



## **Extensional step-over between the Zhongdian and Red River faults: kinematics of the Daju normal fault constrained by cosmogenic dating of the Yangtze terraces (Yulong Shan, Yunnan)**

J. van der Woerd (1), A. Perrineau (1,2), Y. Gaudemer (2), P.-H. Leloup (3), J. Liu-Zeng (4), L. Barrier (2), and R. Thuizat (1)

(1) EOST-IPGS CNRS UMR7516 Université de Strasbourg France (jeromev@unistra.fr), (2) IPGP, Paris, France, (3) U. Lyon 1, France, (4) ITPR, Chinese Academy of Sciences, Beijing, P.R. China

Extension in western Yunnan, southeastern Tibet, is limited by two dextral strike-slip faults, the Zhongdian and Red River faults, to the north and south, respectively, and is characterized by N-S directed normal faults and basins. In the northwestern corner of this large extensional step-over, the Yangtze River crosses the Daju normal fault at the foot of the Yulong Shan. Due to uplift of the Yulong Shan, the Yangtze carved the huge Huxiao Jia (Tiger Leap) Gorges (~3500 m deep) and abandoned sets of fluvial terraces across the fault zone and in the Daju basin to the north. Cosmogenic dating of blocks sampled on top of the terraces provide ages ranging from 8 to 30 ka. In the hanging wall basin to the north, the terraces may have been abandoned after the breach of a natural dam formed in the river (moraine or landslide) during the last glacial period. The average incision rate of the river in the basin is about 5.9 mm/yr, the vertical slip-rate on the Daju fault is  $4.9 \pm 1.3$  mm/yr, thus implying an incision rate of the river inside the gorge reaching about 11 mm/year. These rates may explain the exceptional size and steepness of the gorge. These results show that active faulting plays a major role in shaping the present relief of this region and that recent strain changes involve movement along the largest strike-slip faults of the region, in accordance with models implying large-scale block extrusion.