mobilized by the post-crystallization alteration processes. The Sm–Nd isotope system in the Hutti metabasalts has been least disturbed giving an isochron age of 2662 ± 81 Ma which is suggested as the age of formation of their precursors. Combined with the published U–Pb SHRIMP ages on zircons from the felsic volcanic rocks it is inferred that the Hutti greenstone belt formed over a period of ≈ 86 Ma.

Based on U–Pb isotope study carried out on zircon and titanite from the Hutti granitoid rocks it is inferred that these rocks were intruded between 2569 ± 17 Ma and 2528 ± 36 Ma ago. Different phases of

granitoid magmatism contributing substantially to the continental crust have taken place around the Hutti area approximately between 2530 and 2580 Ma ago. These ages are comparable with those of the granitoid rocks surrounding the Kolar and Ramagiri greenstone belts. The $^{207}\text{Pb}/^{206}\text{Pb}$ titanite age of 2532 ± 9 Ma for the Yelagatti granitoid rocks is not recorded in the granitoid rocks from any other part of the Hutti area. This age is indistinguishable from the zircon ages of 2532 ± 3 Ma and 2528 ± 1 Ma for the Kambha Gneisses of the Kolar area and the Gangam Complex of the Ramagiri area, respectively. The major

greenstone belts of the eastern Dharwar craton have evolved coevally at ca. 2700 Ma ago and are older than the surrounding granitoid rocks. In the eastern Dharwar craton granitoid magmatism took place as distinct pulses and the plutons were juxtaposed during Neoproterozoic by horizontal tectonic forces with the supracrustal rocks emplaced in an island-arc type setting forming the boundary between them.

Summary of the lecture delivered at the monthly meeting of the Geological Society of India on 25 January 2012.

Response of the Rivers in Himalaya to Late Pleistocene-Holocene Climate and Neotectonic Evolution of the Orogeny – Pradeep Srivastava, Wadia Institute of Himalayan Geology, Dehra Dun

Himalaya in its S–N transect is traversed by several roughly E–W trending thrusts namely the Himalayan Frontal Thrust (HFT, the youngest), the Main Boundary Thrust (MBT), the Main Central Thrust (MCT), the South Tibetan Detachment (STD), the Counter Thrust (CT) and apart from this there are several intra-formational thrusts located between HFT and MBT and also between CT and Indus Tsangpo Suture Zone (ITSZ). These thrusts are south verging between HFT and STD and most are north verging between STD and ITSZ (Thakur, 1981; Jamieson et al. 2004). There are several normal faults between STD and CT. The topography slopes southward from little north of STD to HFT and northward from north of STD to ITSZ. This suggests that the Himalayan prism may have evolved in a bivergent manner where both the halves of the prism deform to counter balance the stresses generated due to the northward movement of the Indian Plate. This structural pattern is not uniform and varies laterally. These thrusts/fault when interact with domes like Tso Moriri behave as normal fault. This however still requires detailed structural studies, especially in the area north of STD.

Optically stimulated luminescence dating of strath terraces around Himalayan

Frontal Thrust (HFT) along rivers Ganga and towards the Indus Tsangpo Suture Zone (ITSZ) along the river Indus is carried out. In the frontal Himalaya, the terrace formation took place at ~ 11 ka where the Siwalik ranges are incised at the rate of ~ 7 mm/a (Sinha et al. 2010; Ray and Srivastava, 2010). The chronology indicated that the aggradation and incision of Ganga River followed the climate change during the Late Pleistocene-Holocene and that the Himalayan wedge is showing, both, in-sequence and out-of-sequence deformation. The geomorphic data and the chronology from the Indus river also suggests active uplift and formation of strath terraces during the Late Pleistocene and the river has incised into the molasse sediments at ~ 2 mm/a. Thus if the incision rate are indicative of uplift rates both the front and the hinterland of the Himalaya are actively deforming. According to the critical taper wedge model of the evolution of Himalaya, the deformation should be focused at the mountain front and should diminish towards the hinterland and that explains the uplift along the HFT. It is proposed that the Indus River is responding to the activity along the counter thrust and several intra-formational thrusts, within the molasse sequence, and forming the strath terraces. This probably

is indicating the bivergent nature of deformation in the Himalaya.

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Summary of the lecture delivered at the monthly meeting of the Geological Society of India in November 2011