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Geochemistry and Tectono-Sedimentary Evolution of Surma Basin, Mizoram, India

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Tertiary rocks have been well exposed along the eastern margin of North East India. They constitute one of the largest sedimentary basins which covering about 70% area of north east and have a thick pile of sediments of nearly 13 km succession, known as Surma basin. The Neogene Surma Basin formed due to the collision between Indo-Burmese plate of which can be considered northward extension of the Sumatra-Java trench (Nandy *et. al.* 1983) [1]. Because of eastward collision of Indian plate with Burmese micro plate the sediments of foreland basin have been oriented with a folded mountain of N-S direction which have the similarity in terms of geodynamic evolution with Jura Mountain (Nandy *et. al.* 1983) [1]. The fold belt forms a convex arc towards west which is normally wider in the central part with compare to the southern part and complexity is also increasing towards the margin orogen (Dasgupta, 1984) [2]. The folded series is also cut by a number of parallel to subparallel transverse faults trending either NE-SW to ENE-WSW or NW-SE. The Strike-slip rotational component is at higher rate than the other faults or thrusts present (Gahalaut and Gahalaut, 2007) [3]. The Tertiary sedimentary succession of Mizoram has been grouped into the Barail (Oligocene), the Surma (Lower to Middle Miocene) and the Tipam Groups (Upper Miocene to early Pliocene) in the ascending order. The entire sedimentary column of the formation is a repetitive succession of arenaceous and argillaceous rocks. The main lithologies exposed are sandstone, siltstone, shale, mudstone and their admixtures in various proportions and few pockets of shell limestone, calcareous sandstone and intraformational conglomerate (Tiwari and Kachhara, 2004) [4].

Tectono-sedimentological approaches like petrography, geochemistry, tectonic elements are very helpful for the interpretation basin evolution processes, tectonic setting, provenance, diagenetic history, source rock weathering and depositional environment of Surma basin. In the present study Petrography, geochemistry and tectonic parameters are used for deciphering the geodynamic evolution of the basin. Depositional model of the basin enhanced the understanding of Miocene plate movement and its processes.

The study encompasses petrography of sandstone and geochemical analyses including Major and Trace elements of the representative samples. With the help field data the vertical lithocolumn, cross section along E-W direction of this basin modal has been prepared. It can be deciphered that the Surma basin was deposited under a shallow marine condition in an active continental margin, mostly felsic in composition and quartzose provenance, sediments undergone prolonged weathering of igneous and

metamorphic sources with compositional variation, a quartzose recycled orogen source, shallow marine condition of deposition etc. During Miocene upliftment of the compiled sediments into Folded Mountain belt due to collision between the plates. Thrusting events brought the older sediments at the surface and the prominent strike-slip Fault shaping the present topography. Many structural features indicate the complex geological evolution of this basin that are bounded by different active orogeny.

References:

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