

Jerome VAN DER WOERD, Perrineau Aude, Gaudemer Yves, Leloup Philippe-Hervé, LIU Jing and Barrier Laurie, 2013. Extensional Step-Over Between the Zhongdian and Red River Faults Kinematics of The Daju Normal Fault, Incision of the Yangtze River and Plateau Evolution (Yulong Shan, Yunnan). *Acta Geologica Sinica* (English Edition), 87(supp.): 33.

Extensional Step-Over Between the Zhongdian and red River Faults Kinematics of The Daju Normal Fault, Incision of the Yangtze River and Plateau Evolution (Yulong Shan, Yunnan)

Jerome VAN DER WOERD¹, Perrineau Aude¹, Gaudemer Yves², Leloup Philippe-Hervé³,
LIU Jing⁴ and Barrier Laurie⁵

1 Institut de Physique du Globe de Strasbourg, UMR 7516 CNRS/ Université de Strasbourg

2 IPGP, Paris, France

3 U. Lyon 1, Lyon, France

4 China Earthquake Administration, Beijing, China

5 IPGP, Paris, France

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 ± 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. It also attests to rapid headwater retreat and down-cutting into a previously high-elevation plateau surface. The smooth plateau morphology is now being destroyed and dissected, while river incision is responsible for regional relief increase. Recent and rapid changes of river evolution in Tibet suggest coupling between fluvial dynamic, tectonics and climate responsible for shaping both the interior and the edges of the Tibetan plateau.

* Corresponding author. E-mail: jeromev@unistra.fr