

## **Tectonic Control on Rapid Late-Miocene – Quaternary incision of the Mekong River knickzone, Southeast Tibetan Plateau.**

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The incision history of the Three Rivers (Salween, Mekong and Yangtze) region in the Southeast Tibetan Plateau has been linked to both tectonic and climatic controls. In this study, we report new apatite (U-Th)/He and fission-track thermochronology data from the >6000-m high Kawagebo massif, which forms the edge of the high plateau on the western flank of the steepened knickzone reach of the middle Mekong River valley. Thermal-history modeling of a thermochronological age-elevation profile shows rapid cooling since ~1.5 Ma and suggests a mean Quaternary exhumation rate of >1 km/Myr at the valley bottom. The amount of Quaternary exhumation is too high to be caused by fluvial incision alone and requires additional tectonic uplift. Comparing our data from the western flank of the Mekong River valley with published data from the eastern flank shows differential exhumation across the valley in the late-Miocene, with the western flank undergoing more exhumation, but relatively uniform exhumation in the Quaternary. We relate rapid exhumation since the late-Miocene on the western flank of the Mekong valley and the high topography of the Kawagebo massif to localized tectonic uplift associated with a restraining (left-stepping) overstep between the still-active right-lateral Parlung and Zhongdian strike-slip faults. The pattern of river steepness index across the knickzone also indicates that it results from locally focused uplift. Our results demonstrate the importance of detailed thermochronologic studies in this very active region to constrain the complex multi-phase tectonic history before invoking any potential climatic forcing of river incision.

**Mots-Clés :** Southeast Tibet, incision Mekong, thermochronology, tectonic forcing, climatic forcing.