Dear editors,

I appreciate your comments and considering our paper to be published in ESurf.

The comments give us a lot of help and make the manuscript improved a lot.

This time, we revised again according to the follow comments you gave.

1. Both reviewers also asked how the amount of fertilizer used was determined. Although these questions were answered in the reply document, no changes were made to the manuscript. Please add a couple of sentences to the manuscript to describe how the fertilizer amounts were decided, and how they compare to the amounts used on agricultural fields.

Changed in the manuscript: we added some information about the added amount of each fertilizer. See the manuscript.

2. Some statements in the Results section are not technically correct, related to whether or not observed differences between the experiments were significant. For example, at lines 198-199, the text says that “The remaining treatments made no significant differences in the Rw and Raw of limestone and dolostone in comparison to the control treatment.” However, several of these treatments did show statistically significant differences relative to the control, based on the results in Table 2. For example, the Raw for limestone with NH4Cl was 4.43±1.73, compared to the control value of 2.00±0.58. This is a statistically significant difference, though it is much smaller than for the other fertilizers. It is thus not correct to say that the changes observed with NH4Cl were insignificant. Please change the wording of the text to note that the differences were much smaller for these treatments, but that they were in some cases still statistically significant.

Changed in the manuscript: we rewrite all the statements about this problem.

3.The following should also be corrected to fix grammatical errors or statements that are unclear:

Changed in the manuscript: we corrected them.

Line 70: “world”, not “global”

Line 76: 100% OF NO3-

Line 78: “a deviation”, not “an evaluated deviation”

Line 87: remove “fully” – this study cannot on its own achieve full understanding of these effects

Line 97: remove However

Line 102: “the preferred method” is subjective – as you say at the end, it is also possible to measure rates hydrochemically, and preference is largely down to different researchers – suggest replacing with “a well-established method” or similar language

Line 124: which WAS sampled

Section 2.2: I would prefer to see a sentence added to clarify how the concentrations of each solute in your extractions (e.g., P, K, Ca, Mg, Fe, and S) were analyzed

**Changed in manuscript:** we added some information about it.

Line 149: These, not there

Line 158: What does “orderly” mean? This needs more detail in my opinion. See above.

Line 166: on, not in

Line 193: The differences are significant, just not as significant as for the treatments with NH4-based fertilizers. Please reword.

Line 199: Again, the differences were statistically significant, though small.

Line 205: Remove the mention of the common ion effect here. This is discussion, not results, and is repeated in Section 4, where it is more appropriate.

Line 208: except FOR THE (NH4)2CO3 treatment

Line 208: demonstrating, not exhibiting

Line 209: weathers, not weather

Line 215: suggest rewording to “rather than separately discussing the individual…”

Line 235: probably, not probable

Line 254: remove the formula for urea here, since it is specified in the line above

Line 270: remove “supposedly”

Line 306: provide a citation here for the effect of PO4 inhibiting calcite (and dolomite) dissolution

Line 314: provide a citation here for the effect of PO4 inhibiting calcite (and dolomite) precipitation

Line 317: differences, not differenceS

Line 318: amounts, not amount

Line 320: I assume you mean “1.06 moles NH4 per mole urea”? Please specify

Line 321: same issue with units as line 320

**Answer:** no, it isn’t. In fact, it is the molar amount in total of added fertilizer.

**Changed in manuscript:** we rewrite it.

Line 329: demonstrated, not proven

Lines 335-337: any reference to support the argument that these fertilizers are easier to decompose and produce NH3?

Line 344: remove “more or less relative to” which does not make sense as an English expression

Line 350: remove “However, in Fig. 3”

Line 355: remove “on”

Line 357: remove “process”

Line 372: remove “double”

Line 376: become, not became

Line 392: AN orchard

Line 397: remove comma in Zeng et al. citation

Line 399-400: remove “due to its own limits in methodology” which is an unclear statement

Line 400: remove comma in Semhi et al. citation

Line 407: remove comma in Amiotte Suchet et al. citation

Line 415: need a space before (Yue et al., 2015)

Line 427: note as above, that there is an effect on carbonate weathering, just much smaller than for other fertilizers

Table 4, column 4: change to “molar amount NH4/mole fertilizer”

**Answer:** no, it isn’t. In fact, it is the molar amount in total of added fertilizer.

Figure 2: I assume the bottom 2 cm are the gravel and sand – change the shading to illustrate this difference, and/or add a label on the left side of the figure

**Changed in manuscript:** we draw a new figure to interpret the on-site layout of all soil columns.

Thank you all so much.

Feel free to contact me if any question.

Best regards,

Chao Song