



Erosion Patterns in SE Tibet deduced from the thermochronology of the clastic sediments in the Mekong and Red Rivers, Vietnam

P.D. Clift (1), A. Carter (2), I. Campbell, C. Allen (3), K. Hodges, M. Pringle (4),
Nguyen Van Lap (5), Nguyen Anh Duc (6)

(1) School of Geosciences, University of Aberdeen, Aberdeen, UK, (2) Research School of Earth Sciences, University and Birkbeck College London, UK, (3) Australian National University, Canberra, Australia, (4) Massachusetts Institute of Technology, Cambridge, MA, USA, (5) Sub-Institute of Geography, Ho Chi Minh City, Vietnam, (6) Vietnam Petroleum Institute, Hanoi, Vietnam

Reconstructing evolving erosion in East Asia is important to understanding the timing of topographic uplift in Tibet, the intensification of the East Asian monsoon and to quantifying the processes that control erosion. Although study of sediment source regions is important to such reconstructions, the long-term history of erosion and drainage capture in this area is necessarily preserved in the sediments of the continental margins, which were carried to their present location by the major river systems flowing out of Tibet. However, if we are to read this sedimentary archive then the relationships between modern river clastic loads and the present climatic, topographic and tectonic situation must be documented. In this study we sampled sediment from near the mouths of the Mekong and Red Rivers in Vietnam and analyzed them using apatite and zircon fission track, Ar-Ar dating of micas, and U-Pb dating of zircon in order to distinguish the river clastic loads and constrain sources. Both rivers show a population of AFTA ages around 25 Ma, but with more older grains, as old as 90 Ma seen in the Mekong. ZFTA shows some younger Cenozoic ages, but with a significant population of grains with 230-260 Ma ages, many probably derived from sources affected by the Triassic Indosinian orogeny. Ar-Ar mica ages are slightly younger in the Mekong than in the Red River, 160-210 Ma versus 190-240 Ma. Both rivers appear to be mostly influenced by erosion of Indosinian rocks, with only moderate amounts of material coming from the high-grade Cenozoic metamorphic rocks in the

strike-slip shear zones of the Red River, Three Pagados and associated fault zones. U-Pb zircon ages are consistent with this broad pattern of erosion, but these data also highlight the influence of the Central Highlands of Vietnam on sediment flux to the Mekong (grains around 450 Ma), and the moderate flux of material from the southern edge of the Yangtze Craton into the Red River (grains of around 800 Ma). There appears to be no evidence of significant erosion from mainland Indochina, including the Khorat Plateau, into the Mekong River. Sediments of the Mekong and Red Rivers are resolvable different in their cooling histories, reflecting the dominant path of the Mekong through the Lanping-Simao and Qiangtang Blocks, while the Red River follows the shear zone that reactivates the suture between Indochina and the Yangtze Blocks. However, both rivers largely reflect erosion of source regions on the SE flank of the Tibetan Plateau, where rock uplift is occurring under a strong influence of the East Asia summer monsoon.