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Hydrology and Earth System Sciences Discussions

Interactive comment on "The use of LIDAR as a data source for digital elevation models – a study of the relationship between the accuracy of digital elevation models and topographical attributes in northern peatlands" *by* A. Hasan et al.

Anonymous Referee #2

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1) General comments The article is a very in-depth, comprehensive and systematic analysis about error sources in DEM generation and their consequences on spatial accuracy of natural areas (e.g. drainage areas). The results may be relevant for geospatial analyses in hydrology, climatology, ecology,... working with DEM-data. The user of LIDAR/DEM data with low spatial resolution should be aware of relevant data limits.

Nevertheless, the manuscript has drawbacks:

The content is rather only technical and I find the introduction, data section and results section incomplete. Also, I am not convinced by the novelty of the research. Furthermore, the manuscript is a case study for one region, one measurement and one type of LIDAR-instrument, as well as one interpolation method. Though, the authors try to evaluate which parts of the studies may be generalized. But further results for other, e.g., data sets, regions and interpolation methods (for the latter, the authors mention analyses in the discussion section but don't represent them) would enable a better generalization of the results.

The analysis of this paper could put more weight on the implications of DEM-incaccuracies on hydrological/climatological parameters. The importance of this is named in the introduction, the abstract, and the paragraph about the research area but not considered well, later on. The importance of the results could be demonstrated by some specific application example, e.g., for the topographic wetness index of the Stordalen catchment area.

I see the aim of the paper as relevant scientific contribution. Nevertheless, the manuscript itself is incomplete and needs careful revision before publication.

1) specific comments:

abstract:

The content of the first sentence of the abstract is not matching the further text. The connection and therefore the background of the study should be deduced in more detail or it could be dropped (and e.g., mentioned as relevant application later). Also the passing from second to third sentence is not smooth. The abstract could be shortened from technical details and written more clearly and dence. e.g.: line 20: search radius of the interpolation method line 21: which values; NMAD is not understandable here, without looking in the text (abstract should be stand alone)

Introduction

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8, C3270–C3273, 2011

this section is lacking an current state-of-the-art overview of literature on DEM generation and error estimations

Section 4.1

line 8-16: a lot of interesting information about the are, but it is not relevant for the DEM-Analyses there should be more information of the research area on: - topography (e.g., elevation minimum and maximum) - coordinates - possibly a map

Section 4.1 second paragraph: there should be more detailed information about the LIDAR data, e.g.: - instrument parameters - flight parameters (hight, time) - correction methods

Results:

Section 5.4 is too short and not clearly explained.

Table 5: it could be helpful to display relative errors (in percentage of whole drainage area)

The graphical information is not sufficient to help the reader accessing the content of the results.

Conclusion

Why do the authors not address or respond to the research questions of section 2?

Language:

The language of the manuscript might be improved in a way that it sounds more professional.

You use the word "logical" at certain points in the manuscript, where you better write "expected". Your mentioned conclusions are formally not logical, since they inhibit unsaid and intuitive assumptions. e.g.: page 5507, line 3 AND page 5509, line 25

3) Formal comments:

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Page 5503 line 24: Too large a > A too large line 27: x > times

Page 5506 line13: better choose identify OR reveal OR "identify and reveal" line 14: last sentence sounds incomplete - name the differences

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 5497, 2011.