

Interactive comment on “Nitrous oxide emissions from riparian forest buffers, warm-season and cool-season grass filters, and crop fields” by D.-G. Kim et al.

Anonymous Referee #2

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Measurements and modelling of nitrous oxide emissions in riparian zones is an important topic because there is an urgent need to determine if the promotion of riparian zone to buffer diffuse nitrate pollution does not in fact generate another type of pollution through the emission of this potent greenhouse gas. Several issues need to be addressed: What are the respective role of nitrification and denitrification in the emission rate? Can increase nitrate input increase N₂O emissions? What is the importance of the quality of the organic matter and the ratio between C and N available on the emissions? How the dry-wet soil patterns influence N₂O emissions? How to upscale field studies to landscape scale?

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In this paper the objective of the authors is to compare nitrous oxide emissions measured from 3 forested and 4 grass riparian zones as well as 1 crop field with estimates using the methodology recommended by the IPCC. Several aspects need clarification: In situ variability of emission is known to be very large. It is not clear how the authors deal with this. This study is only measuring N₂O fluxes. There is no information on the processes responsible for N₂O emission, i.e. nitrification and denitrification. Therefore it is not possible to determine what could be the driving forces. This poses problem to extrapolate results at the landscape scale Furthermore, the study is geographically very limited. The results obtained cannot be extrapolated to other areas with different hydrology or soil types for instance. Although the authors underline the importance of soil rewetting on the N₂O emissions, the sampling design does address this factor at the right temporal scale. The evaluation of allochthonous nitrate input from surface and subsurface is not clear.

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