



## **40Ar/39Ar mica dating of late Cenozoic sediments in the upper Yangtze: Implications for sediment provenance and drainage evolution**

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The development of the river systems in East Asia is closely linked to the uplift of the Tibetan plateau caused by collision of the India-Eurasia. The Yangtze River is the largest river in Asia and the timing and exact causes of its formation are still a matter of debate. Controversy exists for example on the start of the connection of the eastern Tibetan rivers to the eastward flowing Yangtze instead of the southward flowing Red River. Here we use the 40Ar/39Ar dating of detrital micas (muscovite and biotite) and muscovite geochemistry to constrain the sediment provenance in the eastern Tibetan Plateau. The remarkable spatial and temporal variation in sediment provenance allow us to extract information about the evolution of the upper Yangtze River. The combined data suggest that the upper Jinsha River upstream from Shigu town lost its connection with the southward flowing Red River at least earlier than the Pliocene. To the east of Shigu, the Yalong and Jinsha rivers flowed across the Yuanmou Basin into the Red River before 3.1 Ma, but abandoned this connection and turned east somewhere between 3.1 and 2.1 Ma. Our results rule out the possibility of a west-flowing Jinsha River since 1.58 Ma. The current stream directions between Shigu and Panzhihua go north, south and east and must have been formed at that time. Our data also shed new light on the evolution of the Dadu River. The Dadu River did not flow southward into Yuanmou Basin at least since 4.8 Ma but flowed into the Jinsha River along the Anninghe Fault. These capture events are closely linked to the tectonism of the eastern Tibetan Plateau and intensification of the East Asia monsoon.