WHAT CONTROLS THE WIDTH OF A RIVER CHANNEL?

LEARNING FROM THE KUITUN RIVER, NORTH TIAN-SHAN, XINJIANG

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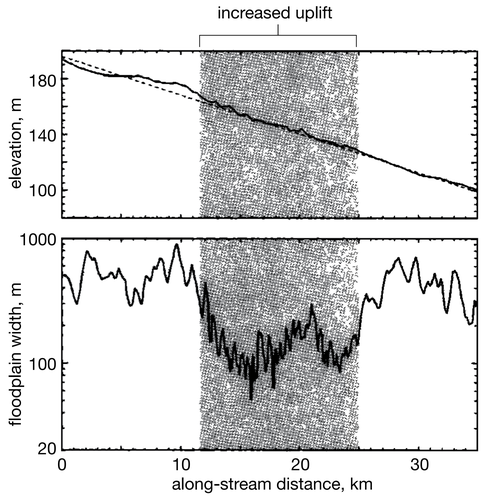
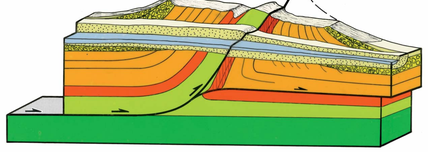
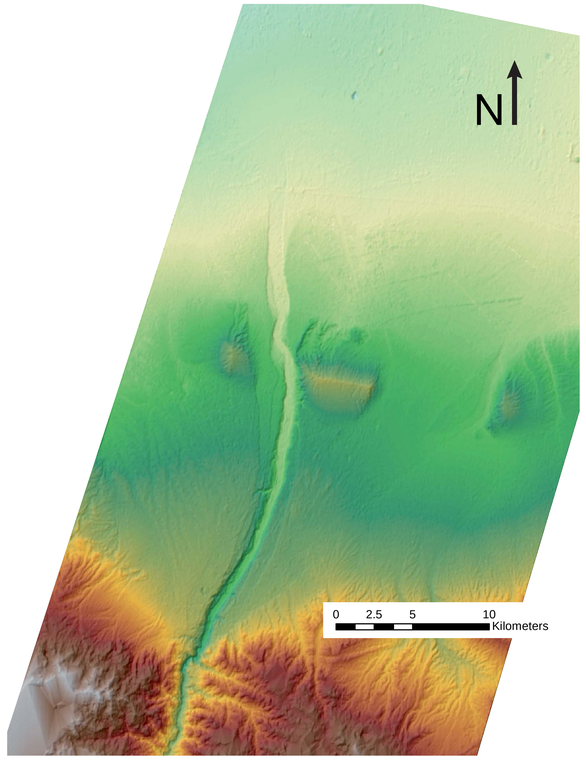
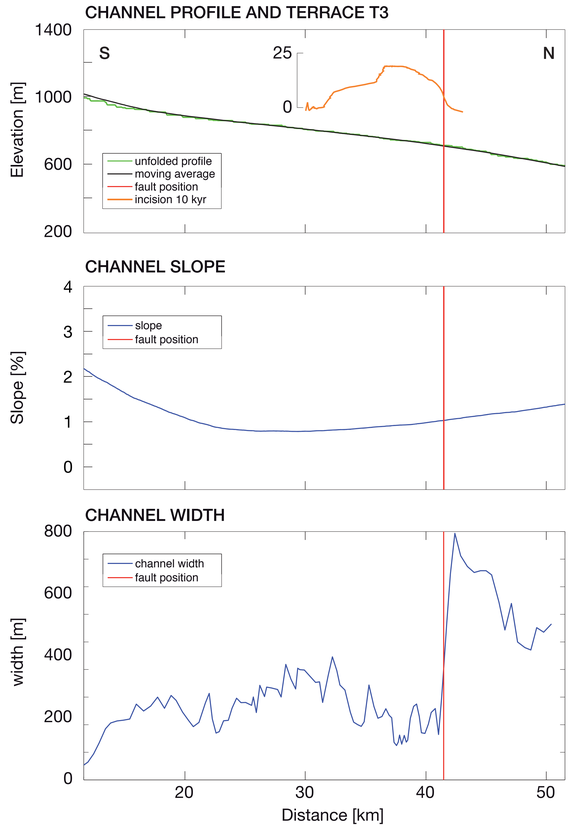




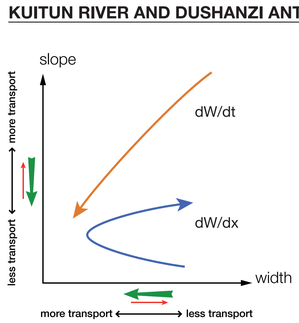
Top: slope and width of the Bagmati River. Lavé and Avouac (2001) observed steady slope and reduced width across a zone of increased uplift in the Himalayas
Bottom: block model for the north Tian-Shan piedmont. The structural setting of the Kuitun River causes locally increased uplift in a context of post glacial river incision. Avouac (1993)



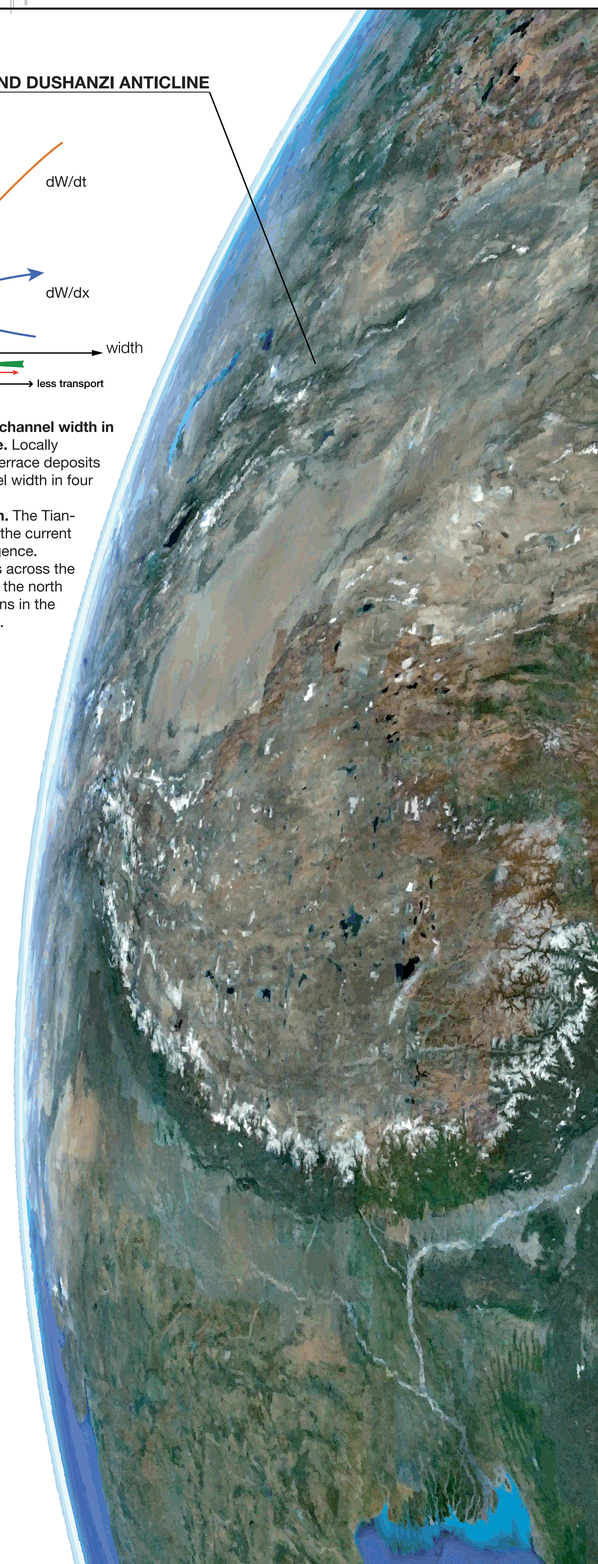
60 m DEM from SPOT images of the Kuitun River across the frontal alluvial fans of the range. The Kuitun River incised up to 200 m in the alluvial fan during the Holocene leaving extended terrace sets (order of magnitude: cm/yr). The Dushanzi Anticline causes a 5 km long zone of increased uplift on the river path (order of magnitude: mm/yr).



Top: longitudinal profile of the Kuitun River with detrended 10 kyr old terrace. The terrace T3 records the deformation of the Dushanzi anticline during Holocene and provides kinematic constraints.
Middle: evolution of slope along stream. The river slope is not affected by the crossing of the anticline.
Bottom: evolution of channel width. The channel width changes strongly across the anticline. (terrace data from Poisson, 2001)



Above: evolution of channel width in both space and time. Locally increased uplift and terrace deposits allow study of channel width in four dimensions.
Right: study location. The Tian-Shan absorbs half of the current India Eurasia convergence. The Kuitun river flows across the northern piedmont of the north Tian-Shan which drains in the closed Djungar Basin.



Below: panorama looking SE in the Dushanzi Anticline. High incision rates in the north Tian-Shan northern piedmont leave a 1 km wide terrace flight abandoned in the Holocene. The river incises vertically and erodes laterally in the anticline. Picture by Julien Charreau.

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