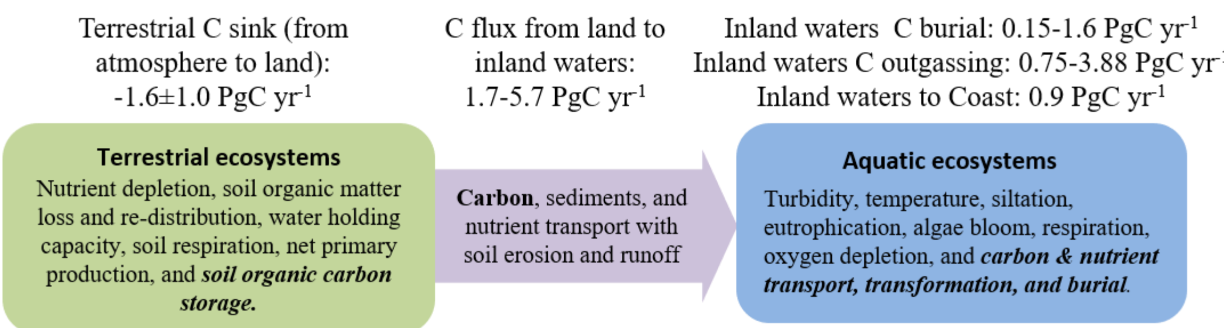
To whom it may concern,

Several days ago, I was referred to the "Soil Enrichment Protocol Version 1.0 – Draft for Public Comment" published at http://www.climateactionreserve.org/how/protocols/soil-enrichment/. It is exciting to see a such comprehensive summary and guidance for monitoring and assessing greenhouse gases (GHGs) emissions and stocks on agricultural fields. I strongly believe the upcoming "Soil Enrichment Protocol" will represent a significant milestone in agricultural GHGs accounting and management, thereby benefit future sustainable agriculture research and policy making.

While the "Soil Enrichment Protocol" has very detailed description about the soil carbon and nitrogen stocks and vertical fluxes of GHGs, it seems little attention was paid to the lateral fluxes of carbon that leave the edge of field. Note that, soil erosion and runoff cause lateral movement of sediment and C from terrestrial to aquatic ecosystems, which not only modify soil health and terrestrial biogeochemical cycles (Lal, 2003; Berhe *et al.*, 2007; Quinton *et al.*, 2010), but also impact trophic states as well as C stocks and flows in aquatic ecosystems (Cole *et al.*, 2007; Tank *et al.*, 2010; Battin *et al.*, 2009), as illustrated in the following figure.



Schematic illustration of the coupling between terrestrial and aquatic ecosystems via large amounts of C and nutrient fluxes. The ranges of land to inland waters C fluxes (Ciais *et al.*, 2013; Tranvik *et al.*, 2009; Wehrli, 2013), C burial in inland waters (Stallard, 1998; Mendonça *et al.*, 2017; Aufdenkampe *et al.*, 2011), C outgassing (Sawakuchi *et al.*, 2017; Raymond *et al.*, 2013; Cole *et al.*, 2007; Bastviken *et al.*, 2011), and inland waters to coast C fluxes (Cole *et al.*, 2007) are derived for the global scale.

Specifically for agroecosystems, soil erosion mobilizes a large amount of sediment from land to water bodies. For example, global estimates of Particulate Organic C (POC) fluxes via erosion vary from a low flux of 0.5±0.15 PgC yr^{-1} (Van Oost *et al.*, 2007), to a medium flux of 2.5 PgC yr^{-1} (Borrelli *et al.*, 2017), and to a high flux of 4.0-6.0 PgC yr^{-1} (Lal, 2003). Notably, the magnitude of the soil erosion driven POC fluxes is comparable to that of the estimated terrestrial C sink of -1.6±1.0 PgC yr^{-1} (negative sign means C flux from the atmosphere to land) (Ciais *et al.*, 2013). In addition, agricultural runoff also carries much Dissolved Organic C (DOC) into rivers.

Clearly, the magnitude of land to inland waters C fluxes indicates that lateral C movement regulates terrestrial C storage. Furthermore, the large magnitude of C storage, emissions, and discharge of inland waters highlight the need of including those components in GHG balance.

Hope lateral carbon and nutrient fluxes could be included into future versions of the "Soil Enrichment Protocol".

Regards,

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