

Interactive
Comment

Interactive comment on “Quantifying methane emissions from rice paddies in Northeast China by integrating remote sensing mapping with a biogeochemical model” by Y. Zhang et al.

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The authors highly appreciate the anonymous referee for his/her time in reviewing this Discuss. paper. The authors have seriously considered and addressed his/her valuable comments by point-to-point responses in the following context. Revisions will be made in the revised manuscript.

Comments from the referee#2

The manuscript offered an estimate of methane (CH₄) emission from rice paddies in Sanjiang plain, one of the major rice producing regions in Northeastern China, by integrating remote sensing mapping with a process-based DNDC biogeochemistry. The

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modeled results were validated by ground tests and uncertainty analysis was also provided by the authors. The paper is quite valuable not only for the data that are useful to update regional methane emission inventory instead of using IPCC default emission factors, but also for the techniques that integrated remote-sensing with a process-based biogeochemical model for a better estimate. I prefer its publication in Biogeoscience. Below are some minor questions:

1) Better show the difference in methane emission estimation in Sanjiang plain from the present study when compared to that using IPCC default emission factors for rice paddies.

Responses:

The authors highly appreciate the anonymous referee's suggestions. According to the 2006 IPCC Guidelines, a baseline emission factor for no flooded fields for less than 180 days prior to rice cultivation and continuously flooded during the rice cultivation period without organic amendments (EF_c) is used as a starting point. The IPCC default for EF_c is 1.30 kg CH₄/ha/day which was estimated by a statistical analysis of available field measurement data (Yan et al., 2005). In the Sanjiang Plain, total area of paddy fields was 1.44 million ha in 2006, and a total of 106-day continuously flooded without organic amendments was assumed to practice during the rice-growing season. Consequently, the total methane emissions in 2006 based on IPCC default emission factors were approximately 0.20 Tg CH₄, which is significantly lower than the modeled estimation in this study (0.53 Tg CH₄-C). The comparison will be added to the "Discussion" section in the revised manuscript.

2) For the modeled methane emission, there were large variations (from ~40 to ~900 kg CH₄-C/ha). Better give an explanation to the extremely high/low values occurred combining the sensitive analysis results presented in Figure 3.

Responses:

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There is small population of farmer whom owing a large amount of agro-lands in the study area where modern cultivation managements are very extensively practiced. Generally speaking, unlike the South China, only single season rice were grown in the Northeast China, and the management practices are relatively identical within the entire study area. The indistinctive differences in rice cultivation practices make less variation in CH₄ emissions from rice paddy in this study area, which has been showed in sensitivity tests of environment factors driving CH₄ emissions (Fig. 3). Therefore, we assumed the general (or average) management practices were identical cover the entire study area. The climate conditions are not homogeneous but very similar cover the study area so that their effects on CH₄ emission rate are negligible. In terms of sensitive analysis shown in Fig.3, the spatial variations in CH₄ emission rates mainly are attributed to the Most Sensitive Factor (MSF) soil properties (i.e., soil texture and SOC content). To that effect, we will add the analysis and explicit explanation on the spatial variations of emission rates to the revised manuscript.

3) Section "2.3 Model Sensitivity Test" line 7 page 393 of the discussion paper: delete "was".

Responses:

Thanks for the referee's corrections in rhetoric and word-building, we have seriously checked in the original manuscript and will correct the misuse of some words like the "was" in the revised version.

Interactive comment on Biogeosciences Discuss., 8, 385, 2011.

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