

## **Behavior of lithium isotopes during continental weathering revealed in a granitic saprolite profile from Huizhou, south China**

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To study the behavior of lithium (Li) isotope during continental weathering, the Li concentration and isotopic composition of a saprolite profile (with thickness of 9.6 m) developed on granite from Huizhou, south China have been measured. The results show that saprolite samples have highly variable Li concentrations and  $\delta^7\text{Li}$  value of 2.3 to 16.3 mg/kg and -8.6‰ to 14.0‰, respectively, and the fresh rock has Li concentrations and  $\delta^7\text{Li}$  value of 2.9 mg/kg and 1 ‰, respectively. As weathering progresses, saprolite samples below 2.6 m show a trend of decreasing  $\delta^7\text{Li}$  value (from -1.0‰ to -7.7‰) and generally depleted in lithium content (normalized to Al) relative to fresh rock. As expected, these results are consistent with the release of heavy Li to the hydrosphere and formation of isotopically light Li in the weathered products. However, the saprolite samples above 2.6 m of the profile show an increasing  $\delta^7\text{Li}$  value (from 3.0‰ to 14‰) with increasing weathering intensity (as measured by the chemical index of alteration (CIA)). This seems to be contradictory with the formation of isotopically light Li in saprolites. Further analysis found that a good correlation ( $R^2=0.77$ ) is seen between Li content (normalized to Al) and  $\delta^7\text{Li}$  value from these saprolite samples. In addition, the location of the profile is very close to the sea with a distance about 57 km. Accordingly, we conclude that the saprolite samples adjacent to the surface could have been supplied by rain water which probably mixed with sea aerosol with relatively high  $\delta^7\text{Li}$  value, generating a gradually increasing  $\delta^7\text{Li}$  value of the profile upper 2.6 m; additionally, the saprolite samples below 2.6 m have affected by this process insignificantly and present relatively low  $\delta^7\text{Li}$  values.

This work was jointly supported by the National Natural Science Foundation of China (Grant No. 41210004; 41661144042).