

## RESEARCH NOTE

### X-RAY DIFFRACTION STUDY ON THE CLAY MINERALOGY OF INFRA(LAMETAS)-/INTER-TRAPPEAN SEDIMENTS AND WEATHERED DECCAN BASALT FROM JABALPUR, M.P: IMPLICATION FOR THE AGE OF DECCAN VOLCANISM

**Abstract:** X-ray diffraction study on the infra-/inter-trappean sediments (Maastrichtian) and their associated degraded Deccan basalts from around Jabalpur, M.P, shows same clay mineral assemblages indicating the Deccan basalt as a major provenance of and hence pre-dating these sediments.

**Keywords:** Lametas, Deccan basalts, Clay mineralogy.

**Introduction:** The age and duration of the Deccan Volcanic activity are much debated, though recent views based on palaeomagnetic, geochronological and palaeontological data favour a shorter duration at KTB (Courtilot, *et al.*, 1986,1988; Duncan and Pyle, 1988; Courtilot, 1990; Alvaraz and Asaro, 1990). Sedimentary units associated with the flows viz. infra-/inter-trappeans may help in resolving this debate. Field observations around Jabalpur M.P. reveal that in the basal part of the volcano-sedimentary sequence at Lametaghat, infra-trappean strata pass into inter-trappean strata. Pockets of green detritus within the infra-trappeans at Amokhoh resemble degraded basaltic products.

In the present study detrital mineral assemblages of infra-/inter-trappean sediments and weathered basalts are compared to comment upon (a) contribution of Deccan Volcanics in the formation of these sediments and (b) the age of Deccan Volcanism.

**Methodology:** Clay fractions, separated after the procedure of Mackenzie (1960), from 21 samples (14 infra-/inter-trappean sediments and 7 associated weathered Deccan basaltic products) drawn from six localities viz. Tendukhera, Lametaghat, Chuihill, Barasimla, Amokhoh, and Silpuri around Jabalpur (23° 10' N. Lat.: 79° 11' E. Long), Madhya Pradesh were studied by powder X-ray diffraction using Philips PW 1130 instrument with  $\text{CuK}\alpha$  radiation and a scanning speed of 1°/minute.

**Results and Conclusion:** The clay mineral phases with more or less identical patterns, identified in the diffractograms of infra-/inter-trappean samples and their associated weathered Deccan basalt are dominant montmorillonite and minor chlorite and illite besides a little kaolinite in a few samples of the former (see Fig.1 for the XRD patterns of these representative samples - S8, S10 and 6). Chlorite from green sandstone (S10) and weathered basalt (6) has intense (002) and (004) reflections indicating it as an iron-rich type (Brown, 1961; Grim, 1968). The commonality of the clay minerals together with their identical X-ray diffraction patterns in both the infra-/inter-trappean sediments as well as their associated degraded Deccan basalt, thus, indicates the latter as a major provenance rock for the former and hence, predates the Lameta sediments of the Maastrichtian age (Courtilot, 1990). In contrast, Jabalpur clays of Upper Gondwana Formation are devoid of montmorillonite, chlorite and are rather characterised by predominant kaolinite (Patil and Lamba, 1989). Absence of green matrix in the higher Lameta level sediments closer to the contact, with flows above, rules out the downward movement of weathered volcanic products.

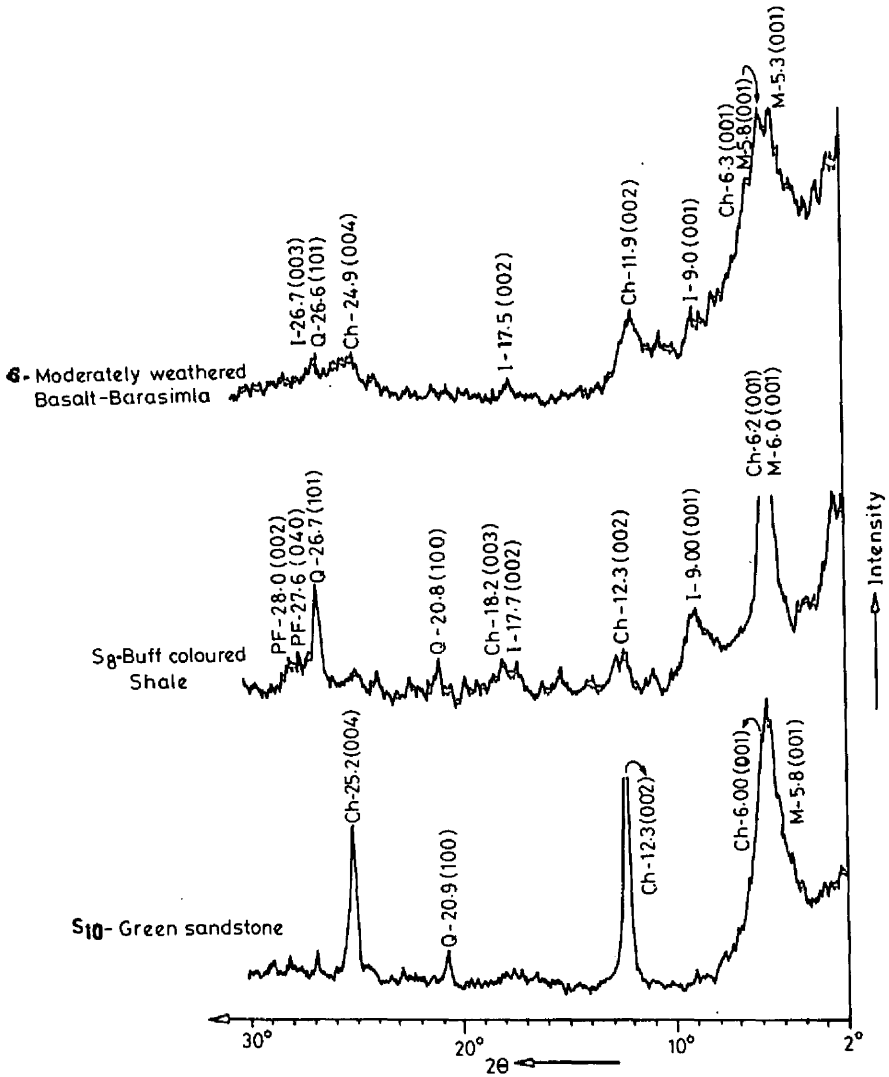


Fig.1. X-ray diffraction pattern of the clay fraction of infra-/inter-trappean sediments and weathered basalt. Abbr: M-montmorillonite Ch-chlorite, I-illite, Q-quartz, PF-Plagioclase feldspar.

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