Variations of Mo Isotope during Intensive Weathering of Basalt

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Terrestrial input is one of the most important factors to influence the Mo isotope cycles in the ocean, and understanding the variations of Mo isotope during chemical weathering can help to constrain the terrestrial Mo isotope budgets. The high precision $\delta^{98/95}$Mo of the weathering products (saprolite) of a weathering profile developped on the Neogene basalt in Hainan Island, South China have been studid. The $\delta^{98/95}$Mo of the saprolites show very large variations, ranging from -0.27±0.06 ‰ (2σ) to 0.44±0.07 ‰, while the fresh parent basalt has a $\delta^{98/95}$Mo value of ~ 0 ‰. The negative $\delta^{98/95}$Mo generally occur on the top of the profile, where weathering is extreme intensive, and at the bottom section, where Mo is relatively enriched. The positive $\delta^{98/95}$Mo generally occur in the middle section of the profile, where oxidant is plentiful. Robust positive correlation occurs between the $\delta^{98/95}$Mo and Ce anomaly (Ce*/Ce) on this profile, with correlation coefficient of 0.83 (N=19, p<0.00001). This indicates that the variation of Mo isotope during chemical weathering is largely controlled by redox status, and positive $\delta^{98/95}$Mo tend to be incorporated into the secondary minerals under oxide environments. This result suggests that the variations of the terrestrial Mo isotope is complicate, and many works should be done before the terrestrial Mo isotope budget could be well constrained.