A study of evolutionary phases and tectonic frame work of Chamoli central crystallines of Garhwal Himalaya, Uttrakhand

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Nagol gad mylonite zone of Chamoli Garhwal is evolved along regional Jutogh Thrust (MCT II) and is characterized by Higher Himalayan Crystalline Unit. Rocks of Pokheri group (Chails) are thrust over by hanging wall quartzite of Jutogh thrust sheet. These metamorphites suffered mylonitisation in ductile condition during the Himalayan orogenic movement and further experienced ductile brittle deformation in subsequent periods. Crystallines have experienced four episodes of deformation. D1 is related with the end phase of the Caledonian Orogenesis and formation of Himalayan sedimentary basin in which folding of basement rock caused activation of Kalsir thrust (MCT I). D2 is related with end phase of Hercynian Orogeny. D2 is interpreted to reflect southward dislocation movement of Central Crystallines. D3 is related with thrust sheet glides further south and development of cleavages at deeper zones and at higher level. D4 is marked as Tertiary Orogeny when thrust mass glided further south and fracture cleavages were formed. D1 marked as Caledonian orogeny, remobilized and folded the basement and formed arena of sedimentation to produce bedding (S=S1) under varied pressure and temperature conditions during Proterozoic to Ordovician period. D2 relates with Hercynian orogenesis when isoclinal folding movement took place. D3 episode developed coaxial tight folds with D2. Later deformation produced close F3 folds that are refolded together with both F1 and F2 and at last open type F4 folds were formed. D4 is related with Tertiary Orogeny when Jutogh (Hafla) thrust sheet glided further southward and final uplift of Himalaya took place. These tectonic units have been plastically deformed and forms duplex system. The Hafla (Jutogh) quartzite near the thrust witnesses increasing trend of flattening and low volume loss. The obtained values of K fall in the field of flattening and show oblate shape of ellipsoids ). Rocks of Hafla (Jutogh) group are mylonitised due to shearing during nappe movement as evidenced by the presence of various types of shear sense indicators, viz. S-C shear planes, pressure shadows, fractured and displaced grains. Stereographic C-axis plots show asymmetrical and incomplete cross girdle pattern showing progressive simple shear of Lister and Hobbs (1980) with typical single girdle pattern of Mancktelow (1987). The relationship among C-axis girdles and all structural (planar linear) features may be indicative of activation of basal prism a slip system along Jutogh thrust zone during intensive mylonitisation.

Biography

B.C. Joshi did his D.Phil. from Wadia Institute of Himalayan Geology, Dehradun affiliated to H.N.B. Garhwal University Srinagar, Uttrakhand. Currently he is a faculty member in Bundelkhand University, Jhansi. He is also members of various academic and administrative bodies presently.

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