

RESEARCH NOTE

UPPER PLEISTOCENE SEDIMENTS FROM TALE VALLEY, LOWER SUBANSIRI DISTRICT, ARUNACHAL PRADESH

Abstract : Tale valley is a NE-SW oriented oval shaped basin situated between altitudes 2278 and 2870 m above MSL in Lower Subansiri District of Arunachal Pradesh. Upper Quaternary sediments measuring about 11.85 m unconformably rest over the crystallines in the valley sides of Karing *nala*, the main tributary in the valley. Radiocarbon dating (^{14}C) of peaty clay in the lower part of the sequence provides 25400 ± 750 yrs. B.P. for the sediments, equivalent to Upper Pleistocene age. Lithology suggests glacio-lacustrine and glacio-fluvial environment of deposition.

Keywords : Tale Valley, Upper Pleistocene, Karing Formation, Arunachal Pradesh

The Tale valley is a NE-SW oriented oval shaped basin between 2278 and 2870 m altitudes, carved within the gneissic granites of Eastern Himalayas in Lower Subansiri District of Arunachal Pradesh (Fig.1). The valley is drained by a fifth order river, Karing *nala*, the valley side of which preserves about 11.85 m thick Upper Quaternary sediments. In this note the lithology and age of the sediment units are discussed.

The NE-SW oriented drainage basin has a catchment area of 46 km² out of which the alluvial sediments of the valley covers approximately 12 km². Karing *nala* which flows along the basin axis for most of the part takes a sudden southeasterly turn before debouching out through a narrow and restricted opening at the eastern part of the basin. The basin floor lies at the minimum altitude of 2278 m and the surrounding hills of the watershed lie at the maximum altitude of 2870 m above MSL (Vaz and Nair, 1980).

Gneissic granite with lenses of quartzite forms the dominant country rock of Tale Valley (Gaur *et al.*, 1978). The upper Quaternary sequence resting over the crystallines and overlain by a thin cover of recent alluvium is well exposed along the 'valley sides' of Karing *nala* in the eastern part of the valley (Fig.1). This sedimentary sequence exposed for about 11.85 m thickness is named Karing formation after the main stream Karing *nala* of Tale Valley. The stratigraphical sequence and the thickness of individual beds based on field measurements at the 'Valley-side section' are shown in Fig.2.

The Karing Formation has been deposited unconformably over the crystallines, the contact being represented by a 1.5 m thick polymictic conglomerate (Bed-I). The bed consists of sub-angular to sub-rounded pebbles of gneissic granite, quartzite and micaschist set in a sandy matrix. Bed-I is conformably overlain by 1 m thick, compact reddish brown sandy clay (Bed-II) containing a few sub-angular pebbles of schist and quartzite. Indistinct sandy laminations of the size of sand grains ranging from medium to fine are common in this unit.

The reddish brown sandy clay is conformably overlain by a 2.85 m thick dark brownish peaty clay (Bed-III), which contains fragments of carbonised wood of 1 cm size (approx.). Fine laminations (varves) of variegated light and dark brown colour measuring 3 to 5 mm thickness is characteristic feature of this bed. The 2 m thick brown to reddish fine grained ferruginous sand (Bed-IV) overlies the peaty clay bed separated by an erosional unconformity. The ferruginous sand bed occasionally contains 3 to 5 mm thick gray clay and

micaceous laminations. A micaceous gravelly sand of about 2 m thickness (Bed-V) unconformably lies over the ferruginous sand. The lower gravelly part fines upwards to micaceous sandy layers. Current bedding with horizontal primary bedding and a 20° SE dipping secondary bedding indicating SE current movement are characteristic of this unit. The overlying 1 m thick plastic clay (Bed-VI) is variegated gray to brownish in the upper

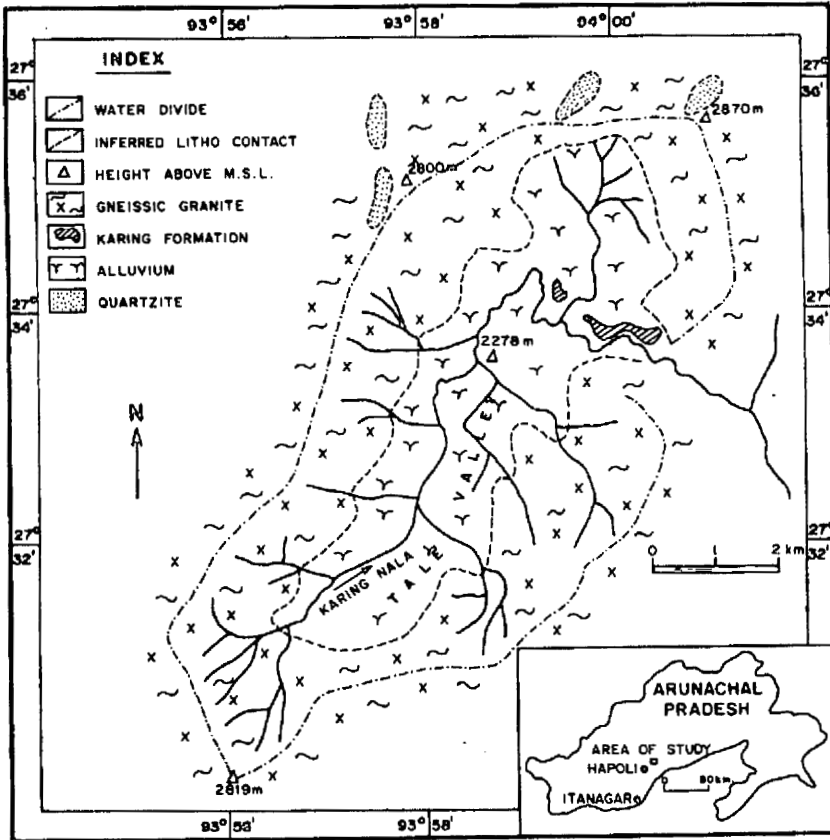


Fig.1. Geological Map of Tale Valley.

level. Micaceous medium grained sandy laminations and a few pebbles of quartzite and mica schist are also noted. The black carbonaceous clay (Bed-VII) of 1.5 m thickness forms the topmost unit of the Karing formation and contains streaks of peat and gray plastic clay. Unsorted clasts (3 to 5 mm) of quartzite and micaschist are other constituents. The recent alluvium with an approximate thickness of 1.7 m overlies the Karing formation in the 'valley-side' section shown in the map.

The disposition of the whole sequence is horizontal with rolling dip of 5 to 10°, whereas at the outlet zone of the *nala* it appears tilted towards SE.

The peaty clay (Bed-III) sample collected from Lat. 27° 33' 45" N and Long. 93° 59' 54" E was radiocarbon (^{14}C) dated in Birbal Sahn Institute of Palaeobotany, Lucknow (No.248, 1980). The age of the sample is 25400 ± 750 years B.P.

Facies analysis in a limited scale suggests 3 sedimentary cycles (Fig.2). Within the cycles the grain size invariably shows a general fining upwards. The first cycle consisting of Bed-I to III generally shows fining upward trend with varves at the upper level signifying glaciolacustrine environment. The subangular pebbles of the lower conglomerate (Bed-I)

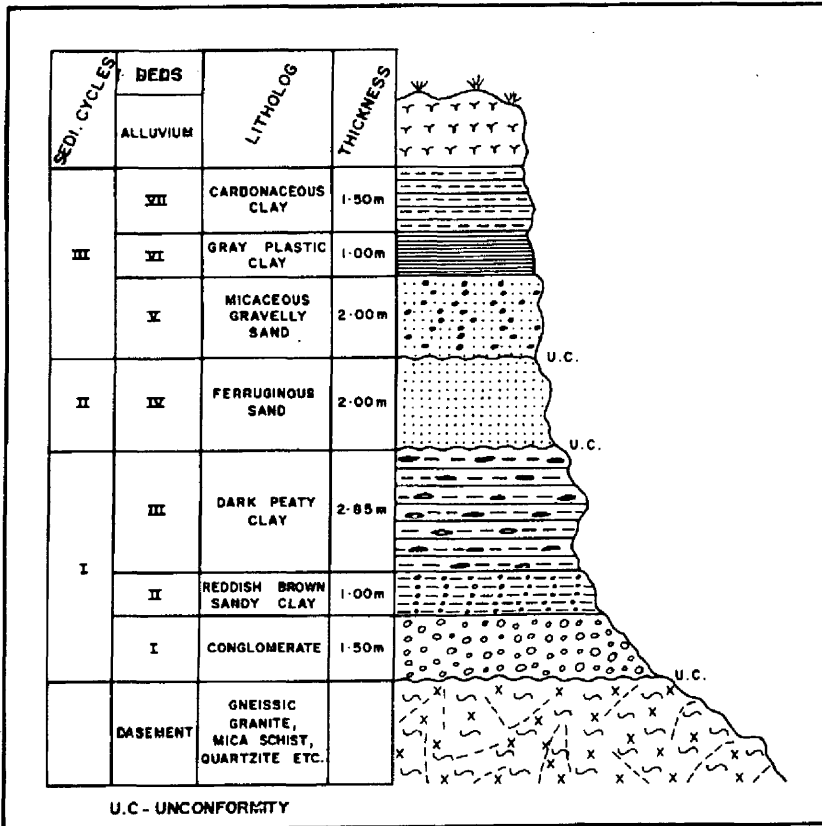


Fig.2. Stratigraphic succession of Karing Formation.

probably might have involved very short transportation, derived from the surrounding high ranges. The erosional unconformity following Bed-III indicates a break in sedimentation. The sandy texture in Bed-IV denotes a shallow basin and commencement of second cycle of sedimentation. Iron oxide tinting in the sandy horizon indicates subaerial exposure. Beds-V to VII represent the third cycle deposited under partial fluvial environment, evidenced by the presence of current bedding. The carbonaceous clay of Bed-VII was the last bed to be deposited before the basin outlet broke open due to structural adjustments leaving behind 11.85 m thick of Karing formation as valley-side deposits. The radiocarbon date of 25400 ± 750 years B.P. for the peaty clay (Bed-III) confirms its deposition during Upper Pleistocene time. It is surmised that Karing formation (Beds-I to VII) within the Tale valley commenced with glaciolacustrine environment and culminated with probable glacio-fluvial environment.

ACKNOWLEDGEMENT

The authors express their gratitude to the then Director, B.S.I.P., Lucknow for providing the radiocarbon date.

*East Coast Project-II,
Marine Wing, GSI, Visakhapatnam*

G.G. VAZ

*West Coast Project-I,
Marine Wing, GSI, Mangalore*

E.V. NAIR

References

- GAUR, R.K., SINGH, G., VAZ, G.G. (1978). Investigation of Graphite occurrences in the area around Bopi, Subansiri District, Arunachal Pradesh, Geol. Surv. India, Unpub. report for 1977-78.
- VAZ, G.G. and NAIR, E.V. (1980). Report on the Geology and Geomorphology of Tale Valley, Subansiri District, Arunachal Pradesh, Geol. Surv. India, Unpub. report for 1979-80.

(Received : 8 April, 1994; Revised form accepted : 18 October, 1994)