

## ***Interactive comment on “Cultivated grasslands present a higher soil organic carbon sequestration efficiency under leguminous than under gramineous species” by Yu Liu et al.***

**Yu Liu et al.**

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Thank you very much for your positive and constructive comments and suggestions on our manuscript. We have tried to take these comments and suggestions seriously and addressed each of them in all details. We have replied to the comments point by point and all changes have been included in the MS-modified version attached as a supplement.

Manuscript is devoted to assessment of storages of carbon, but not focused on SOM quality. From my point of view the quality of SOM is the most important aspect of stabilization rate assessment. I strongly recommend to discuss it in review, results and discussion as well as in conclusion chapter. This is general comment. The particular

ones are follows: a) discussion should be more detailed, with taking into account another types of published data about post antropic successions; b) chemical mechanism of sequestration efficiency should be taken in to account, e.g. characterization of SOM by  $^{13}\text{C}$ -NMR or by kinetic parameters; c) please provide the soil name in few soil taxonomies, please specify the soil profile morphological organization, name of horizons, soil morphological features, especially of carbonate genesis; d) please provide more detailed soil chemical and particle size information.

Response: Thank you very much for your positive and constructive comments and suggestions on our manuscript entitled “Thank you very much for your positive and constructive comments and suggestions on our manuscript entitled”. In our study we calculated SOC by the relationship between SOM and SOC (Guo & Gifford, 2002) using the formula:  $\text{SOC} = 0.58 \times \text{SOM}$  (Deng et al., 2014), so SOM and SOC have the same changing tendency in our study. Moreover, we have added some discussion about SOM in our manuscript. For example, “Over relatively long time, the proportion of the aboveground biomass enters soil as organic matter and incorporates into soil through physical and biological processes. Some leachates from plant material in the litter layer, root exudates, solid decomposed litter and fragmented plant structure materials were the main sources of soil organic matter.” We have revised our discussion by re-organizing the structure and adding some details. The soil properties have been added in section 2. The details and all the changes have been included in the MS-modified version attached as a supplement.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/se-2016-109/se-2016-109-AC4-supplement.pdf>

Interactive comment on Solid Earth Discuss., doi:10.5194/se-2016-109, 2016.

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Discussion paper

