Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2019-693-RC1, 2019
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Linkage between Dust Cycle and Loess of the Last Glacial Maximum in Europe" *by* Erik Jan Schaffernicht et al.

Anonymous Referee #1

Received and published: 23 October 2019

Comments to "Linkage between Dust Cycle and Loess of the Last Glacial Maximum in Europe" by Schaffernicht et al.

Manuscript number: acp-2019-693

Quantification of the dust cycle for the Last Glacial Maximum (LGM) is crucial to better understand effects of dust on glacial paleoclimate and paleoenvironments. Loess deposits are paleodust archives providing basic information to test dust cycle models such as the one introduced by Schaffernicht et al. This dust cycle simulation is novel in the sense that it follows a weather typing approach (circulation weather type, CWT, classification) providing deeper insight into regional differences of peak glacial atmospheric circulation in Europe and dust emission/deposition in relation to CWT classes. As demonstrated by the authors simulated bulk and dust MAR values are in good

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Discussion paper

agreement with the paleodust record (loess MARs) in central Europe, and this study reveals the significant role of easterly and cyclonic wind regimes in LGM dust emission and dust emission/deposition seasonalities (summer/autumn peak). My limited number of (minor) comments/suggestions can be found below as line-by-line comments. This manuscript is recommended for publication in ACP after minor revisions.

Specific comments

Lines 41-46: Bulk and dust MARs should clearly be distinguished in this paragraph, and later in the text. The dust MAR value (100 g/m2/yr) in line 43 is slightly misleading, as this is an estimate of MAR of the <10 micron fraction, so cannot be directly compared to bulk MAR (800 g/m2/yr), as given in the next sentence.

Lines 150-151: Significant loess accumulations are found along the west bank of the Danube river in Hungary, Croatia and Serbia, providing further observational evidence for easterly paleowinds.

Figure 4: Position of the scale is inappropriate as it covers circles representing MAR magnitudes. Also, I suggest adding an x-x plot directly showing a model/paleodata comparison of dust MAR values.

Lines 268 and 278: The dimensions should be g/m2/yr and not kg/m2/yr, I guess.

Lines 297-298: State clearly if this is bulk or dust MAR.

Technical corrections

Line 29: Ujvari et al (2012) is not listed in "References"; or is this the cited study of the authors from 2017? Line 42: Ujvari et al. (2010) cannot be found in the reference list Line 133: missing full stop at the end of sentence Line 249: write "average dust emission"

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-693, 2019.

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