

We thank Anonymous Referee #2 for his thoughtful review, which will help to clarify several points in our manuscript. In the following, we like to address the issues raised in his review.

Anonymous Referee #2: The authors need to sharpen the definition of “the soil” and the related hypothesis (i). They need to clarify in the abstract and especially at the end of the introduction that they investigated the gradient from the topsoil to the subsoil and the substrate of the two soil profiles. It needs to be said that they expect no significant contribution of lipids in the subsoil and substrate. The discussion should have much more focus on that topic. The authors should compare lipid loads with other concentrations observed in topsoils, subsoils and substrates and evaluate whether this is little or not.

Response: The abstract and hypothesis i) are modified accordingly. Hypothesis (i) reads now: " Two sediment profiles through glacial till on the Swiss Plateau were analyzed for their biomarker concentrations. The profiles consisted of a topsoil (A_h horizon) as well as the underlying B and C horizons. As glacial sediments are extremely poor in organic material, the presence of large amounts of leaf-wax markers in the subsurface (B and C horizons) is not expected and would indicate post-sedimentary contributions from roots or overprint by microorganisms." We further agree that the comparison to other soil sections will add more substance to the manuscript, and will compare the concentrations in the Niederbuchsiten and Steinhof profile with yet unpublished lipid data from a set of soils along a meridional transect in Europe.

Anonymous Referee #2: The Niederbuchsiten shows interesting variations in the lipid loads which were not discussed (Fig. 2b). Unfortunately, a 14C analysis is lacking here, I wonder if this might be related to a transformation of fatty acids into n-alkanes which is still ongoing in this soil (see also the discussion along the 14C data for Cr1). It should also be discussed how deep the input of lipids might potentially reach (considering other literature data and comparing the two profiles in this study).

Response: The variations in the lipid loads in the Niederbuchsiten- profile are below the limit of quantification (see p. 16910 l. 5-9) and were therefore not discussed. We agree that this point should be clarified and will expand on the issue in the revised version of the manuscript.

¹⁴C analysis was not performed in the till sections, since the biomarker concentrations in the subsurface were too low. We are going to give an assessment of the potential depth lipid input reaches in the revised version of the manuscript.

Anonymous Referee #2: The discussion of the loess section (Cr) in Serbia is consistent, however, the first subsection of the paragraph deals with the input of fossil carbon which was not introduced before. As this is not the main topic of your study this can be shortened considerably. Especially the part about marine organisms can be deleted. The heading of subparagraph 4.2 is not ideal, since fossil lipid input would also and exclusively be post-sedimentary (as long as you do not assume contributions of marine rocks or coal in the loess substrate).

Response: The heading in 4.2 is clarified to '4.2 Evaluation of younger, postsedimentary lipid contributions' in the revised version of the manuscript. Furthermore we shorten the discussion about fossil carbon. Synsedimentary contributions of fossil or reworked material in loess are however possible (Liu et al. 2007) and we will highlight this possibility in the revised version of the manuscript.

Anonymous Referee #2: Abstract lines 8, 15: be more specific about soil, subsoil and substrate. Line 20 ff.: the mention of “odd-and-even homologues” and of “reworking” at this place needs more explanation.

Response: We revise the abstract in the revised version of the manuscript by adding details on the studied soil horizons. Furthermore, we expand on the topic of postsedimentary input in the last sentence of the abstract.

Anonymous Referee #2: Chapter 2.1.2, line 5: delete “and”

Response: Done

Anonymous Referee #2: Chapter 3.1, last sentence: the message of this sentence should be given in the abstract.

Response: In the revised version of the manuscript, the last sentence of Chapter 3.1 will be removed and equivalent information is added to the abstract as well as the discussion part.

Anonymous Referee #2: Chapter 4.1: your point “four”: did you analyze $\delta^{13}\text{C}$ in this study or is the data from another study? Give either a reference or an argument why you analyzed the $\delta^{13}\text{C}$.

Response: We did indeed analyze $\delta^{13}\text{C}$ in this study. The $\delta^{13}\text{C}$ values presented in the manuscript are a byproduct of the AMS measurement conducted for radiocarbon dating and were not a primary aim of this study. They proved however to be useful in the discussion of the result. The information is added to the revised form of the manuscript.

Anonymous Referee #2: Conclusions: to my opinion you have not proven that the amounts of lipids are negligible below the topsoil. You should do this by comparison to other soil profiles and to the average of detectable lipids in paleosols.

Response: Since the lipid concentrations in the subsoil approach blank values (see p. 16010 l. 5-9), our conclusion remains that the lipid concentrations in the till section are negligible. In the revised form of the manuscript of the manuscript we clarify that these results are exclusively valid for soil sections in glacial till. As noted above, we will compare the glacial till profiles to other soil profiles in the revised version of the manuscript.

Anonymous Referee #2: In Table 1 you can provide a definition of FAMES or better use fatty acids (also in the manuscript you vary a bit too much with the names of the lipid compound classes).

Response: We will consistently use the term fatty acid in the text and Table 1.

Anonymous Referee #2: The figures are ok, however, in my version the symbols (especially nodules) are not good to see. In Figure 2 you could change A and B to have it in the same order as in Figure 1.

Response: A and B in Figure 2 are changed in the revised version of the manuscript, and revised figures will be provided.

References

Liu, W., Yang, H., Ning, Y., and An, Z.: Contribution of inherent organic carbon to the bulk $\delta^{13}\text{C}$ signal in loess deposits from the arid western Chinese Loess Plateau, *Org. Geochem.* 38,1571–1579, 2007.