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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.

Anonymous Referee #1

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General comments Overall this paper is clearly-written and demonstrates the use of the DNDC model in combination with satellite images to calculate CH₄ fluxes from rice paddies in a high latitude region. The authors need to be a little clearer about what assumptions they used for their regional results (e.g. climate year and management practices). Some other minor points are addressed in more detail below.

Model validation tests – Table 2: this would be less confusing if each of the different treatments (C04-N60, C04-N150, C06-N150) were listed as a separate row or column. – It would be good to include either the formulae or a brief description of the “goodness of fit measures” RMSE, EF and CD so that readers know something about what

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they measure, what values indicate a good fit, and what the differences between them are – Page 392, lines 5-16: these are actually results rather than methodology and should be moved to the results section – Figure 2: What are the “P” values printed on the graphs? It seems unlikely to be the usual definition of p (the probability of finding such a trend in uncorrelated data). For example, Fig a2 has $R^2 = 0.872$ and $P=0.972$, which doesn’t make much sense

Regional Database – You state that “detailed management practices on rice cultivation were investigated by communicating with local agronomists and farmers”. What management practices were used for the regional simulations? Table 6 quotes results for C04-N60 and C04-N150 which were the management practices used in the validation study. Were the same management practices used in the regional simulation? Were all farms considered to use the same management practices or were there regional variations?

Results – Page 396, lines 3-8: this section would be better in the Discussion – Page 396, lines 13-14: the results you quote here are the minimum from the C04-N60 and the maximum from the C06-N150. This is a bit strange as you are combining two simulations with different management practices and climate data. You need to state clearly what you are trying to calculate. Is it the emissions for the province for a particular year? A long term average? What assumptions are you making about management practices? – It would be nice to include some context for the total CH₄ emissions you found. How do they compare with IPCC estimates? How do the emission rates compare with DNDC simulations in other regions? – Figure 5: there is no legend explaining the colour codes used for each county in Figures 5(a)-(c) – Page 397, line 18: “Statistic results”, should be “Results” – Page 397, line 19: Figure 5(d) is not labelled – It could also be interesting to look at counties on an emissions/ha basis as well as just the total emissions.

Discussions – Page 398, lines 13-14: the range of results obtained were not simply due to variation in the MSF soil properties. There were also differences in the climate

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and management practices assumed in the different simulations.

Minor edits – Page 386, line 4 use “climate” rather than “weather” – Page 387, line 9 change “In the perspective” to “From the perspective” – Page 387, line 12 delete “evidently” – Page 387, lines 16-17, place commas after “rice cropland” and “(Frolking et al. 2002)” – Page 389, line 17 “upscaling” misspelt – Page 390, line 18: change “dominatingly” to “predominantly” – Page 395, line 16: change “grad” to “grid”

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