Geoscientific
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Discussions

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Interactive comment on "Estimation of uncertainties due to data scarcity in model upscaling: a case study of methane emissions from rice paddies in China" *by* W. Zhang et al.

W. Zhang et al.

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Dear refree: Thank you very much to your suggestions to this manuscript. Followed are the response to your questions. We also made revisions according to your suggestions. The attachement file are the revised manuscript and appendix. The highlight parts are the revisions to the manuscript. Response to refree 2:

General comments: This study presents the methodology to evaluate the impact of data scarcity on model upscaling. They developed a data sharing matrix to aggregate the modeled uncertainties in divisions of a subject region. The study is a valuable contribution to the literature on estimation of uncertainties due to data scarcity in model

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upscaling. There are a number of issues that the authors will need to address. Specific comments:

1. As far as I can see, besides data sharing, there are other reasons causing correlation among different cells (e.g. similar geographical condition), which means that the uncertainties calculated in this paper may be underestimated in aggregation. It is better to mention the other sources that cause additional correlation and their effects on estimating the uncertainties in aggregation.

Re: We agree with the reviewer that the uncertainty of the methane emission from rice paddies of China was underestimated owing to the exclusion of the reasons other than the data scarcity and errors considered in the present study. Uncertainties of regional estimations come from many sources, including the model imperfection due to inaccuracy of parameters and structural fallacy of the model, as well as the data errors and poor availability of the model inputs. In Section 3.1 of the manuscript, we briefly discussed, without many details, other possible sources of the uncertainty besides the data availability (please see Line 285-307 in the revised MS).

2. P187 L4-L12. The most valuable contribution of this paper is that they developed a data sharing matrix. More details should be provided about how to calculate Cij.

Re: In the present study, we described two way of the Cij calculation. The first one is to calculate it by numeric experiments (P187L4-13, Table 1), and thereafter assigns value to the specific data sharing by looking up Table 1. The second way is quite simple and presented by the Equation 4 (P193). The Equation 4 can be used as the preliminary evaluation of the data sharing and the impacts on uncertainty aggregation.

3. P187 L21. What is DS matrix? Should "Eq.(2)" be changed to "Eq.(1)".

Re: DS matrix is "data sharing" matrix. Literal errors corrected.

4. Fig. 2. GR II contains "Fujian" according to the legend which disagrees with the figure. How did the authors divide China into five GRs? The criteria should be provided

more clearly.

Re: Fujian should be in GR I and we had fixed the problem. The GRs was defined by the dominant crop rotations in rice paddies and the climatic conditions. In GR I, double rice is the primary crop rotation and in rice paddies of GR II, rice usually rotates with upland crops in a year round. We add brief description in the figure caption to explain the division.

Please also note the supplement to this comment:
http://www.geosci-model-dev-discuss.net/7/C152/2014/gmdd-7-C152-2014-supplement.pdf

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