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Interactive comment on "Reviews and Syntheses: Ironing Out Wrinkles in the Soil Phosphorus Cycling Paradigm" *by* Curt A. McConnell et al.

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Overall I think the review is very good although, as I am not a modeller, I will be commenting more on specific methodological issues.

My own work has shown that while soil C:Pt is extremely variable and highly likely not the parameter we should be looking at C:Po is not as variable and probably much more useful. This of course raises the issue of a reliable and repeatable method for measuring Po which I do not think we have yet. While the authors mention methodological and analytical discrepancies it is done in just a couple of lines. Do the authors think it is really important or not so important, and why. While it is pretty obvious why Pi is generally poorly correlated with soil C do the authors think soil C is poorly correlated

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with Po because of the unnamed methodological or analytical discrepancies or some other, perhaps unknown, reason.

The authors suggest that as microbes are a major driver of P transformation, which may be driven by their stoichiometry, then differences or shifts in community composition could affect such transformation. Ignoring archaea, for which there is little published information, fungi and bacteria are therefore the two groups that are doing these transformation. It is generally recognised that fungi are more nutrient poor than bacteria (fungal C:P 300-1190 and bacteria C:P 5-370) and thus trying to relate fungal:bacterial ratios of different soils with P transformations maybe useful. While obtaining such a measurement is probably expecting too much it might be worthwhile seeing if forest soils and top soils in no till agriculture (which generally have high fungi:bacteria ratios) can be modelled differently to soils that are often cultivated (which often have lower fungi:bacteria ratios). Taking this to the extreme one could try modelling forest or top soils (high fungi:bacteria ratios) with soils from deeper in the profile, which often have much lower fungi:bacteria ratios.

The difference in fungal and bacterial C:P ratios may help to explain differences in P-driven Po mineralization compared to C-driven Po mineralization in different soils. As fungi do not require as much P as bacteria perhaps C-driven Po mineralization is more common in fungal dominated soils (forest or no till top soils) as they might be mainly after the energy but P-driven Po mineralization might be more common in soils with lower fungi:bacteria as bacteria might be mainly interested in the P for biosynthesis.

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