

Interactive comment on “Spatial variability of heavy metal concentration in urban pavement joints – A case study” by Collin J. Weber et al.

Anonymous Referee #1

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Novel and interesting research with the focus on the specific urban soils, typically considered "sealed soils", i.e. impermeable for surface water and hampering the plant rooting, fauna activity, cycling of elements. There is a wide variability of such Technosols, from absolutely impermeable (covered with continuous concrete/asphalt) to partially impermeable, where intentionally made joints allow water and elements cycling. The paper is probably one of the first contributions to this topic, thus - worth of publishing. However, some important issues should be considered by authors before the final editor's decision. 1. Authors wrote about importance of joints, but readers still don't know, why they are important? Due to risk for humans or for environmental quality? Which kind of risk for humans do you mean (exposure)? This question is important if you try to apply any legal threshold! Why did you apply this for playgrounds? Is

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there similar people/children exposure? Each threshold is calculated taking into account e.g. the exposure time and exposure path/way. Is the paved square comparable to any unpaved playground? 2. Authors decided to use the geochemical indexes. I'm afraid, it may not have the sense! Geochemical background, in particular in its current understanding, must be identified for soil - not for geological substratum. Background soil and soil under comparison should be comparable - also in terms of soil processes. Are the pavement joints comparable to any more or less natural soil, in terms of biological activity, bioaccumulation processes, nutrient and water cycling? Rather not. It means, calculating the Igeo and other indexes, which were constructed taking into account real soils, has no sense. If you cannot determine reliable geochemical background for soils under comparison - calculation of indexes which require such background - is simply impossible... 3. So, any comparison to legal thresholds/intervention values and indexes have a sense if you can combine it with a kind of risk. If you cannot explain how the accumulated metals may influence humans or environment - you don't know if the scales are applicable... 4. Authors tried to combine the soil contamination in the joints with water cycling. But we know, that the pavement materials are commonly laid on the stabilised ground, often with admixture of cement, or mechanically compacted. All these stabilisations lead to impermeability. Thus, even if the pavement is not continuous, the underlying layers may be impermeable and thus all the cover is impermeable for water and roots. Such cover may have some capacity for rain/melting water (in joints and subsequent layers), but it may not mean permeability and cycling... Other authors suggest protective role of pavement for underlying soil - already due to pavement impermeability for water and solutes... Charzyński, P., Plak, A., & Hanaka, A. (2017). Influence of the soil sealing on the geoaccumulation index of heavy metals and various pollution factors. *Environmental Science and Pollution Research*, 24(5), 4801-4811. Mendyk, Ł., & Charzyński, P. (2016). Soil sealing degree as factor influencing urban soil contamination with polycyclic aromatic hydrocarbons (PAHs). *Soil Science Annual*, 67(1), 17-23. (I do not agree with all statements and conclusions presented in the above cited papers, but I think Authors should at least read these

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opinions) 5. Authors don't have informations about the mobility of metals in the joints, thus any conclusions referring the their translocation should take into account the general knowledge and confirmed affinity of (some) metals to organic matter, in particular under neutral/alkaline reaction.

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