Detrital provenance analysis of the river sediments of Taiwan

C.Y. LAN[1]*, T. USUKI[1], C.Y. TSENG[2] AND S.L. CHUNG[3]

[1]Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan, ROC (usu@earth.sinica.edu.tw) (*correspondence: kyanite@earth.sinica.edu.tw)
[2]Department of Earth Sciences, National Chen Kung Univ., Tainan, Taiwan, ROC (yuan1515@yahoo.com.tw)
[3]Department of Geosciences, National Taiwan Univ., Taipei, Taiwan, ROC (sunlin@ntu.edu.tw)

U-Pb dating of detrital zircons from modern drainages is ideal for study the provenance. We report LAM-ICP MS U-Pb ages of 463 zircons from river sediments of six rivers including the Lanyangxi (LYX), the Nanaobeixi (NABX), the Nanaonanxi (NANX), the Hopinxi (HPX) and the Liwuxi (LWX) distributed in NE Taiwan and the Choshuixi (CHSHX) in central Taiwan.

For NE Taiwan, the rocks covered the drainage area of NANX are mainly late Paleozoic to Mesozoic metamorphic basement rocks whereas the rocks exposed in the LYX are mainly Oligocene to Miocene weakly metamorphosed clastic rocks. The rocks exposed in the drainage area for the rest three rivers of NE Taiwan are late Paleozoic to Mesozoic metamorphic basement rocks and Eocene and Miocene weakly metamorphosed clastic rocks. The rocks spread over the drainage area of CHSHX in central Taiwan are Eocene to Miocene weakly metamorphosed clastic rocks and Miocene to Pleistocene clastic rocks.

Age populations of detrital zircons from these rivers have been used to assess the source regions for the exposed rocks in the drainage area. Generally, peaks at late Neoarchean to early Paleoproterozoic (~2500 Ma), late Paleoproterozoic (~1900 Ma), late Mesoproterozoic to early Neoproterozoic (~1000 Ma), Caledonian (410-480 Ma) and Yanshanian (90-250 Ma) are distinct and consistent for the six rivers. Among them, the Yanshanian peak is the strongest. The age spectrum of four rivers covered the metamorphic basement rocks in NE Taiwan (here as group 1) is different from that of the rest two rivers with their drainge areas covered by the Cenozoic rocks (here as group 2). The late Paleoproterozoic age (~1900 Ma) that is prominent in the group 1 and the CHSHX is weak in the LYX. The late Mesoproterozoic to early Neoproterozoic age (~1000 Ma) and Caledonian age (410-480 Ma) can be clearly recognized in the group 2, whereas they are weakly presented in the group 1. Different age patterns between detrital zircons from the basement and Cenozoic rocks may imply the different source provenance. Further analysis is required for detail study the zircons from individual strata .

Sulfur isotope as an approach tracing cycling of sulfur in small karstic river basins in Southwestern China

Y.-C. LANG, C.-Q. LIU, H. DING, S.-L. LI, J. LI AND Z.-C. XUE

State Key Laboratory of Evironmental Geochemistry, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550002, China (langyc822@163.com, liucongqiang@vip.skleg.cn, tigerding@gmail.com, lisiliang@vip.skleg.cn, lijun5931@163.com, zichenxue@163.com)

For a better understanding of the linkage between eco-environmental change and the bio-geochemical cyclying of sulfur and its effects on those of other nutrients such as carbon and nitrogen in karstic region, we have conducted a study on hydro-geochecmial features of surface water in several small river basions with different geological and ecological back grounds in Guizhou Province, Southwestern China. The major ion compositions and sulfur isotope composition ($\delta^{34}S$) of more than one hundred water samples collected from karst and non-karst areas show a wide variation, and are dominated by Ca^{2+}, Mg^{2+}, SO_4^{2-}, and HCO_3^- ions in karst area and by $Na^+(Ca^{2+})$ and HCO_3^- ions in non-karst area. This chemical compositional feature should be ascribed to dissolution mainly of carbonate rocks, clastic silicate rocks, and sulfate evaporite in the river basins. Moreover, the chemical composition of the waters shows a close relationship with ecologial background of the river basin.

Sulfate ion has largely variable concentrations of from 0.7mg/L to 124.5mg/L, and variable $\delta^{34}S$ values of from -13.1‰ to +9.0‰. Several sources are responsible for the varition of sulfate concentration and of $\delta^{34}S$ values, which include dissolution of sulfate evaporite, oxidation of sulphide minerals and organic matter in the strata, and atmopheric deposits. Stoichemistrical analysis and sulfur isotope signatures show that cycling of sulfur in the river basins is linked to the eco-environmental change and the cycling of carbon.

This work was financially supported by the Ministry of Science and Technology of China (Grant No. 2006CB403205), the National Natural Science Foundation of China (Grant No. 40603004) and the CAS Actionlan for West Development (Grant No. KZCX-XB2-08-01).