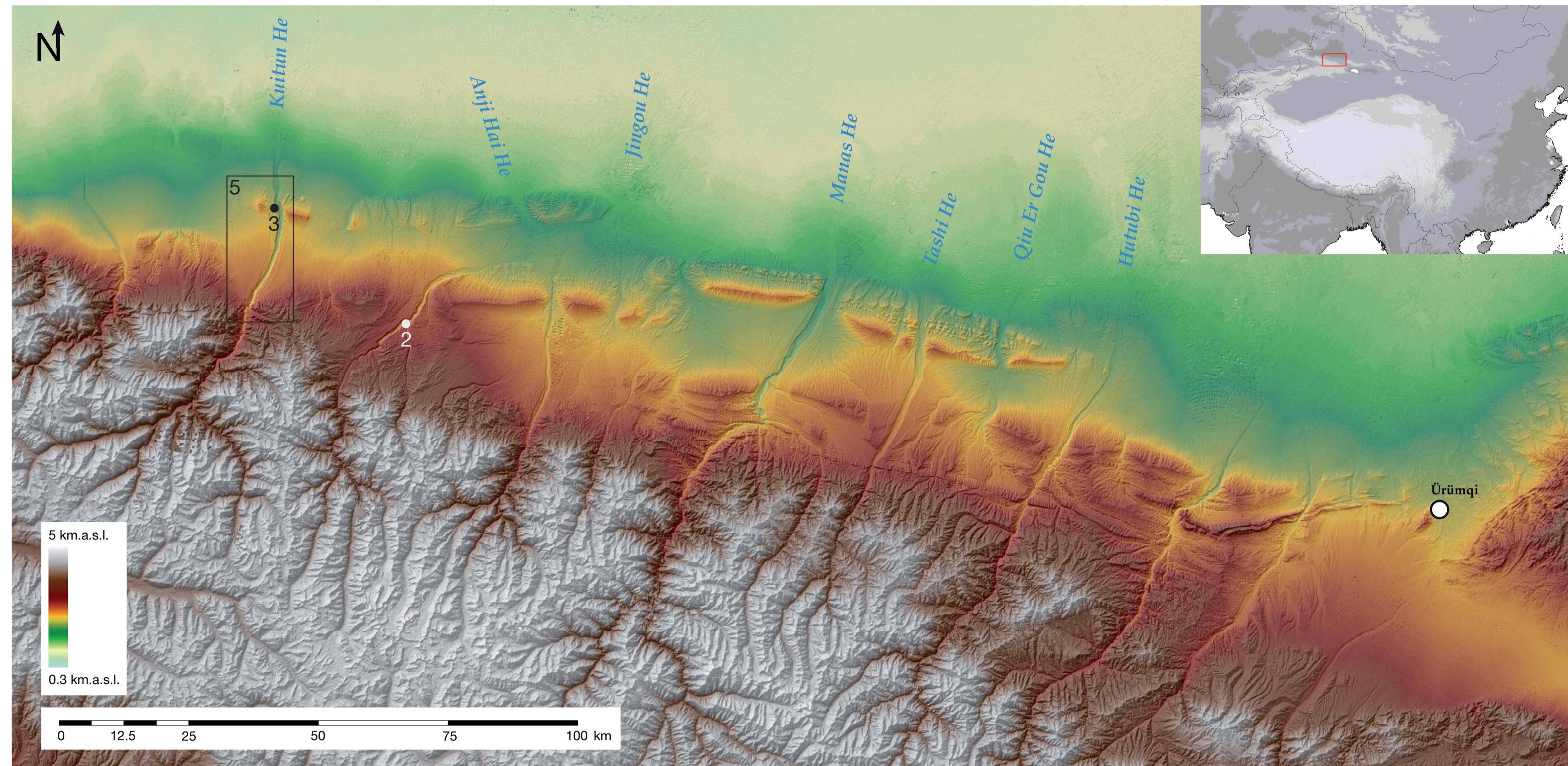
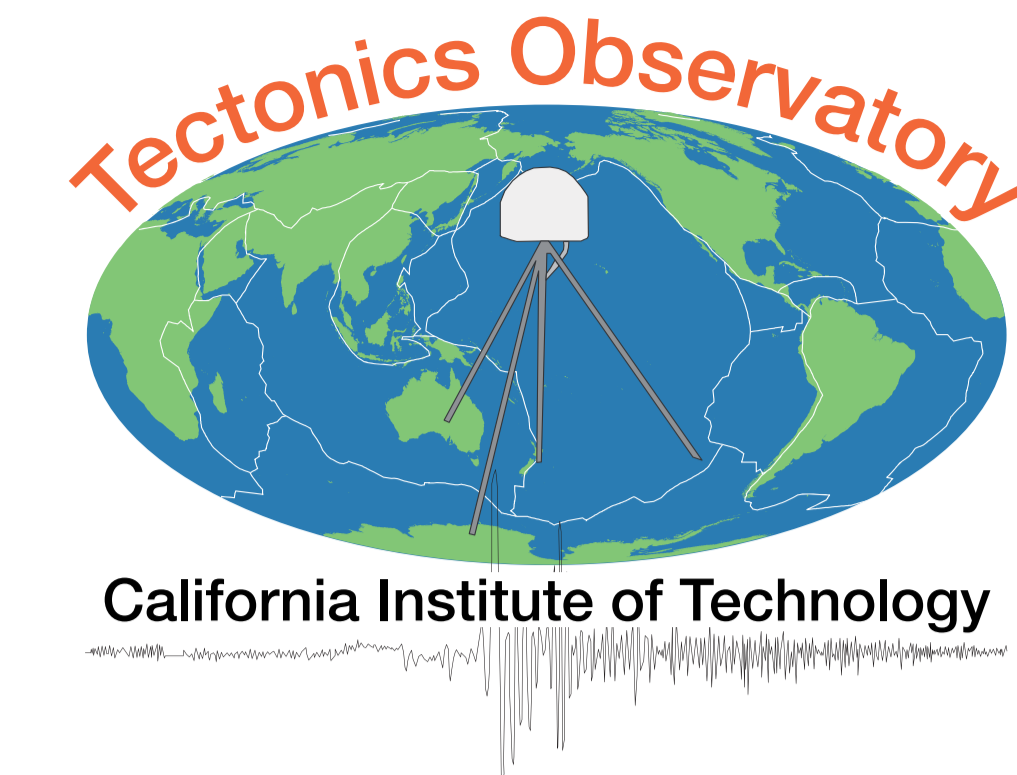


SEDIMENT TRANSFER UNDER TECTONIC AND CLIMATIC FORCING

A NATURAL LABORATORY IN THE CHINESE TIAN SHAN, XINJIANG

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1. The northern piedmont of the Chinese Tian Shan in the Xinjiang Uyghur Autonomous Region is a fold-and-thrust belt characterised by a dozen rivers deeply incised in Pleistocene alluvial fans. All rivers present a similar facies with 200-250 m of entrenchment during the Holocene, equivalent to 2-2.5 cm/yr incision rates. The likeness of all fluvial profiles reflects regional climatic forcing at the end of last glaciation, when increased river discharge first built up the fans with glacial-sediment-saturated water and then incised them as the flow became undersaturated yet powerful (ref. a, b).
2. The Holocene incision of the Anji Hai River is recorded by 18 cut-in-fill terraces that we have sampled for OSL and U-series in carbonate coated pebbles.
3. Active anticlines cause a narrowing of river channels. Across the Dushanzi anticline, the Kuitun river has a reduced width and leaves 9 terraces behind (sampled as well).
4. Activity of the Dushanzi anticline increases incision rates by 10% across the structure as documented by the deformed 10 kyr T9 terrace. Channel width reflects differential uplift while slope is not affected. The sediment grain size along the reach is steady and indicates the recycling of fan material in modern bedload.
5. Location of grain size surveys along the Kuitun River, note the Dushanzi anticline between survey V and VI.
6. Preliminary analytical solutions for water depth and sediment transport capacity as a function of river geometry constrained with field data. During incision phase, river geometry evolves so that its transport capacity increases downstream.

