23rd HIMALAYAN-KARAKORAM-TIBET WORKSHOP, LEH (LADAKH)

The 23rd HKT Workshop was organized during 7-10 August, 2008 at Leh (Ladakh district), Jammu and Kashmir by Dr. Sandeep Singh and Professor Arvind K. Jain of the Department of Earth Sciences, Indian Institute of Technology, Roorkee. About 127 geoscientists from Australia (1), Canada (10), China (1), France (20), Germany (6), Italy (3), Japan (1), South Korea (1), Switzerland (3), UK (7) and USA (9) attended this workshop along with a large number of Indian Earth Scientists (65). All the participants were accommodated in different hotels in Leh.

To encourage better mutual interactions amongst the participants, the organizers had provided the extended abstracts of the lectures in a 180-page Special Volume of the Himalayan Journal of Sciences (Volume 5, Issue 7, 2008; www.himjsci.com). After a very brief welcome on August 8 by Dr. Sandeep Singh, the HKT workshop began for three days with oral presentations by the geoscientists under specified sessions. The first session on the Foreland Basins covered the sediment record and stratigraphy of the Indo-Gangetic Plains (I.B. Singh), the Siwalik hills (U. K. Shukla), Bangladesh (Y. Najman) and Shimla hills (O. N. Bhargava). Second session was on

Earthquakes: their relocation, causes and effects with the relocation of earthquakes by 3-D plots (Shamita Das), lake-level changes in the Kathmandu valley, Nepal (T. Sakai), and past records of earthquakes in the Himalayan region from paleoseismic studies by strain partitioning in the foot-hills (A.K. Pandey) and soft-sediment deformation structures (Binita Phartiyal and Devender Kumar). The afternoon session of this day was on the Himalayan Metamorphism and the Main Central Thrust (MCT). This was a very exciting session because the speakers highlighted as to how the Higher Himalayan Crystallines (HHC), often renamed Greater Himalayan Slab (GHS) were exhumed. Besides regional correlations in Pakistan and Nepal, the participants intensely debated exhumation models like channel flow (R. D. Law) and tectonic wedge hypothesis (A. A. G Webb). The last session of day 1 was on the Holocene Climate. Speakers analyzed the sedimentary record of deglaciation in the Indus Delta (P. D. Cliff), glacial moraines (R. P. Gupta), tree rings (A. Bhattacharyya) and river discharge and erosion rates (H. Wulf) to infer climatic variations during the Holocene time.

The August 9 began with a session on the Ultra High Pressure Terrains, in which three well-known localities of these very interesting rocks from the Himalaya were described in great detail. Speakers concentrated on new SHRIMP zircon ages of the Stak massif eclogitic rocks from the High Himalaya in Pakistan (K. Hattori), Tso Morari terrain from Ladakh–its formation and exhumation (J-L. Epard), tectonics (A. Steck), petrology and Ar dating of micas (I. Villa), eclogite emplacement within continental Puga gneiss (R. S. Sharma) and active tectonics (C. S. Dubey), and eastern Himalayan province (C. Montomoli and P. H. Leloup). The next session on the Nappes, Domes and Exhumation contained five papers, out of which four dealt with the regions of Eastern Himalayan Syntaxis–the Siang dome (S.K. Acharyya and P.K. Verma) and Namcha-Barwa (P. Zeitler and C. Guilmette), and only one paper described the Western Syntaxis (A. Pecher). The entire afternoon session on August 9 covered recent geophysical research on the Himalaya-Karakoram-Tibet crustal structure where the proposed INDEPTH IV program along northeastern margin of the Tibetan Plateau was discussed (M. Karplus). Geoelectrical structure across the Garhwal Himalaya from 27 stations provided patchy appearances of low resistivity zones (M. Israil), while other profiles revealed deeper structures in northern parts (R.S. Sastry) near the ITSZ and SSZ. Presence of shallow level ophiolites was worked out by gravity and magnetic profiles (R.G.S. Sastry), while deeper seismic discontinuities were deciphered from teleseismic receiver functions in Ladakh and Karakoram (K.S. Prakasam).

The forenoon session on the last day of August 10 was exclusively devoted to Trans-Himalaya-Karakoram and Tibet terrains. In northern Pakistan, metamorphism and melting of the crust about 28-22 Ma was documented by the Baltoro granite batholiths along Karakoram, where youngest dated leucogranites (17-12 Ma) are reported to extend in the Nubra-Shyok valley region, and cut by the Karakoram strike-slip fault (M. Searle). According to M. Leech, the initiation of motion on the crustal-penetrating Karakoram fault at 25-21 Ma may have created a barrier to southward flow of mid-crustal melts and acted as a vertical conduit for the same melts. Age of collision by paleomagnetism, dating of UHP metamorphism along northern margin of India, dating the youngest subduction-related granites along the southern margin of Asia and dating the Indus Group sediments within the suture zone (A. Henderson) have been attempted by the Himalayan researchers. A more precise dating (52-51 Ma) is claimed from the Cretaceous-Tertiary carbonate platform evolution (O.R. Green), which is stated to mark the transition from marine to continental facies within ITSZ suture zone and along the margin of the Indian plate. The Indian speakers, working on the Ladakh Batholith, reported hybrid microgranular enclaves to show multistage magmatic processes, which were confirmed from the SHRIMP zircon dating (S. Kumar and T. Ahmad).

There were a few studies from the Tethyan Sedimentary Belt in this HKT, except its diagenetic and deformation studies of the Permo-Triassic sediments from SE Tibet (I. Dunkl) and study of flexure-slip folding in Spiti valley (D.K. Mukhopadhyay). The afternoon session of the last day was engaged on the Extensional Tectonics and data from other orogens. Here, the speakers emphasized on extensional features, especially on the southern Tibet detachment system (STDS), which represents the most prominent example for orogen-perpendicular extension (E. Hintersberger). It is also claimed that the collision of India and Asia has caused large strike-slip faults in East Asia, resulting in the extension of crustal blocks toward the southeast and also opening of South China Sea (P. Clift). One group of researchers gave a comparison of thermal and structural evolution of the Himalaya-Karakoram-Tibet orogen with the Trans-Hudson orogen of North America and suggested the notion of tectonic uniformatarianism record in older exhumed orogen and the one (Himalaya) being exhumed presently (M. St-Onge). South Korean tectonics was also discussed in view of the modelling of the Himalayan orogen (M. Cho).

On August 11, 2008, field excursion, for 34 participants was organized through India-Asia plate boundary from Leh-Tso Morari-Chang La-Pangong Tso across different domains of the Himalayan orogen, viz. the ultra-high pressure (UHP) terrain of Tso Morari Crystallines, magmatic arc of the Ladakh Batholith, ophiolitic zones of the Indus Tsangpo and Shyok Suture Zones (ITSZ and SSZ), and finally the Karakoram metamorphic complex and granites of the Asian plate. The field party visited selected localities of these terrains for seven days (August 11 to 17). Each participant was provided with an elaborate and illustrative guide book with description of each field stop. At many places, lengthy discussions followed within the UHP Tso Morari terrain, especially on its deformation, exhumation, location of boundaries between the UHP and non-UHP rocks and emplacement of eclogite lenses within the gneisses. There were also discussions on the role of the Karakoram Shear Zone in the overall tectonics of the India-Asia collision. The workshop was well organised in Ladakh.

RAM S. SHARMA
K.R. GUPTA