Cenozoic weathering record within Suriname Laterites

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Laterite formations occupy 1/3 of the Earth's land surface and represent about 80% of the global soil volume. Lateritic profiles can be more than one hundred meters thick and result from long-term (up to tens of millions of years old) and intense chemical weathering of silicate rocks. As such, laterites are both actor of Earth's climate evolution through CO_2 consumption by silicate weathering and witness of past climatic conditions and weathering processes recorded by successive generations of secondary minerals (kaolinite, hematite, goethite …).

The current research investigates an entire weathering profile, developed on the Guiana Shield, sampled in the Brownsberg Natural Park in Suriname. The sampling region is geodynamically stable and has remained in equatorial position for the last 100 Myr, with lateritic development since early Tertiary [1]. Such latitudinal stability offers the possibility to look at the effect of past climate oscillation on weathering profile development.

The lateritic profile shows a strong depletion in both alkali and alkaline-earth elements as well as in Si, and an enrichment in Fe, particularly in the duricrust. Using mineralogy, geochemistry, investigation and preliminary (U-Th-Sm)/He ages of Fe oxides from the duricrust, we investigate the presence of multiple generations of Fe oxides, that could have formed through successive processes of dissolution/re-precipitation.

[1] Theveniaut and Freyssinet, 2002. Pal. Pal. Pal., 178, 91-117