Distribution of B and variation of $\delta^{11}B$ in basaltic weathering profile from Hainan island, South China

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A 60-meter core spanning from the fresh parent rock to laterites was drilled from a Cenozoic basaltic weathering profile in Hainan Island, South China to investigate the behaviour of elemental and isotopic geochemistry during intensive chemical weathering. B contents and B isotopic compositions were measured to exhibit B distribution and boron isotopic fractionation during the weathering process. Normalized to Ti, τ_B (the percentage changes of B relative to Ti) values in most samples show negative values and have great variations ranging from -2% to -78%. $\delta^{11}B$ also show a great variation in weathering products ranging from -4.5 to 2. τ_B values are gradually decreased from the bottom parts to the middle parts with the continuous increasing of CIA, indicating a successive release of B from the profile during chemical weathering until the CIA values close to 100%. τ_B values in the bottom parts have a low loss and most samples keep relative constant values of about -22%. The τ_B variation on the profile is close associated with that of the pH values. When pH values decrease from 6.3 to about 5.3, τ_B values are gradually decreased to -78%. This suggests that B was easier to be removed from the profile at low pH condition. The positive correlation between Si and τ_B values suggest that B is mainly hosted in the silicate minerals, consequently, B is released during the decomposition of primary silicate minerals and the re-construction of second silicate minerals. Meanwhile, $\delta^{11}B$ show negative correlation to Si concentrations, τ_B values and pH values. This suggests that lighter boron isotope (^{10}B) are preferentially released from the profile at low pH values, and, heavy boron isotope (^{11}B) tends to be hosted in the residual products during decomposition and re-construction of silicate minerals.