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Geochemical characteristics and in-situ Quartz oxygen isotope ratio in a Terra Rossa profile: an unconsolidated paleosol horizon

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An epikarst-Terra Rossa profile is developed in gently dipping early-middle Triassic dolomite rocks on karst terrain of Guizhou Plateau, China and with four horizons recognized in the field.

Our results shown that the variations of major, trace elements and isotopes ($^{87}Sr/^{86}Sr$ and $^{13}C_{SOC}$) were well correlated in weathering profile, indicating it was obviously inherits that of its underlying bedrock. The strong χlf signal of the profile was consistent with its high degree of pedogenesis and was sensitive to the relative concentration of pedogenic superparamagnetic particles in soils.

Quartz was isolated in the fine fraction (50-100μm in diameter) from bulk soil samples and ion microprobe data are obtained. Quartz origin from two sources was established: weathering igneous and metamorphic rocks ($\delta^{18}O$=12.5±1‰) and low-temperature authigenic sources ($\delta^{18}O$=17±1‰) . Concurrently, the former of oxygen isotope ratio present the less in Northern Hemisphere continents. The result indicated the material sources of Terra Rossa derived from soils across tropical and equatorial climate with consistent that the study areas were located in Southern Hemisphere continents in the Permian.

Our results support the conclusion that the terra rossa is derived from an in-situ red paleoweathering crust, which has recording the changing of climatic variations in the Quaternary and the result of the long-term effects of the ancient environment.