

Interactive comment on “Filter properties of seam material from paved urban soils” by T. Nehls et al.

T. Nehls et al.

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Report of the revision of the paper "Filter properties of seam material from paved urban soils" by T. Nehls et al. (HESSD 4, 2625-2657, 2007)

The Abstract is lacking a rationale.

The whole abstract has been revised and improved, see revised text.

p. 2626, l. 5: Perhaps, this humus form is unique, perhaps not. It might be "particular"? Text has been changed to what was suggested.

p. 2626, l. 6: "filter" for what?

The text has been changed to: *filter properties of seam material for Pb and Cd.*

p. 2626, l. 15: "compared to natural soils" is clearly too general as there are many different natural soils of which some might even have similar properties as the seam material.

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The text has been changed to: *natural sandy soils with similar organic carbon content*.
p. 2626, l. 17: Perhaps "ponded rain water" is clearer than "ponds".

"Ponds" has been changed to "puddles" throughout the whole manuscript. According to an English colleague, this is the best word for the German "Pfütze", which is a small depression on the pavement, in which the rainwater is accumulating.

p. 2626, l. 22: Figure 1 can be omitted. It is unrelated to the objectives of this work.
Figure has been deleted.

p. 2627, l. 4: What is meant by "amount" - "coverage"? Generally, "amount" is ill-defined.

"Amount" has been changed to "coverage". "Amount" has been substituted by appropriate terms throughout the whole manuscript.

p. 2627, l. 15-17: This would read better "The high infiltration rates might result in high contaminant fluxes even if dissolved contaminant concentrations are low."

Text has been changed to what was suggested.

p. 2627, l. 18-19: Delete "according materials which are".
deleted

p. 2627, l. 22: What is a "very dark" color? Is this a Munsell category?

According to Table 2 the seam material soil colors have hues of 10 YR and 2.5 Y with values of 2 to 3 and chromas of 1 to 2. According to Munsell color table this corresponds to "black" and "brownish black", therefore "very dark color" has been changed to "black and brownish black according to Munsell soil color table".

p. 2628, l. 14-17: This can be shortened to a single sentence.

Text has been changed to: *Furthermore, (ii) the seam materials specific adsorption of Pb and Cd, two relevant toxic heavy metals of different mobility and affinity to organic matter, were exemplarily studied.*

p. 2628, footnote: Papers in preparation should not be cited (see also at other parts of the text).

Citation has been changed to: *own unpublished data*.

p. 2629, l. 6-7: "under suspicious observation of pedestrians" must be proven or

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deleted.

That has been written with an winking eye. Some pedestrians really looked critical and asked what I was doing there. However, the reviewer is right, I can not prove this. I only can "prove" (if you trust the BILD -Zeitung 25th of March 2004, Berlin-chapter) the interest of the police.

Therefore, I changed the sentence to: once, under suspicious observation of the police. According to Webster (2003) "Let's re-write the scientific paper." EJSS 54: 215-218, I ask to keep the sentence as a personal statement which reflects the particular obstacles of urban soil science.

p. 2630, l. 2-3: Delete

done

p. 2631, l. 9: "cmol(+)" is not SI and should be replaced by "mmolc" throughout the manuscript.

The unit cmol(+) which I learned in university is one of the most accurate and logical I know, as the positive charge of exchangeable ions is part of the unit. As it is not very widespread, I agree to change it. But, "mmolc" is not a SI unit for CEC either. Every journal seem to use and allow different units like cmolc/kg (Commun.Soil sci.Plant Annal.) or molc kg⁻¹ (EJSS) or meq g⁻¹ (Z.Pflanzenernähr.Bodenk.) or cmol kg⁻¹ (SSSAJ). I found no hint, that HESS prefers a special unit for the CEC. Therefore, "cmol(+)" has been changed to "cmolc".

p. 2631, l. 16: Θ_T is not explained.

The text has been changed to: *in the total adsorption isotherm Θ_T , which is the sum of adsorptions on sites of energy E_i , weighted by their fractions, $f(E_i)$:*

p. 2632, l. 3: Is this equation correct? I miss a Σ .

Σ has been inserted

p. 2632, l.4: "f(Ei) vs. Ei".

done

p. 2632, l. 15: Which "values"?

changed: values of f(Ei)

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p. 2632, l. 16: Replace "for" by "by".

done

p. 2632, l. 21: No results of Ni, Cu, and Zn are reported. Therefore, these elements do not need to be mentioned.

Thought it was necessary to tell thereader that not only Cd and Pb were added burt a cocktail.Text has been changed to: *Then, Pb and Cd were added in 5 ml 0.01M CaCl2 solution for 48 h of equilibration.*

p. 2633, l. 2: Replace "according" by "corresponding".

done

p. 2633, l. 6-7: Move whole sentence to after "under pressure".

done

p. 2633, l. 9: CV of what? Replicate measurements with the AAS? Do not need to be mentioned.

deleted

p. 2635, l. 1: "seam surface area"?

done

p. 2635, l. 12: Figure 4 is nice but not necessary.

The figure is necessary to explain, how the bulk density of the seam material was measured. Furthermore it demonstrates the object of investigation, which is different from other soils. I think not everybody is familiar with it, as in some cities such pavements have been substituted by tar. Furthermore, if it is nice, why not keeping it?
p.2635, l. 15: "dissolved" instead of "liquid".

changed, also "solid phase" has been changed to "adsorbed" throughout the manuscript.

p. 2635, l. 18: What is meant by "runoff" -the infiltrating water?

"Runoff" was misleading here. The text has been changed to: *The rain water runs over the pavements takes up soluble contaminants and then accumulates in puddles or infiltrates directly through the seams. The concentrations of this infiltrating surface water at the upper boundary for...* p. 2635, l. 20: This sentence is unclear.

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In revision, the sentence was found to be not necessary and has been deleted.

p. 2635, l. 26: Which salts? Most salts including NaCl do not have a pH effect.

Right, something has been mixed up while writing the paper. The relation pH-salinity has been removed from the whole manuscript.

p. 2636, l. 1: "supply" instead of "intake"?

done

p. 2636, l. 8-9: This is an unrelated statement that should be removed.

done

p. 2636, l.14-15: Unclear. You could simply state that some vertical movement of organic C is to be expected.

done

p. 2637, l. 5 and l. 15: Why are there different CEC values? This is confusing.

The different Corg vs CECpot slopes can be explained. One time an axis intersection different from 0 was allowed because clay minerals may also contribute to CECpot. (Fig 5) If the contribution of Corg and different pools of Corg is discussed, the clay minerals are not considered and the CECpot is assumed to be solely depending on Corg (axis intersection at CECpot = 0). This should have been stated. Therefore the following sentence has been inserted: "Assumed, the CECpot of the seam material is solely depending on Corg (axis intersection at CECpot=0), the CECpot of the OM rises, if not Corg, but Corg - BC is applied for the correlation (85cmolc,kg-1C ($r^2=0.77$) for Corg and 97cmolc kg-1Corg-BC ($r^2=0.77$))."

p. 2637, l. 5: What is a common soil? Like a common plant or a common animal? This is by far too general.

"common" was deleted. I wanted to direct the readers attention to the fact, that the soils investigated by Krogh and Parfait are natural or nearly soils. Now, "non-urban" has been inserted.

p. 2637, l. 8: Why should organic matter of an acidic sandy forest soil have a high CEC? You must make clear that this is the artificial potential CEC value because in acid soils this CEC is reduced because of the loss of variable charge.

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“CEC” was substituted by “CECpot”.

p. 2637, l. 19: What is "spheriodal"? Even if it's just a typing error, what is the spheroidal particular character of Corg"?

two typing error and the message was lost. it must be “spheroidal particulate”, meaning "round" particles

p. 2637, l. 21: Skip "very".

The word "very" has been deleted throughout the whole manuscript.

p. 2638, l. 1: "report a SCD of "
done

p. 2638, l. 4: As the polarity of the organic matter has not been directly determined, something as "likely" or "suggest" should be included.

I inserted "likely".

p. 2638, l. 5: Skip "investigated".
skipped

p. 2638, l. 14: The variable for mean adsorption energy is not identical with that introduced on p. 2632 (the cross above the E is lacking).

That has been hanged in the whole manuscript.

p. 2638, l. 14: What is meant by "shadowed by the salt accumulation effects". The whole salt effects remain some-what obscure. This needs to be better explained.

In relation to water adsorption, salt is an important parameter. Saline soils adsorb water because salts get hydrated. We know this effect from the salt on the table, don't we? (if the single salt grains are not covered with wax like in Germany. In former times, rice grains were added to the salt to adsorb the humidity and keep the salt flowable). see also the osmotic potential.

The whole section has been changed: *Higher polarity (indicated by E_a) usually results in higher SCD. However, there is no dependence between E_a and SCD for the seam material. Likely, the low E_a is caused by the adsorption of water by salts. The E_a decreases with increasing EC which is connected logarithmically with low hydration energy of the salt cations. Similar relations of adsorption energy and soil salinity*

parameters are observed in natural saline environments (Here, another reference has been added, which supports that statement. Jozefaciuk, G., T. Toth, et al. (2006). "Surface and micropore properties of saline soil profiles." Geoderma 135: 1-15.)

p. 2638, l. 15: "found to be" can be omitted.

deleted

p. 2638, l. 20-24: Delete. There is a wealth of possible methods and no need to mention an arbitrary selection (perhaps meant as announcement?).

yes was an announcement, deleted

p.2638, l. 25-26: This statement is unclear. Perhaps it can just be deleted.

has been deleted

p. 2639, l. 3: The range of Cd retardation factors are inconsistent in text and Table 3. AND p. 2639, l.4: What is the "described case"?

changed to: They vary from 2056 to 94817 for Pb and from 42 to 485 for Cd for $\rho_B=1.5$ gcm⁻³, $c_l=0.1$ mgL⁻¹, $\Theta =0.3$ m³ m⁻³

p. 2639, l. 5-6: Positive effect on what?

The text has been changed to: Thereby, the seam material retards Pb stronger than the original construction sand.

p. 2639, l.14-15: This statement is unclear.

Statement was deleted. It was found to be not necessary.

p. 2639, l. 16: If there is no correlation, a regression equation does not make sense.

deleted

p. 2639, l. 17-19: Senseless results do not need to be reported. Delete.

done

p. 2639, l. 26: Write more directly "different EDTA-extractable and total Pb concentrations".

done

p. 2640, l. 1: Replace "very well" by "closely".

done

p. 2640, l. 6-14: What's about Mn and Fe oxide concentrations? Are these the

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suspected sorbents explaining Cd retention?

Most probably, but this has not been investigated, we had been focusing on OM.

p. 2640, l. 11: Where is the contrast, justifying the use of "however"?

"however" has been deleted

p. 2640, l. 14-15: Replace "towards" by "of".

done, changed in the whole manuscript

p. 2640, l. 17: Mention that soils A1-3 are from the Kocher study.

done

p. 2640, l. 19: Where are the clay concentrations shown?

reference inserted

p. 2640, l. 20: Skip one of the "are".

done

p. 2641, l. 4: What's the "liquid phase". Do you mean the soil solution after equilibration with deionized water? AND p. 2641, l. 5: Replace "runoff" by "infiltration", because this has a lateral connotation.

Text has been changed to: *At the site B2, the measured dissolved equilibrium concentration of Pb in the soil is already higher than the concentration in the infiltrating surface water.*

p. 2641, l. 7: Delete the "!".

done

p. 2641, l. 10-12: Explain. Sounds like a comparison of apples and pears.

Text has been changed to: The smaller dry bulk density of the seam material compared to the construction material results in a smaller number of adsorption sites per volume unit in the seam material although the number of adsorption sites per mass unit of the seam material is higher than in the original construction material.

p. 2641, l. 12: Replace "example" by "exception".

Than it would be wrong.

p. 2641, l. 14: Can a time be high?

"time" has been substituted by "period" in the whole manuscript

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p. 2641, l. 18: Replace "leads not" by "does not lead".

done

p. 2641, l. 23: This is a repetition.

deleted

p. 2642, l. 7: Why glyphosate is mentioned and not any other organic compound?

Because glyphosate is actively applied to paved sidewalks with intention, meaning it was not deposited because of diffuse pollution.

p. 2642, l. 21: Replace "runoff".

deleted p. 2642, l. 22: I do not think that it is reasonable to generally state that dust deposition has a positive effect. Most pollutants only enter the soil because of this deposition and part of them are retained. Without dust deposition there might be much less pollution.

That is right and I did not want to state that. It has been made more clearly: We conclude, that the seam material is a interesting model substrate to show the positive and negative impacts of deposited dust on ecological soil functions in urban areas.

p. 2646, Table 1: Explain all variables.

done

p. 2647, Table 2: Too many valid figures. This produces the impression of an accuracy that is not reached.

The number of valid figures has been reduced.

p. 2648, Table 3: Explain all abbreviations.

done

p. 2650, Table 5: Move the footnote to the lower end of the table.

done

p. 2651, Figure 1: Delete.

done

p. 2653, Figure 3: Not mentioned in the text (or I missed it).

you missed it, see page 2630 in original version

p. 2655, Figure 5: Replace figure legend by "Relationship between organic C and

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potential cation-exchange capacity in seam materials? " The regression equation has too many valid figures.

Legend replaced. I agree about the number of valid figures but I am sorry not to be able to change it. I work with MS Excel 2000 where the number of valid figures for the regression equation is the same as for the squared correlation coefficient. If I want to show two valid numbers for the correlation coefficient (which I think is useful), all numbers in the regression have the same number of valid figures.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 2625, 2007.

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