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Interactive comment on "Modeling soil organic carbon dynamics and its driving factors in global main cereal cropping systems" *by* Guocheng Wang et al.

Anonymous Referee #1

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The spatiotemporal variation of cropland soil organic carbon (SOC) across the global main cereal cropping system were analyzed based on the result of soil C turnover model (RothC), and the relationship between SOC changes and C input management, edaphic and climatic variables were also investigated in this article. Though, the modeled SOC may have bias due to the defect of the RothC model and the lack of model inputs datasets, it was still a better way to understand the spatiotemporal distribution of the SOC and its variation in a certain extent. It is very interesting and useful for the carbon input management and investigating the soil C sequestration on a global scale under the background of climate change. This paper is well presented, but the English of this paper need to be improved. The following is the concerns: 1.It was

confused by direct relationship between the net fluxes of carbon dioxide (CO_2) and soil organic carbon (SOC). "The net fluxes of carbon dioxide (CO_2) between the atmosphere and agricultural systems are mainly characterized by the changes in soil carbon stock, which. . ." in Page1 Line 10-12. CO_2 flux mainly depends on the CO_2 exchange between land surface and atmosphere by photosynthesis and respiration of the plant and decomposition of the microbe, but the variation of soil organic carbon was dominated by the carbon input. Detailed physical mechanism was suggested to be involved to link these two terms. And the same question is also found in Page 2 Line 8-9, "a small variation in soil carbon stock can lead to substantial changes in atmospheric carbon dioxide (CO_2) concentrations". 2.What does the abbreviation stand for? e.g. GIS, WISE, SOTER, HWSD, . . . 3.Why did the authors choose the 30%, 60% and 90% of the crop residue retention rates in this study? 4."enhancing the crop residue retention rate from 30% to 60% and 90% approximately induced a double and triple SOC sequestration rate, respectively (Fig. 1 and Fig. S3)" in Page 10 Line 20-21. It was difficulty to get the information of a double and triple SOC sequestration rate from these two Figures. 5. Because the air temperature and precipitation datasets are the input parameters, there should have some parameterization schemes to calculate the SOC based on the effect of temperature and precipitation in the RothC model. The derived SOC from the model has already included the information of climate change. How did you strip out this effect when attributing the variation of SOC under the background of climate change?