

others are doing laudable work on a systematic study of Indian medicinal plants with a hoary tradition but surely these deserve more attention!

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**Geology and Tectonics of the South-eastern Ladakh and Karakoram.** A. K. Jain and Sandeep Singh. Geological Society of India, P.B. No. 1922, Gavipuram, Bangalore 560 019. 2009. xiv + 181 pp. Price: Rs 600/\$ 60.

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*The Geology and Tectonics of Southeastern Ladakh and Karakoram* is an excellently produced publication of the Geological Society of India. Its first six chapters give an up-to-date account on the geology and tectonics of the Indus Tsangpo Suture Zone (ITSZ) and the adjoining tectonic units of the Tso Morari Crystalline Complex (TMC) to the south and the Karakoram zone to the north. In chapter 7, a field excursion of 7 days guiding across a south-north transect from southeastern Ladakh to Pangong Tso is described. Chapter 1 deals with regional framework of Ladakh introducing the major tectonic units of the ITSZ, Trans Himalayan Ladakh Batholith, Shyok Suture Zone (SSZ), Karakoram Shear Zone (KSZ) and Karakoram Metamorphic Complex (KMC). Chapter 2 deals with the Tso Morari Crystalline, which belong to northern edge of the Indian plate. It encloses lenses of ultra high pressure (UHP) rocks, which were subducted to a depth of ~90 km at steep angle, followed by oceanic slab break off and rapid exhumation of UHP rock into the crust and resumption of subduction at low angle, according to their model. U-Pb SHRIMP Zircon dating assigns 53 Ma for UHP event, 47 Ma for amphibolite facies retrogression event and 49 Ma for the HP eclogite facies event. The 90 km subduction model is based on <5% of eclogite lenses in the Tso Morari Crystalline gneisses, whereas the bulk country rock gneisses lack mineral che-

mistry signature of subduction to UHP depth. Chapter 3 deals with the major tectonostratigraphic units of the ITSZ, viz. Dras Volcanics, Nidar Ophiolites, Nindam Formation, Lamayuru Unit, Indus Formation, Kargil Molasse, and Spongtang and Karzok Ophiolites. The Ladakh Batholith, which was produced as a result of subduction of the Neo Tethyan oceanic crust in an Andean-type tectonic setting, is described in chapter 4. The petrography, geochemistry and geochronology of the batholith described by earlier workers are given in this chapter. Chapter 5 covers SSZ which has been interpreted either marking a subduction zone beneath the Eurasian margin or a back arc basin. Tectono-stratigraphy of the SSZ from Nubra to Chasul in three sectors are described in the chapter. In the geological framework of the southern part of the Karakoram mountains, three tectonic units are the KSZ, the Karakoram Batholith Complex and the KMC. These units are described in chapter 6 giving an up-to-date data on geochemistry and geochronology. Chapter 7 is the most important part of the book giving an account of the field excursion, south to north, from Tso Morari lake area through Chang La to Pangong Tso. A seven-day excursion is described stop-wise focusing on important field geology observations. Day 1 includes a whole day long drive from Leh to Karzok village on the northern margin of the Tso Morari lake, but also includes a stop at Karzok and along the Karzok-Sumdo road. The day 2 traverse is devoted to Karzok-Sumdo section showing mylonitic gneiss developed below the Tethyan sedimentary cover, sheared eclogite lenses metamorphosed to amphibolite facies, eclogite lense in the Puga Gneisses and structural relationship between the Taglag La Metasedimentaries and the Puga Gneisses. In this account, geochronological including thermochronometric data on the UHP and amphibolite facies events and the Pan-African age of the Puga Gneiss is highlighted. Day 3 of the fieldwork covers the contact relationship between the TMC and the ITSZ along the Zildat River Section, the TMC along the northern limb of the Tso Morari Dome, Polokong La Granite, and the Taglang La Formation on the northeastern limb of

the dome. Retrogressed eclogite lenses and S-C fabric in Puga Gneisses are also explained in this traverse. Day 4 is a long traverse from Tso Morari to Tangse via Mahe, Kharu and Chang La. This traverse passes through Zildat Ophiolitic Mélange, pillow basalt, gabbro and dolerite dykes, Ladakh Granitoids, mafic enclaves, Chang La Ultramafics and deformed Chilam Diorite. Day 5 focused on Tangse-Pangong Tso Section covering structures and metamorphism of the Pangong Tso Group Metasedimentaries around Lukung and Pangong Tso and the mylonitic granite and migmatites along the section. Day 6 covered the southern belt of the Karakoram Metamorphics, called the Tangse Group, in the Tangse Gorge Section of the Shyok-Darbuk-Tangse-Phabrang Region. Here deformation, different granite generation, metamorphism and geochronology are explained in the three stops of the traverse. Day 7 is focused on the main strand of the KSZ along the Tangse Valley. The excursion is devoted to the localities showing deformation features and geochronological constraint in the shear zone. Under summary and conclusion in chapter 8, geodynamic model for closure of the NeoTethys after Maheo *et al.* 2004 is elaborated together with synthesis on tectonics of Tso Morari Crystalline Dome and plutonism of Ladakh and Karakoram Batholiths. The last chapter 9 on analytical procedures dealing with SHRIMP U-Pb dating, TIMS, EPMA and FT dating appear out of place. The coloured field photographs and maps and figures are of high quality, and credit must be given to the authors. The publication brings a good review on the geology and tectonics of the southeastern segment of Ladakh and Karakoram. The field excursion across S-N transects is a value addition to the publication. It is well described with their own field experience and knowledge of the area. This publication will be a useful guide to the geology of a part of Ladakh for graduate students and researchers.

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