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**TITLE: Non-steady state topography in the Three Rivers region, SE Tibetan plateau.**

ABSTRACT:

The Three Rivers region in southeast Tibet is characterized by deeply incised river valleys separated by a perched low relief landscape that gently descends from the high Tibetan plateau towards the southeast. When and how this unique landscape formed is debated. In this talk, I am going to present a short summary of recent results on 1) the timing of surface uplift using delta  $^{18}\text{O}$  isotope paleoaltimetry, 2) the spatial and temporal pattern of exhumation in the region using apatite and zircon U-Th/He and apatite fission track thermochronology, and 3) the rates of river incision by dating fluvial terraces preserved at various levels along the Lancang-Mekong river. These studies show that the major phase of surface uplift occurred before Miocene. The Paleocene plateau may be continuous from central Tibet, and extend southeastward to as far as 25-26°N. The region has undergone three episodes of relatively fast exhumation (~0.1-0.3 mm/yr): during the mid- to late-Cretaceous (120-80 Ma), the Paleocene to Eocene (60-40 Ma) and Miocene to present (20-0 Ma), separated by intervening periods of slow exhumation. Perched strath terraces along the Mekong river suggest that the river has been incising at a fast rate of 1-3 mm/yr during the past 150 kyr, which is about one order of magnitude larger than the long-term exhumation rate. The Paleocene to Eocene period of rapid exhumation is likely a response to early Cenozoic deformation along tectonic boundary structures, related to the transpressional collision of the Indian plate with Asia. These results suggest considerable spatial and temporal heterogeneity in landscape evolution pace in the region. Non-steady state topography can be maintained over millions of years, unlike the predictions of numerical modeling of landscape evolution. How to form and preserve the low-relief surfaces at ridge-tops are the key questions need to be further addressed in the future.