

Interactive comment on “Controls on the distribution of the soil organic matter in mountain permafrost regions on the north Qinghai-Tibet Plateau” by C. Mu et al.

Anonymous Referee #2

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This manuscript tried to clarify the main factors for affecting the SOC densities in the Tibetan Plateau based on dataset from the far north corner of the Tibetan Plateau, source region of Heihe River, Qilian Mountains. The dataset was valuable in such a data-absent region, specially, the dataset from deeper layer of soils. But the conclusions were general knowledge, which could be found in most related literatures.

The concerns and suggestions include: 1. It could be seen from Figure 1 that all the boreholes are located on the bottom of valley and the lower part (gentle) of the slopes. The sites even could not cover all the surface ecological and geological conditions of the study region. The dataset is so limited, just 10 boreholes to be considered as representatives of 3 types of ground surface conditions (AS, AM and ASM). Furthermore,

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the sampling sites are located in the far northeast boundary of the Plateau, and the area of the study region accounts for less than ten thousandth of Tibetan Plateau. All the geologic, geomorphologic, geographical and climatic backgrounds are great different from the real plateau. I do think that the dataset collected in this region just can be representative of the local condition, even not as representative of Qilian Mountain Ranges, because the climatic conditions is also great different to the western part of the mountain range. It would be better if the title of the manuscripts revised as “Controls on the distribution of the soil organic matter in the Upper Reach of Heihe River, Qilian Mountains. 2. The results in section 3.1 and 3.2 are very general description for soil organic carbon, C:N ratios and stable carbon isotopes. The highest soil organic carbon density was found in boreholes under ASM, and the lowest was at AS. Similar results were reported in great amount of literatures by Wang, et al. and Wu et al., but there is no more new. 3. SOC in deeper soil layers should be affected more by paleo-climatic, ecological and geological background of the soil formation. The authors simply correlated SOC with the moisture content and texture (gravel and clay) of the soils. It would be better to add more information about soil formation history and discuss the controlling factors of SOC for different soil layers separately. 4. L160-168: it is a general knowledge that SOC is produced by photosynthesis of plants. There is without exception for organic carbon deposited in deep soil layers. Therefore, generally speaking, the better in the vegetation, and the higher in SOC densities. So, I do think that is not so called “finding” of this paper. 5. L91: “The collected core diameter was about 15 cm.” I do think that the core diameter is not 15 cm according to the Geological drilling specification. Please check and correct. 6. L185, L189: the expression of “ $\delta^{13}C\%$ ” is right?

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