

EXAMPLES OF TECTONIC MECHANISMS FOR LOCAL CONTRACTION
AND EXHUMATION OF THE LEADING EDGE OF INDIA. SOUTHERN TIBET
(28-29 °N; 89-91 °E) AND NANGA PARBAT, PAKISTAN

by

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ABSTRACT

In Gonto La valley, southern Tibet, a continuous, planar, $\sim 10^\circ\text{N}$ dipping detachment horizon juxtaposes Tethyan slates over a footwall of leucogranite that intrudes a S-dipping injection complex layer that I regard as a rotated Southern Tibet Detachment System (STDS) horizon. This is deformed & partially cut by the leucogranite which forms a pluton extending throughout Khula Kangri massif. In collaboration, ^{208}Pb - ^{232}Th measurements on 12 monazite grains of the leucogranite gave a crystallization age of 12.5 ± 0.4 Ma. Integrated estimates of magnitude, and rate, of detachment displacement suggest that STDS displacement continued after granite crystallisation for 1-3 m.y. Therefore N-S extension in southern Tibet continued into the Late Miocene. A new geologic map of the Khula Kangri and Kanga Punzum-Monlakarchung High Himalayan ranges is presented using field, satellite & topographic data. These define a fork in the High Himalaya that results in a repetition of the main geological section. The STDS can be traced around both ranges and is a continuous surface. A simple model of post detachment, scissor faulting and block rotation is proposed. In SE Nanga Parbat Haramosh Massif (NPHM), Pakistan, field and microstructural analysis of strain and sense of shear trends indicate that several km of metasedimentary schists and gneisses are Himalayan Main Mantle Thrust (MMT) footwall rocks rotated to vertical due to NW-SE directed shortening. Near the NPHM summit region, several km of non-coaxially sheared granitic orthogneiss show W over E displacement structures. Although deformation mechanisms appear lower temperature than in the MMT footwall rocks, a major "uplift" structure (the Rupal Chichi shear zone - RCSZ) is proposed. To the SW, an E-over W shear zone (the Diamir Shear Zone - DSZ) that coincides with a syn-kinematically intruded granite (the Jalhari Granite) is recognised. In collaboration, ^{208}Pb - ^{232}Th measurements on monazite grains of the Jalhari indicate displacement has continued from ~ 9 to < 3 Ma. The DSZ is regarded as the mechanical continuation of the Raikot Fault. The Raikot-DSZ, together with the RCSZ define a conjugate pair that is interpreted to mark a pop-up structure, allowing the skywards displacement of NPHM.

DEDICATION

*For Anna,
who remained in Albany
until shortly after I left*

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