Ca sources for pedogenic carbonate nodules in a silicate watershed (Far-North Cameroun)

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Unexpected pedogenic carbonate nodules are observed in clayey-loamy soils of a silicate watershed (Far-North Cameroon). Occurrence of such pedogenic carbonates is enigmatic in this semi-arid area. $^{87}Sr/^{86}Sr$ and ε(Nd) have been used to trace Ca and parent material that comprise nodules and soils [1] [2].

According to $^{87}Sr/^{86}Sr$ signatures of carbonate nodules (0.711200 ± 484 on average, n=10), their Ca source is mainly attributed to local granite plagioclases that show similar isotopic compositions. The quantity of nodules accumulated at the surface reach 17 kg/m^2. One kilogram of nodules contains 280g ± 25 g of Ca (n=10), whereas one kilogram of granite contains 8 g of Ca. Due to this budget, and despite the huge amount of available granite, some specific processes are needed to retain and concentrate Ca in this acidic geosystem.

The mean values of $^{87}Sr/^{86}Sr$ and ε(Nd) of clay-loamy soils (0.719646 ± 75 and -11.68 ± 0.23, n=4, on average and respectively) are close to the signature of the average Saharian dust (0.7179 and -12.0, respectively [3]). The clayey-loamy soils and the presence of smectites provide good conditions for Ca concentration.

Albeit processes responsible for pedogenic carbonate formation remain elusive, the Ca source of North Cameroon nodules seems to be local, excluding any major allochthonous sources, contrary to the observations from other sites [4]. However, the aeolian part in the clayey-loamy soil plays a key role in the Ca conservation in this acidic geosystem.

[1] Capo et al (1998) *Geoderma* **82** 197-225. [2] Borg et Banner (1996) *GCA* **60** 4193-4206. [3] Pelt et al (2013) *Chemical Geology* **341** 147-157. [4] Chiquet et al (1999) *GCA* **63** 311-323.