

Dear Dr Charbonnier and colleagues,

After reading your manuscript and the suggestions by Reviewer #1, I have decided to accept your publication, subject to minor revisions. Please have a look at the reviewer's suggestions for necessary corrections. Your manuscript is very long with 11 different figures. Please consider whether it is possible to move some of your figures, and maybe also parts of your discussion to the appendix.

Best regards,

Edzo Veldkamp

We thank the editor for giving us the opportunity to publish our manuscript in Biogeosciences. Regarding the size of the manuscript, all of the technical discussion had already been moved to the Appendices and Supplementary Material during the previous round of revision, hence it seems hard to find other parts of the text that are easily removable. Therefore, we would prefer to keep the text as it is, especially given the fact that this text is the fruit of an extensive discussion with the reviewers. Nonetheless, during this last round of revision we moved one figure (Fig. 3 now Fig. S3) to the on-line supplementary material, removed another figure (Fig. 11) that was not necessary for the understanding of the manuscript, and optimized the layout of a third figure (Fig. 4), all in order to shorten our manuscript.

I thoroughly reviewed an earlier version of this manuscript. Given that the authors convincingly addressed all main concerns and almost all minor comments raised by both reviewers, reviewing this manuscript again was a real pleasure. Also, the English is very good now. In cases in which the authors did not follow the reviewer suggestions they provide convincing arguments for their opposite view. All in all, the revisions helped to improve the previous and anyhow very good manuscript. I suggest publication of this manuscript after addressing the only few and very minor comments below.

Cheers, David Uhlig

We thank the reviewer for this constructive comment and we appreciate his open-mindedness on the several opposite views we had during the revision process. In overall, he allowed us to strongly improve the manuscript and especially regarding the nutrition strategy of the vegetation. Below we detail the different technical changes that we made.

L.1 better should read "...element cycles on the Earth surface ..."

We changed "cycling" to "cycles" (line 1).

L.4 please add the abbreviation (Ba) next to word barium

We added "(Ba)" (line 5).

L.25 Typo: the multiply symbol reads like a comma and the citation style in the abstract should be checked for journal style

We replaced "." by the multiply symbol and changed the citation style (line 25).

L.49 Typo: long-term
“-“ has been added (line 49).

L.70 Please add the half-life time
We reworded the sentence “given its half-life of 10^{21} yrs” (lines 69-70).

L.114 Typo: remove spacing before the comma
We removed the space before the comma (line 114).

L.121 “consist of” instead of “consist in”?
We changed “in” by “of” (line 121).

L.145 plural for “concentration” to be consistent with e.g. L. 149
We changed for “concentrations” (lines 145 and 153-154).

L.176 “total procedural blank” instead of “blank procedure” as the latter reads like a method
We changed to “total procedural blank” (line 176).

L.362 Typo: “mm/yr” to be consistent with e.g. t/km²/yr
We corrected to mm/yr (line 362).

L.398 replace “strong” by “high”?
We replaced “strong” by “high” (line 398).

L. 419 Provided that F^{Ba}_{sec} is also increasing with D it reads misleading to emphasize the biological uptake flux is this sentence only. This sentence needs a slight rewording
The fact that the absolute flux of secondary phase formation increases at higher denudation rates -excluding very high denudation rates- was already emphasized in Dellinger et al. (2015). Then mentioning that F^{Ba}_{sec} increases as well with denudation rates is the most “striking features” might be seen as an overstatement. Nevertheless, we changed the sentence to “The most interesting and novel observation” (line 419).

L.624 I do not understand the wording “after important deforestation” and suggest the deletion of the word “important”.
We removed the word “important” (line 624).

L.649 To my understanding it should read NPP (net primary productivity) in equation 17 because according to Chapin et al. (2012) (page 161, eq. 6.2) $NPP = GPP - R_{plant}$ where R is respiration. To my understanding this is exactly what the authors mean by $NEE = GPP - TER$ in the manuscript. Thus, there is no need to introduce the “NEE”.
We changed the term NEE to NPP here and elsewhere in the text when it was necessary (lines 649-650).

L.651 Typo: “values ... differ” not differs
We corrected this (line 651).

L.671 Typo: should read “behavior”
We removed one of the two “behavior” (line 670).

L.674 To me it reads that the recycling strategy causes less uptake of “new” nutrients. But actually, the lack of substantial litter export in the described scenario does not require “new” nutrient uptake by plants. Thus, in my opinion the wording “minimizes” (which I understand as causing a strategy) is not correctly used here and needs rewording.

We reworded the sentence (lines 673-674).

L.702 Please add in brackets “R(sil+bio)/sil” behind “weathering fluxes”

We added “(R(sil+bio)/sil)” after weathering fluxes. (line 701).

L.718 Typo: should read “nutrient cycling” and a point is missing at the end of the sentence.

We corrected “nutrient” and added a point (line 718).

L.761 Provided that isotope fractionation factors (in this manuscript the capital delta) are used I found it quite confusing to read the alpha as a symbol for proportions in appendix A and B and would encourage the authors to use an alternative symbol, e.g. “f” for a relative fraction.

The alpha term as the relative contribution from the different rock dissolution to the dissolved species directly derives directly from Dellinger et al. (2015) paper and tables within it. Therefore, we preferred to keep the same term for the sake of the consistency and clarity for peoples interested in reading this paper and the Dellinger et al. (2015). Moreover, the use of “f” as a relative source of dissolved species in the river might be confounded with “f” as the extent of processes after rock dissolution (e.g. $f_{\text{sil}}^{\text{Ba}}$ vs $f_{\text{sec}}^{\text{Ba}}$).

L.775 Typo: should read “... influence of ...”

We corrected this (line 776).

L.789 Typo should read “as shown in ...”

We added “in” (line 787). Also, we added the values for each (Ba/Na)₀ (lines 787-790).

L.840 Typo: should read “... in detail ...”

We corrected this (line 841).

L.871 Typo: please add “eq” to (3)

We added “eq” before (3) (lines 870 and 873).

L.879 Typo: should read “... which is a ...”

We added “is” (line 881).

L.881 Typo: should read “dimensional value ...”. Also, this sentence is difficult to read. I suggest ending the sentence after $f^{\text{Ba}}_{\text{bio}}$ and begin a new sentence.

We changed to “value” line (883) and the sentence has been reworded after $f^{\text{Ba}}_{\text{bio}}$ “Below, we show how to calculate the net biological uptake flux for major rock-derived nutrients based on $f^{\text{Ba}}_{\text{bio}}$ computations.” (lines 883-884).

Supplement:

L.6 should read “... of the river dissolved load”?

We added “load” (line 6).

L.32 Typo: should read "... stacked to produce one ..."
We removed "one" (line 32).

L.35 should better read "... to reconstruct the ..."
We changed to "reconstruct" (line 35).

L.40 Typo: should read "... to Li"
We removed "the" before "Li" (line 40).

L.46 preposition missing, should better read "river mass budget equations for the ..."
We added "for" before "the" (line 46).

L.52 better should read "... but applied it to Li"
We added "to" before "Li" (line 52).

Reference used:

Dellinger, M., Gaillardet, J., Bouchez, J., Calmels, D., Louvat, P., Dosseto, A., ... & Maurice, L. (2015). Riverine Li isotope fractionation in the Amazon River basin controlled by the weathering regimes. *Geochimica et Cosmochimica Acta*, 164, 71-93.