SHORT COMMUNICATIONS

NOTE ON THE FIRST REPORT OF QUATERNARY SEDIMENTATION AND ITS SIGNIFICANCE IN WEST JAHAJPUR BASIN, BHILWARA DISTRICT, RAJASTHAN

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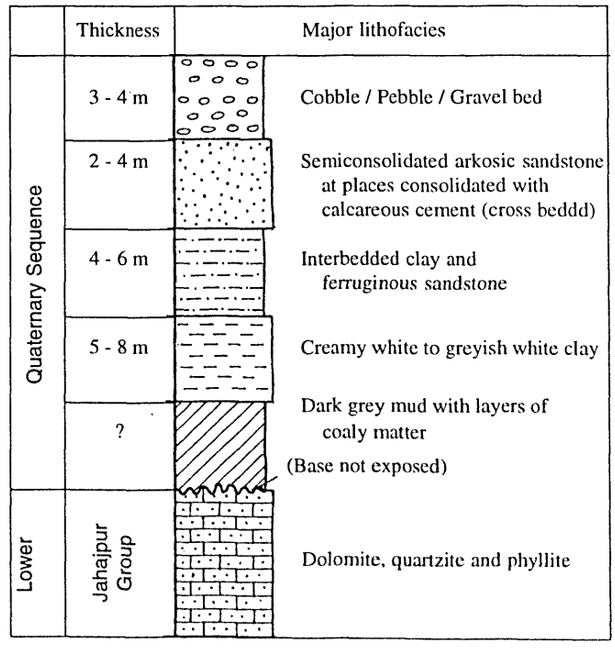
Abstract: Quaternary sequences of mud/silt with carbonaceous matter and coaly layers, sandstone and conglomerate is found in the structural depressions near Jahajpur basin in Rajasthan. Uranium is also found in these sediments which may have been derived from the basement of Berach Granite and phyllites of Jahajpur Group.

West Jahajpur basin encompasses an area of about 300 sq. km in Bhilwara District. The metasedimentary sequence of this basin has been equated with the Palaeoproterozoic Aravalli Supergroup and is bounded by basement rocks of Hindoli Group in the east and Magalwar Complex in the west (Sinha-Roy, 1984). The Jahajpur Group mainly consisting of quartzites, dolomites and phyllites has undergone polyphase deformation during the compressional tectonic regime dated around 1.5 Ga (Sinha-Roy, 1998). NE-SW trending tectonic troughs/lakes, formed at suitable geomorphic locations, controlled by axial zones of F_2 folds of the Jahajpur Group and choking/disorganization of Banas river channels during Neogene tectonic movements (Sinha-Roy et al. 1998), provided locales for Quaternary sedimentation in Jahajpur basin. Two such troughs forming linear alluvial valleys have been identified by the present authors in west Jahajpur basin (Fig.1).

Lithologically, the Quaternary sequence consists of dark grey mud/silt rich in carbonised plant matter with galls and layers of brown coal, creamy white to greyish white clay, partly compact sandstones and unsorted cobble-pebble bed in chronological order (Table 1). Bottom mud/silts are greenish black, fine grained and appear to have been deposited in inland lakes/estuaries or poorly watered swamps under quiet water conditions. Organic matter and coaly layers associated with these muds indicate their deposition under reducing conditions and were probably formed by accumulation of plant remains in inland lakes/swamps. Creamy white/greyish white clays are characterized by their fine grained nature and paper-thin laminations indicating quiet water sedimentation, whereas sandstones are characterized by scour and fill cross bedding structures indicative of rough water environment. The upper weakly cemented cobble-pebble bed consisting of mainly quartzite cobbles/pebbles is indicative of a piedmont zone containing alluvial fans.

These Quaternary sediment-filled outliers occupy low-lying areas underlying the modern alluvium. Sometimes, the pebble beds, pebbly gravel or unconsolidated sands form low flat mounds bordering the slopes of hills. The coarse detritus restricts itself to the peripheral parts of the valley, while the finer variety prevails towards the central parts. It is difficult to estimate the exact thickness and extent of these sediments due to thick cover of alluvium and uneven

Table 1. Synoptic view of Quaternary lithostratigraphic succession of west Jahajpur basin, Bhilwara District, Rajasthan (*after* Yadav and Babu, 2001; Succession based on the depth section exposed in quarries located in Fig.1)



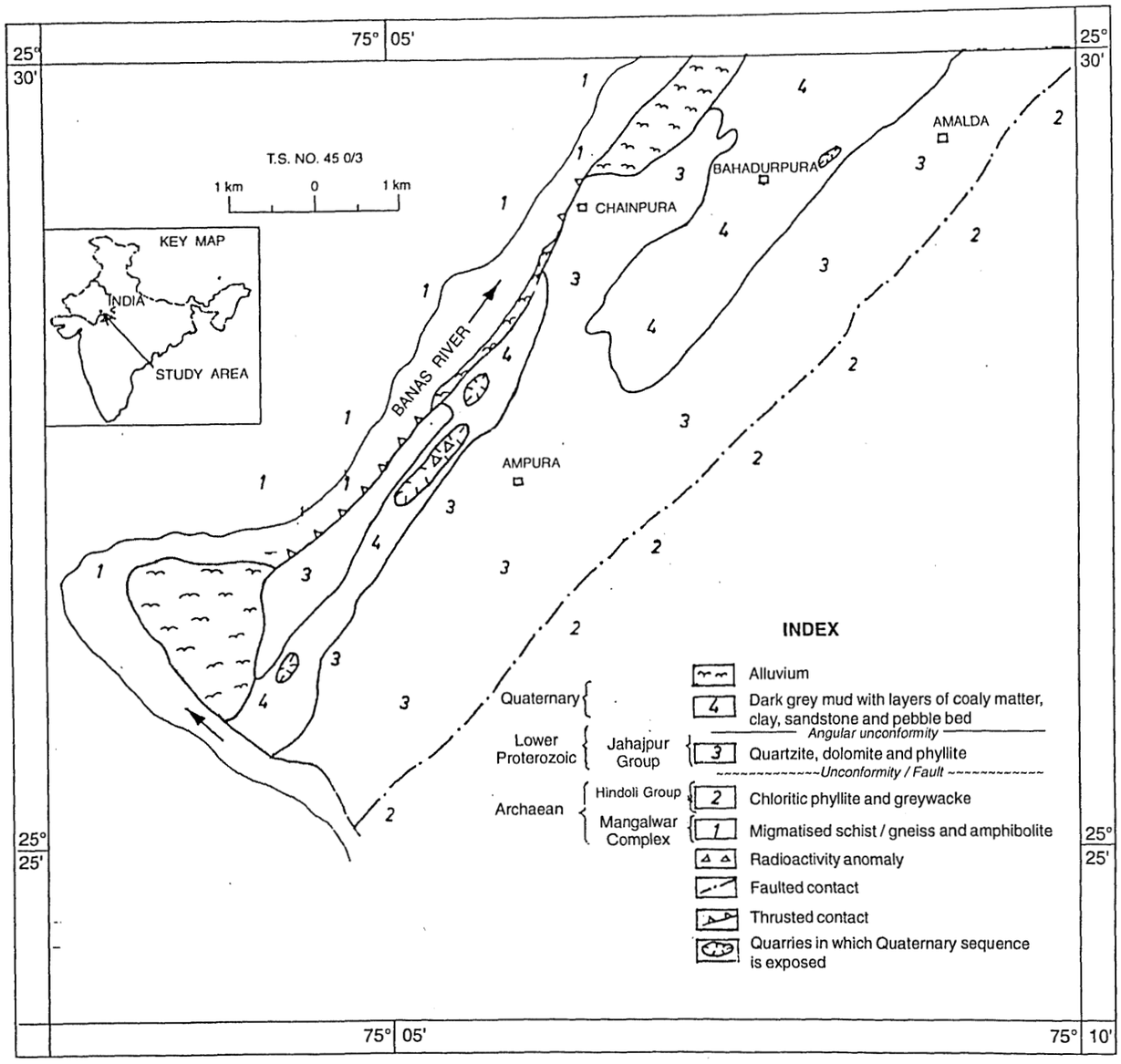


Fig.1. Sketch geological map of the part of west Jahajpur basin, Bhilwara District, Rajasthan.

topography of the basement rocks. The arkosic/kaolinised nature of sandstone and kaolin-rich clays suggest their derivation from granitic/gneissic country occurring in the vicinity. Dark mud might have been derived from the carbonaceous/basic volcanics/tuffaceous sediments of the Jahajpur basin. Debris of several kinds of aquatic vegetation, grasses, sedges and rushes might have been converted into low-grade coal in swampy grounds of the valleys.

The Quaternary sediments are horizontally stratified, with a sag towards the valley. Only when they abut against the slopes of Jahajpur rocks, they show dips of 5° to 27° near the hills, indicating that they have shared the later upheaval of Jahajpur Group. The sedimentation appears to have taken place in fault-bounded troughs, indicated by steep escarpments formed by Jahajpur metasediments, development of soapstone in dolomites and effects of silicification observed near the contact (Fig.2). Based on lithological and sedimentological characteristics of sediments, it can be envisaged that the sequence belongs to Quaternary era. However, characterization and dating of coaly matter is under way.

The Quaternary sub-basins occurring in the lower Proterozoic Jahajpur basin in Bhilwara District host the kaolin-rich clay deposits. Many more such tectonic troughs

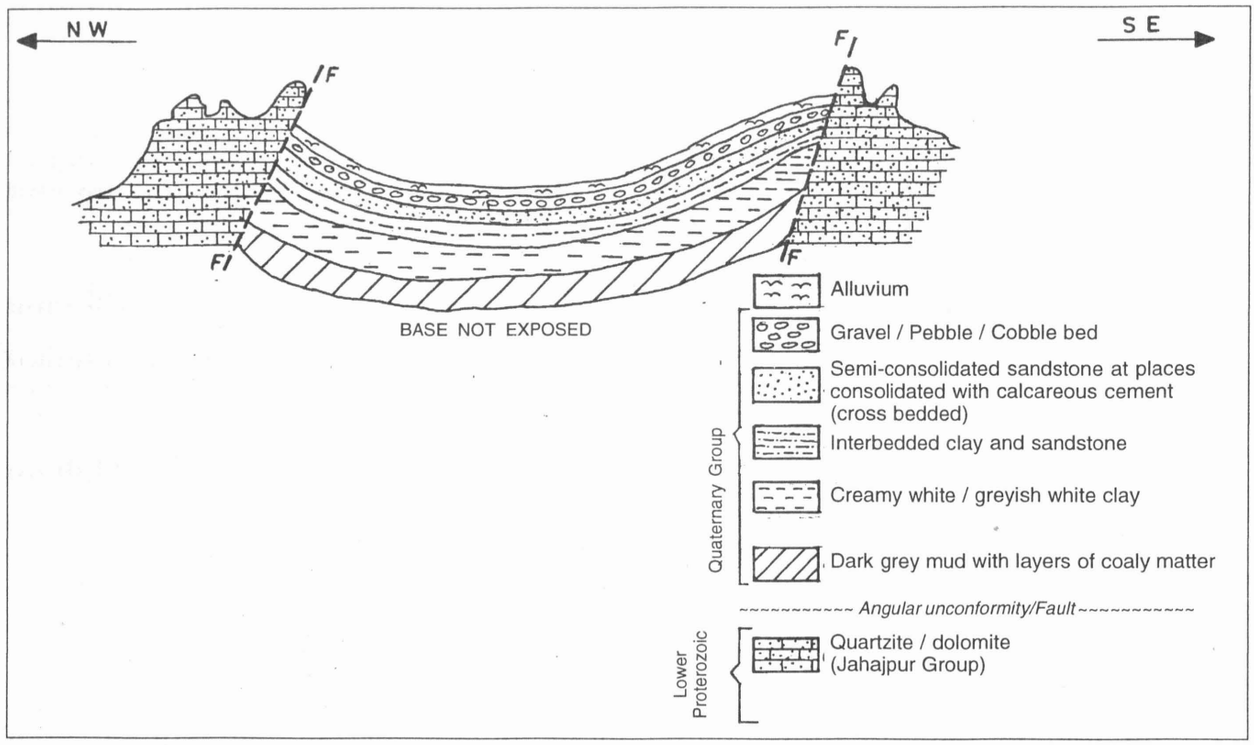


Fig.2. Schematic section showing disposition of Quaternary sediments in west Jahajpur basin. (not to scale).

Quaternary sedimentation in a tectonic trough of west Jahajpur basin

in the east and west Jahajpur basins presently manifested as linear alluvial valleys may be explored for clay deposits. Besides, radioactivity shows in the bottom dark grey mud with carbonized plant matter are also significant. This horizon is exposed in china clay quarries in Chainpura, at places extending laterally over 100 m x 50 m area but the exact thickness and extent could not be deciphered. Grab samples assayed 0.012 - 0.025% U_3O_8 with 0.001 - 0.003% ThO_2. From the geological setting of the regions, it can be envisaged that the Berach granites/gneisses which contain an average of 10 ppm U (n = 8) and carbon phyllites of Jahajpur Group with an average of 21 ppm U (n = 5), provided uranium to stream waters which got adsorbed onto the dark grey mud with carbonized plant matter. As the U-source rocks in the contiguous area and adsorbents in the basin were both extremely favourable, sedimentary facies control of U-mineralisation can be expected at depth. Epigenetic changes may also be expected during Neogene tectonic movements at the interface of Phanerozoic unconformity.

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