

Interactive comment on “Modeling impacts of management alternatives on soil carbon storage of farmland in Northwest China” by F. Zhang et al.

Anonymous Referee #2

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General comments:

The paper presents a good example of how simulation models can be used for studying the soil-plant-atmospheric processes. A large amount of information has been collected and analyzed in this study. The DNDC model has been validated using five long-term data sets in different counties in Northwest China. The paper is well-written and the conclusions are well-drawn. However, the Results and Discussion sections need more elaboration. They seem to be quite weak compared to the Introduction and Materials and Methods sections of the manuscript. It would have been appropriate to discuss how C storage and C dynamics differ in different cropping systems such as rice-rice vs. potato-fallow and the underlying biogeochemical processes associated with them. Whether the management alternatives will have similar or differential impact

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on C storage in different cropping systems also needs explanation. Besides C, addition of residues and manure will change the storage and dynamics of N in soil. There could be more emission of other greenhouse gases, particularly nitrous oxide, due to these management alternatives. Some information on this aspect will be beneficial for the readers.

Specific comments: 1. Check the values in Column 3, Table 1. The values of average annual temperature are unrealistic. 2. Bulk density of 1.7 g cm⁻³ is quite high. Check the value. 3. In Figures 2 to 6, some statistical tools such as root mean square error (RMSE) and/or index of agreement (d-stat) could be used for model validation. 4. Some of the figures such as Fig. 8 and 13 are not clear and need improvement. 5. Figures 10 to 13 can be combined into one figure. 6. Line 10, page 424. Replace 'manre' with 'manure' 7. Line 4, page 431. Correct reference is 'Pathak, H., Li, C.S. and Wassmann, R. (2005) Greenhouse gas emissions from Indian rice fields: Calibration and upscaling using the DNDC model. Biogeosciences. 2:113-123.'

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