# Adsorption-and desorption-controlled Molybdenum isotope fractionation during weathering process of granite from Guangdong province, south China

ZHIBING WANG[1], JINLONG MA[1,*], JIE LI[1], GANGJIAN WEI[1,*], WENFENG DENG[1], LE ZHANG[1]

[1]State Key Laboratory of Isotope Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China. (wangzhibing@gig.ac.cn)

Molybdenum isotope system has become one of the most important tracers for redox state in the ancient oceans. The application of this system is adopted a critical assumption that the composition of continental input is similar to the mean value for average basalts and granites. Recent work has shown that the $\delta^{98/95}$Mo composition of global rivers is heavier than that of the average for continental rocks, and display a range of from 0.2‰ to 2.4‰, indicating that $\delta^{98/95}$Mo potentially fractionate during the soil-forming (pedogenic) or chemical weathering processes. However, at present, the $\delta^{98/95}$Mo fractionation mechanism during the soil-forming (pedogenic) or chemical weathering processes is in debate [1, 2].

Here, we present both Molybdenum abundances and $\delta^{98/95}$Mo compositions in granite weathered profile from Guangdong province, south China, with the aim of evaluating the mechanism of $\delta^{98/95}$Mo and Mo abundance variations during chemical weathering. The investigated data show that the $\delta^{98/95}$Mo value of granite weathered profile display a general increasing trend upward from -1.04‰ to 0.08‰ (relative to the JMC standard), and the Mo abundances opposite trend. We assessed Mo abundances and $\delta^{98/95}$Mo as a functions of organic matter content, Fe-Mn oxide abundance, mineral composition abundance, atmospheric input, and Mo gain/loss. We find that the kaolinite abundance display a good negative correlation with $\delta^{98/95}$Mo and positive correlation with Mo abundance. Meanwhile, the Fe-oxide abundance display a weakly positive correlation with $\delta^{98/95}$Mo and negative correlation with Mo abundance. These suggest that the kaolinite adsorption is a major mechanism for $\delta^{98/95}$Mo and Mo abundances variations during chemical weathering and Fe-oxide absorption play a subordinate role. Our results can provides the reason for why the riverine $\delta^{98/95}$Mo is heavier than that of the average for continental rocks.

[1] Siebert et al. (2015) GCA, 162, 1-24. [2] King et al. (2016) CG, doi:10.1016/j.chemgeo.2016.01.024.