Origin of pedogenic carbonate nodules in silicate settings by using $^{87}Sr/^{86}Sr$ and ε(Nd)

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Pedogenic carbonates result from interactions between the Ca and C terrestrial cycles. Understanding their forming processes is paramount, especially in silicate settings, where they can constitute a significant sink of carbon. In northern Cameroon, large accumulations of pedogenic carbonate nodules are observed in different geological settings (from granitic and basaltic bedrocks) and seem to be systematically associated with the occurrence of Vertisols [1]. These Vertisols, which are nowadays largely degraded, are likely inherited from a wetter period than present-day, and developed in a clay-rich parent material (CRP), which origin remains unclear [1]. This study aims to determine the Ca sources of the carbonate nodules as well as the origin of the CRP using Sr and Nd isotopes [2][3].

$^{87}Sr/^{86}Sr$ signatures of carbonate nodules are close to $^{87}Sr/^{86}Sr$ signatures of plagioclases from each bedrock source, pointing to a local origin for Ca. $^{87}Sr/^{86}Sr$ and ε(Nd) signatures of the non-carbonate fraction of CRP are consistent with a mix of bedrock components and an allochthonous material, which isotopic signature is similar to those of aeolian Saharan dusts [4]. Thus, the CRP is probably a mix between the local bedrock and an aeolian fraction from the Sahara.

In the specific context of northern Cameroon, Ca source of pedogenic carbonates is mainly provided by local plagioclases, in contrast to other well-documented environments where atmospheric inputs are predominant. The CRP contains high amounts of smectites, which have a high cation exchange capacity [5], and may have contributed to Ca storage. Nevertheless, the ways Ca is concentrating and carbonate nodules are forming are still pending questions, in which life influence is likely to be inevitable.

[1] Diaz et al (2016) *Geomorphology* **xx**. [2] Capo et al (1998) *Geoderma* **82**. [3] McLennan et al (1993) *GSA* **284**. [4] Abouchami et al (2013) *EPSL* **380**. [5] Bohn et al (1985) Soil Chemistry.