EGU21-2145
https://doi.org/10.5194/egusphere-egu21-2145
EGU General Assembly 2021

Late Cenozoic two-phase rapid exhumation of the Daliang Mountains, Southeastern Tibetan Plateau

Haijia Lei[1], Xiaoming Shen[2], Xijun Liu[1], Xiudang Tang[2], and Shiming Zhang[2]
[1]School of Earth Sciences, Guilin University of Technology, China
[2]National Institute of Natural Hazards, Ministry of Emergency Management of China, China

The southeastern Tibetan Plateau experienced significant tectonic uplift, fault activity, climate change and reorgnization of fluvial systems during the late Cenozoic. All these processes were probably accompanied by rapid rock exhumation. Therefore, rock exhumation history in this region could provide a key to reveal the interaction between tectonics, climate and surface processes. Here, we report new apatite and zircon (U-Th)/He dates from a ~1200 m granite vertical profile, located at Shimian county in the Daliang Mountains, southeastern Tibetan Plateau. The age-elevation relationship and thermal history simulation exhibit a two-phase rock exhumation history, one at ~25 Ma (~1 km/Myr) and a second moderate exhumation from ~15 Ma to present (~ 0.2 km/Myr). This two-phase rapid exhumation history is consistent with that of Longmen Shan and Jiulong in the adjacent areas. For the first phase in Oligocene, abundant geological evidence indicates that it was related to the regional uplift caused by the transpressional deformation during India-Asia convergence. However, there are two distinct explanations for the rapid exhumation from ~15 Ma to present: one group suggested this exhumation was related to the rapid river incision caused by regional uplift; By contrast, based on paleo-altimetry data another group proposed the uplift was ceased before the late Miocene in southeastern Tibetan Plateau, and then the enhanced rainfall caused by the East Asian monsoon resulted in rapid exhumation since the Middle Miocene. Our study suggests that the fast exhumation in southeastern Tibetan Plateau since ~15 Ma cannot be attributed solely to the regional uplift or the intensification of Asian monsoon. Combined with the activity history of the Anninghe fault in the study area and the East Asian monsoon evolution history, we suggest that the regional rock exhumation of southeastern Tibetean Plateau since the Middle Miocene could be the result of the combination of tectonic activity and climate change.