**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "The application of GIS based decision-tree models for generating the spatial distribution of hydromorphic organic landscapes in relation to digital terrain data" *by* R. Bou Kheir et al.

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Received and published: 29 April 2010

General comments

This is a very nice and well-written paper about the spatial modelling (prediction) of inorganic and organic soils. The work bases on a very solid data base (1541 sites analysed for SO and partially very detailed spatial data) that enables a modelling under absolute ideal conditions. I can, thus, highly recommend its publication in HESS, although some very minor revisions should be done.

Specific comments

- The quality of English is in general ok. Only the abstract should be checked maybe once again.

- Chapter 3.2.1: LIDAR was used to produce a very high spatial resolution. It is, however, not clear to me why the high-resolution DEM was then coarsened to 25-m resolution. Why did you use LIDAR? One could have omitted this step obviously.

- What does the Danish soil map (Madsen et al., 1992) contain: soil types, "textural classes" . . . and what else? Why were only the soil types and textural classes taken into account?

- Please provide some more information about the analysed soil samples: why did you take only the depth range of 10-20cm into account? What about 0 – 10cm? What about depths > 20cm?

- Usually soils having a SOM content of > 30% are classified as organic. You choose a limit of 10% SOM. Please justify this choice.

- p. 390, l. 20. The overall accuracy of modelled soil maps obviously seems often to be near 70% (see also Egli et al., 2006).

Technical corrections

p. 390, l. 2: ". . . presented in a spatial form . . ."

p. 392, l. 18: add also Egli et al. (2006).

p. 394, l. 14/15: " . . . (i.e. Weichsel . . .. Saalian . . ."

p. 395, l. 12: how was SOC converted into SOM? Using a factor of 1.72?

p. 396, l. 24: "The errors vary between and m in a typical . . ." Not clear. I think, some numbers are missing here.

p. 397, l. 15-17. This sentence is in general somehow confusing. Of course, higher

altitudes are directly linked to lower (!) soil temperatures (the temperature itself cannot be "cool"). I think you wanted to say that lower temperatures lead to an accumulation of SOC. The SOC content is a function of climate. This was not only measured in the Appalachians (see also Egli et al., 2003, 2006b).

p. 400, l. 21: ". . . is assigned to the . . ."

p. 401, l. 8: "Where X is the cumulative . . ."

p. 402, l. 23: What is "soil saturation"? I think you mean "soil water saturation" (?). If not, then please explain.

Fig. 1: the different items are difficult to distinguish (legibility). Can you produce a coloured map?

References

Egli, M. Mirabella, A., Sartori, G., Fitze, P. 2003. Weathering rates as a function of climate: results from a climosequence of the Val Genova (Trentino, Italian Alps). Geoderma, 111, 99-121.

Egli, M., Wernli, M., Kneisel, C., Biegger, S., Haeberli, W. 2006. Melting glaciers and soil development in the proglacial area Morteratsch (Swiss Alps): II Modelling present-day and future soil state. Arctic, Antarctic, and Alpine Research, 38, 510-522.

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