Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2019-173-RC2, 2019

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Exogenous phosphorus compounds interact with nitrogen availability to regulate dynamics of soil inorganic phosphorus fractions in a meadow steppe" *by* Heyong Liu et al.

Anonymous Referee #2

Received and published: 16 July 2019

Nutrient management in intensively utilized grasslands is an essential topic that draws considerable attention in current studies. This study of P and N manipulation was done in an important ecosystem where a large population is supported. It has the potential to address the key question on soil P transformation and to advance our understanding of how P and N interacting to affect soil fertility of the meadow grasslands. However, there some minor issues should be properly addressed before being acceptable for publication in Biogeosciences. P2 Line 14-15: logic leaps exist in the statement 'Moderate-cycling IP was mainly regulated by aboveground plant biomass with KH2PO4 addition, while by soil pH and plant biomass with addition of Ca(H2PO4)2'. Please change 'plant biomass' into 'plant P uptake'. P2 Line 24: Please change the

Printer-friendly version

Discussion paper

keyword ‘soil phosphorus’ into ‘nitrogen enrichment’. P3 Line 3: change ‘50-90%’ into ‘50%-90%’. P3 Line 17-18: ‘labile/ available P (Olsen P), moderate-cycling P fractions (Al-P, Fe-P, Ca2-P and Ca8-P)’. according to the Methods introduced by the authors, ‘Olsen-P was extracted from air-dried soil with 0.5 M NaHCO3 (pH 8.5)(Olsen et al., 1954)’, while ‘Ca2-P was determined by shaking 0.5 g soil with 25 ml 0.25 M NaHCO3 (pH 7.5)’ , and in contrast to Fig. 3a,b and Fig5.a,b, Ca2-P is more suitable to classified into ‘labile’ fraction. The statement should be ‘labile P (Ca2-P)/ available P (Olsen P), moderate-cycling P fractions (Al-P, Fe-P, and Ca8-P)’. P3 Line 21: delete ‘understanding’. P4 Line 1: reword ‘content’ into ‘concentration’. P5 Line 6: suggest to rephrase ‘release of P from soil organic P’ into ‘mineralization of soil organic P’. P5 Line 25: ‘soil labile IP (Olsen-P)’: ‘Soil labile IP (Ca2-P) or available P (Olsen-P)’. P6 Line 1: remove ‘Ca2-P’. P7 Line 12-13: maybe, this sentence should be written as ‘The plants were sorted to species and oven-dried at 65 for 48 h, then weighed and ground’? Because the way you did these should be to determined aboveground net primary productivity and get plant samples ground to measure plant P concentration. P7 Line 24: change 0.5g into 0.5 g. P8 Line 16-18: change ‘Total IP (TIP) concentration was defined as the sum of moderate-cycling IP (Al-P, Fe-P, Ca2-P and Ca8-P) and recalcitrant IP (Ca10-P and O-P).’ into ‘Total IP (TIP) concentration was defined as the sum of liable IP (Ca2-P), moderate-cycling IP (Al-P, Fe-P, and Ca8-P) and recalcitrant IP (Ca10-P and O-P).’ P9 Line 24: plant P uptake should be incorporated in the SEM model instead of plant biomass. If plant biomass is included, it should be explained by P fractions/ P availability. But do not use plant biomass to explain P fractions. P 12 Line 12: Even though plant biomass production consume soil P, it would be better to directly use the parameter of plant P uptake as you calculated in P 9 Line 5. P15 Line 16-17: In this study, you were unable to determine the relative transformation rates of the two compounds. But the results of higher O-P and Ca10-P suggested that a higher proportion of Ca(H2PO4)2 was converted into stable inorganic P forms. So, please correct this point. P16 Line 7 & 22: Be aware that the mechanistic description might change if you replace the parameter of plant biomass with plant P uptake. P18 Line 19-20 change

‘Phosphate Release Kinetics in Calcareous Grassland and Forest Soils in Response to H+ Addition’ into ‘Phosphate release kinetics in calcareous grassland and forest soils in response to H+ addition’ P19 Line 9: Lolium perenne and Pinus radiate, italic. P20 Line 1-2: change ‘Do Nutrient Limitation Patterns Shift from Nitrogen Toward Phosphorus with Increasing Nitrogen Deposition Across the Northeastern United States?’ into ‘Do nutrient limitation patterns shift from nitrogen toward phosphorus with increasing nitrogen deposition across the Northeastern United States?’ P20 Line 24-25: change ‘Soil fertility and fertilizers an introduction to nutrient management’ into ‘Soil Fertility and Fertilizers: An Introduction to Nutrient Management’ P24 Line 20-21: change ‘Nitrogen Fertilization Effects on Grassland Soil Acidification: Consequences on Diffusive Phosphorus Ions’ into ‘Nitrogen fertilization effects on grassland soil acidification: consequences on diffusive phosphorus ions’ P26 Line 1: ‘Larix gmelinii’, italic? P30 Line 8: ‘P’, italic. P33 Line 8: ‘P’, italic. P35 Fig. 6: reshape the ‘Structural equation model’ and rewrite the Results and Discussion sections related to the SEM. P36 Fig. 7: The content in the figure is hard to read because of the background color. Remove Ca2-P from the ‘moderate-cycling P’, and instead of using Olsen as labile P, I suggest the authors use Ca2-P as labile P.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2019-173, 2019.