



Structural Framework of the Sub-Himalaya and its tectonic evolution along Kameng river section: Arunachal Pradesh, India

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The structural style or architecture of the Neogene-Quaternary foreland basin is studied in the Kameng River section of Arunachal Pradesh. The Kimi, Dafla-Subansiri, and Kimin formations correspond to Lower, Middle and Upper Siwaliks. The outcrop scale structures from the Main Boundary Thrust (MBT) towards S shows an overall ramp and flat geometry. The intervening strata between two parallel thrust faults (roof thrust and floor thrust) are sub-parallel. The individual subsidiary faults in imbricate fashion (horses) occur as planar units with straight sides. These duplex structures are significant manifestation of the processes involved in the internal domain of the Siwalik rocks and they represent the mechanism of the slip transfer processes from one glide horizon at depth to another at shallower depth. This process of slip transfer and formation of horses are responsible for the formation of structural thickening, duplex growth and mass addition to the moving thrust complex. In the present area the Siwalik strata showing duplex structures have undergone structural thickness in their internal domain mainly in Dafla formation. The lithology in the foreland basin dominantly composed of the sandstones (Greywacke and lithic -arenite), siltstone, claystone, carbonaceous shale, boulder beds in the upper part. In the microscopic scale, the lithological response in the structural development is well documented as pressure solution seams, elongated quartz and feldspar grains, bent micas, kinked biotites, strained quartz grains, healed grains, and micro-fractures. The basement asperities play a significant role as the moving thrust front produced a major lateral ramp. The differential movement of the mountain front on both sides of the ramp is visible in the field as the mountain front of the western part of the Kameng River move more southeastward compared to the eastern part. The tectonic evolution of the area initiated with the development of the MBT, which resulted in the formation of the foreland basin, where Siwalik sediments were deposited. Further compression led to southward propagation of the thrusts from the MBT and this resulted in more southward movement of the Himalayan mountain front. This process is still continuing.