for F-T dating have been collected from the glauconite-rich sandstone bed capping the small hillock (~20 m in height). The nearby village, named as Jawarkala, is 10 km northeast of Rawatbhata on the road towards Kota.

iv) Jagpura (24°59'24"; 75°33'24") : This locality is 5 km north of Bhainsrorgarh on an unmetalled road which is close to Chambal river bridge. In this hillock (~100 m in height) Govindgarh sandstone overlies Jhiri Shale. The glauconite-bearing sandstone bed from which a sample was collected for F-T dating is very thin (~1 cm) and is deposited at the contact of shale and sandstone.

Following the methodology described by Srivastava et al. (1983), glauconitic grains have been separated from the samples. After mounting, grinding and
polishing, these grains were etched in a mixture of $1\text{H}_2\text{SO}_4 (98\%) : 2\text{HF} (48\%) : 4\text{H}_2\text{O}$ at room temperature for 35 min. After obtaining the fossil and induced track densities (grains irradiated at CIRUS-reactor BARC, Bombay), the F-T age is calculated as described by Srivastava and Rajagopalan (1985, 1986). The results are given in Table I. These F-T ages have not been corrected for annealing as the separated glauconitic grains do not show the effects of thermal event such as colour change, friability, increase in optimum etching time and decrease in track-length (Srivastava, 1987).

**Table I.** F-T age of glauconitic sandstone deposits around Rawatbhata area, Rajasthan.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Description</th>
<th>Fossil Track Density $\rho_s$ (t/cm²)</th>
<th>Total Track Density $\rho_t$ (t/cm²)</th>
<th>Induced Track Density $\rho_i$ (t/cm²)</th>
<th>Age (Ma)</th>
<th>Err (1σ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSFT 199/SR-G</td>
<td>Shreepura, River section, bifurcation of Bamni river, 17 km from Rawatbhata towards Singoli</td>
<td>2.03E+03 (109,2143.2)*</td>
<td>8.49E+03 (136,641,2)</td>
<td>6.45E+03</td>
<td>710</td>
<td>120</td>
</tr>
<tr>
<td>BSFT 200/KG</td>
<td>Kolipura, 15 km NE of Rawatbhata on the road towards Kota</td>
<td>1.97E+03 (101,2054.2)</td>
<td>8.29E+03 (127,613,2)</td>
<td>6.32E+03</td>
<td>700</td>
<td>120</td>
</tr>
<tr>
<td>BSFT 201/JG</td>
<td>Jawarkala, 10 km NE of Rawatbhata on the road towards Kota</td>
<td>1.95E+03 (97,1991,2)</td>
<td>8.31E+03 (118,568,2)</td>
<td>6.36E+03</td>
<td>690</td>
<td>125</td>
</tr>
<tr>
<td>BSFT 202/JP-G</td>
<td>Jagpura, 5 km north of Bhainsor-garh</td>
<td>2.02E+03 (112,2215,2)</td>
<td>8.81E+03 (145,658,2)</td>
<td>6.79E+03</td>
<td>675</td>
<td>110</td>
</tr>
</tbody>
</table>

* The bracket shows number of tracks, graticules and thin-sections respectively
One araldite mount contains 40-90 glauconite grains
Area of one graticule = 2500 µm² (1000 x magnification, Olympus BH-2 microscope)
Thermal neutron fluence ($\phi$) = 3.965E+16 n/cm².

The F-T age of 700 Ma for Govindgarh (Upper Rewa) sandstone supports the lithostratigraphic division suggested by Prasad (1984). The F-T age value is in good agreement for Rewa Group, considering the fact that the K-Ar age for Upper Kaimur sandstone is 900 Ma (Vinogradov et al. 1964). The glauconite sample dated by Vinogradov et al. (1964) was from Rana Pratap Sagar dam foundation, Rawatbhata area. But now this location is inaccessible after the construction of the dam. We are planning to collect glauconite samples from Chittorgarh area, south-west Rajasthan, after which it will be possible to determine the extent of Vindhyan sedimentation in the Western part of India.

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**References**


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COMMENT

Estimates of palaeodiameters of the Earth through geological times.


Ahmad’s attempt to estimate palaeodiameter of the earth seems untenable as it raises serious geological, geophysical and astronomical anomalies, which need to be satisfactorily explained.

Changes in the intensity of the geomagnetic field are not recorded. Geomagnetic field of about the present intensity has existed for the last 3.0 b.y. This is in favour of the hypothesis that the size of the earth’s core and consequently the earth’s radius did not change significantly during the same period. Wegener had suggested that ‘all the continents were assembled as a single mass (Pangaea) at the beginning of the Mesozoic’ thereby implying indirectly that in the earlier geologic periods, the continents were separated.

Opening and closing of the Atlantic ocean, has been explained to account for Cambrian- Silurian orogenies on either of its coasts. Though pre-Cambrian drift is less well documented, it appears that the separation and fusion of continent-size blocks has been repeated more than once (McElhinny and Briden, 1971; Spall, 1972). The formation of Pangaea, in other words, also suggests closing and opening of basins, without affecting the variations in the size of the earth.