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Interactive comment on "Matching soil grid unit resolutions with polygon unit scales for DNDC modelling of regional SOC pool" *by* H. D. Zhang et al.

Anonymous Referee #2

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General Comments:

In this paper, the authors investigated impact of raster resolution of soil map on quantification of soil organic carbon (SOC) simulated by a DNDC model. They figured out optimal grid unit resolutions based on the SOC amounts of soil map polygons and grids. The resolutions for C5 (1:50,000), D5 (1:200,000), P5 (1:500,000), N1 (1:1,000,000), N4 (1:4,000,000), and N14 (1;14,000,000) were 0.2, 0.7, 1, 2, 8 and 17 km, respectively. They also developed a formula to figure out an optimal grid unit resolution from a map scale. In general, the Materials and Methods is well written and the methods used are interesting. In the Results section, the explanation needs to be more explicit. The manuscript will be of interest to readers of this journal.

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Specific Comments:

1. I checked Yu et al. (2014) which was cited by the authors and understood that the manuscript was written following the method adopted by Yu et al. (2014). The SOC data was different between the two researches (observed and simulated data were used by Yu et al. (2014) and the authors, repectively). However, I am somewhat concerned about the novelty based on the difference, because it is obvious that the optimal grid unit resolutions showed similar values if the model was well validated. There must be some advantages to use the simulated dataset, but I couldn't find any statement from the manuscript.

2. The results need to be more explicit. The authors used the words or sentences, "corresponding" (page2664, line5), "differences from each other" (page 2665 line 4 and 11), and "differ distinctly from the others", but it was difficult to know how different from the word and sentences. Detail description of the results shown in the table 1 to 6 would help readers understand the manuscript. Many citations in the Results section are also confusing. Only results should be described in the section.

3. I think that the reason why not logarithm curve but quadratic carve was adopted to fit the data should be described in the manuscript. The quadratic curve relational expression cannot be used to smaller map scale than 1;14,000,000, though logarithm curve would be available, and logarithm curve seems to be better for the authors' objectives.

Technical Corrections:

1. Page 2655 line 22 Tonitto et al. (2007) were not listed in the References.

2. Page 2661 line 20 What is five assumptions? Please describe the assumptions.

3. Page 2661 line 22 DNDC run for 19 years, but only the data for 2000 seem to be used in the manuscript. It must be mentioned.

4. Page 2662 line 19 Please add the reason why 20 cm was adopted as the soil depth.

GMDD

8, C397–C399, 2015

5. Page 2663 line 22- page 2664 line 1, page 2665 line 18-20, page 2666 line 20-21 The sentence should be moved to M&M or Discussion.

6. Page 2664 line 2-4, 7-14, page 2664 line 22-page 2665 line 2, page 2665 lien 14-16 The sentence should be moved to Discussion.

7. Page 2669 line 11 - 17 Please clarify the sentences. I couldn't understand why the authors mentioned geomagnetic and magnetospheric terms in it. Phillips (1999) was not listed in the References.

8. Is there statistical difference between the equations (7) and (8)?

9. The equation (8) should be deleted.

10. Table 1 to 6 would be able to summarize in one table.

Interactive comment on Geosci. Model Dev. Discuss., 8, 2653, 2015.