

# ***Interactive comment on “Phosphorus fertilisation under nitrogen limitation can deplete soil carbon stocks – evidence from Swedish meta-replicated long-term field experiments” by C. Poeplau et al.***

## **Anonymous Referee #2**

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This paper presents a new idea: the addition of P under N limitation can deplete soil C stocks. However, I guess that according to mechanism (1) increases on P availability can increase SOM decomposition also in N rich soils. If this mechanism is proved to be relevant SOM decomposition models should consider P availability in some way. Under which cases/scenarios P availability must be considered in order to understand SOM dynamics? Trying to transpose this idea to the real world it may be useful to identify under which situations or scenarios increases on P availability can deplete SOM. For instance increased P availability after fire (forest fire, slash burning) may hasten SOM decomposition and contribute to SOM depletion post fire. In fertilized soils it could be also relevant to test the sensitivity of decomposing activity to P additions. Another field

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in which the main finding of this paper could be relevant is trying to understand why legume species enhance soil organic matter stocks. May this be related, among other processes, to P depletion in soils growing legumes?

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Interactive comment on Biogeosciences Discuss., 12, 16527, 2015.

**BGD**

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