# 3

# Regional Geology and Tectonic Setting

Geological studies of Sikkim Himalaya commenced with the first account of Geology and mineral resources of Darjeeling district by Mallet in 1875 and Bose in 1891. In the following years important contribution were made by Auden (1935), Heim and Gansser (1939), Ray (1947) and Ghosh (1952). Subsequently Raina and Bhattacharya (1975), Roy (1976), Acharya and Ray (1977), Acharya (1978), Raina and Srivastava (1980),Thakur (1986),Ravikant (1993), Neogi et.al.( 1989), and Ray (2000) contributed to the understanding of geology of Sikkim.

Sikkim Himalaya is an important representative section of Eastern Himalaya where four physiography based transverse zones - Sub, Lower, Higher and Tibetan Himalaya (Gansser, 1964) - roughly correspond to four tectonostratigraphic domains: Sub Himalaya, Lesser Himalaya, Higher Himalaya and the Tethys Himalaya respectively, are separated by major tectonic dislocations. These four tectonostratigraphic units are exposed in the Teesta basin which is 125 km N-S and 40 km E-W approximately.

Typical feature of Sikkim Himalaya is the lateral arch of thrust surfaces in the form of culmination across the Teesta River McClay (1992) and Ray (2000), known as Teesta culmination (Fig 3.1). Similar culminations such as Kuru in Bhutan and Siang in Arunachal are also identified (Fig3.2). In the core of these culminations vast exposure of Pre – Tertiary rocks, dominantly Pre – Cambrian are arranged in a pile of thrust sheets. Recesses of Main central thrust (MCT) extend about 100 Km towards hinterland in the Teesta and Siang culmination zones. Proterozoic Lesser Himalayan low grade metapelites of Daling Group (Table 3.I)dominate the core of the Teesta culmination which is a north south trending antiformal flexture. The distal part is formed by medium to high - grade crystalline rocks of the Darjeeling Group or the Higher Himalayan Crystalline Complex (Proterozoic). Main Central Thrust (MCT) separates the two units.