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Comment on bg-2021-53

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Referee comment on "Effect of organic carbon addition on paddy soil organic carbon decomposition under different irrigation regimes" by Heleen Deroo et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-53-RC1, 2021

This manuscript investigates how the addition of exogenous OC influences dissolution and mineralization of native SOC in paddy soils in function of water management, with particular attention to the role of the co-release of Fe-bound SOC. The present data are interesting and novel, and the experiments are well designed to provide the useful insights in the complex priming effect in soil.

Please find some more detailed comments below.

- Lines 17, 87, the full name of "Feox" is inconsistent. I recommend that the "oxalate-extractable Fe" is more accurate than "reducible-Fe".
- Lines 81-83, it is suggested to add the Fe reduction derived production of hydroxyl radicals in the Discussion section. During this process, the production of hydroxyl radicals is certainly essential in the priming effect of native OC mineralization.
- Line 96, I think that the total Fe and dissolved Fe are critical and should be provided here.
- Lines 156-158, why the authors did not use the typical CBD method to estimate the content of Fe-bound OC?
- Lines 366-376, root exudates can disrupt the mineral-organic associations directly or indirectly by driven redox-active bacterial communities, which are the predominant control over soil C dissolution. In the Discussion, this point should be considered.
- Line 63, 505, "Fe hydroxides"; Line 74, 88, "Fe3+ oxides"; Line 88, "Fe oxides"; Line 364, "Fe oxyhydroxides". The names of Fe minerals are very complexed. In fact, "Fe (oxyhydr)oxides" is more common than the above names.