General Comments

The manuscript is of great value for the scientific community involved in palaeoclimatic and palaeoenvironmental quaternary research and it will certainly stimulate deepened discussions and more sophisticated ongoing research. High resolution correlations of Greenland ice records (NGRIP) with western and central European loess-palaeosol-sequences (LPS) spanning the last glacial-interglacial cycle, in particular the Nussloch section (Germany), have been previously suggested as well as with loess sections in the Chinese Loess Plateau (CLP) with – in my eyes –admittedly more persuasiveness in case of the western and central European sections (e.g., Antoine et al. 2016). This may be due to the closer vicinity to the North Atlantic Ocean. The present manuscript follows an approach to even improve the time resolution of NGRIP and LPS records and presents an interpretation to explain impacts of high-frequency palaeoclimate change in Greenland on the CLP. The age model of the Nussloch key section is revisited in some way, supported by new radiocarbon ages from earthworm pellets (Moine et al. 2017) which are partly challenging previous luminescence ages. The manuscript suggests a close link of rapid North Atlantic climate changes and coeval changes in the entire Eurasian loess belt, proposing the links gathering atmospheric, marine and continental records. Innovative approaches include i), the use of two rather independent indices ($\delta^{18}O$ and dust) in the NGRIP core, similarities of these records eventually highlighting a more global phenomenon, and ii), the resolution of non-linear time development in LPS with the attribution of palaeosols to Greenland Interstadials (GI) and loess depositions to Greenland Stadials (GS). The latter one not only has implications for exact timing but also for mass accumulation rates (MAR). The manuscript emphasizes dust as a key factor in the climate system.

I recommend publication of the manuscript, after minor corrections.

Specific Comments

The manuscript strongly refers to Rousseau et al. (2017, under revision), and to some extend also to Moine et al. (2017, in press). Both articles are meanwhile published online.

Page 3, line 74 “stop of the eolian sedimentation”: As a model assumption this may be justified. It is not sure however, if sedimentation stopped totally or continued with a strongly reduced rate as is the case for some steppe soils. This uncertainty which would be propagated to the timing and to the MAR should be addressed in the text.

Page 4, lines 11-37: It is stated that maximum activity of present day dust storms in Asia occurs in April. Which evidence allows to resume this for the last glacial? Seasons probably shifted a bit due to more continental climate leading to longer winter and shorter spring.

Page 6, line 97 to 98: The IRSL ages given by Frechen et al. (2003) are prone to age underestimation. Thus, MAR may be overestimated.

Technical Comments

Page 3, lines 67 and 69: does „1s“ mean „1 sigma“? (Also further down in the text). If so use Greek σ. GI duration of “1048±1163 years” and “1053±1068 years”: Error is larger than the mean value. Clarify that this is probably due to few long interstadials. See also page 3, lines 87 and 89.

Page 5, line 47: replace “along” by “at the eastern margin of”

Page 5, line 77: “Greenland warmings leading *to* Antartic coolings”

Page 13, line 41: records

Page 13, line 43: sequences

Page 13, line 46: Rousseau et al. 2017

Page 13, line 54: unit for dust should be “part/µL” (see Fig. 4)? Also, indicate which color indicates $\delta^{18}O$ and which one dust.

Page 13, line 58: rewrite “Hpa” as hPa (hectopaoscal).

Figure 3, column “MAR”: **1952 – 1952.** Identical values (type error?)

Figure 5: Can you replace the out-dated unit “mb” by “hPa”?

References:

Antoine, P., Coutard, S., Guerin, G., Deschodt, L., Goval, E., Locht, J.L., Paris, C. (2016). Upper Pleistocene loesspalaeosol records from Northern France in the European context: Environmental background and dating of the Middle Palaeolithic. Quaternary international 411, 4-24, doi: 10.1016/j.quaint.2015.11.036

Frechen, M., Oches, E.A., and Kohfeld, K.E. (2003): Loess in Europe-mass accumulation rates during the Last Glacial Period. Quaternary Sci. Rev. 22, 1835-1857, doi: 10.1016/S0277-3791(03)00183-5

Moine, O., Antoine, P., Hatté, C., Landais, A., Mathieu, J., Prud'Homme, C., and Rousseau, D.-D. (2017): The impact of Last Glacial climate variability in west-European loess revealed by radiocarbon dating of fossil earthworm granules. www.pnas.org/cgi/doi/10.1073/pnas.1614751114

Rousseau, D.-D., Boers, N., Sima, A., Svensson, A., Bigler, M., Lagroix, F., Taylor, S., and Antoine, P.: (MIS3 & 2) millennial oscillations in Greenland dust and Eurasian aeolian records: a paleosol perspective. Quaternary Science Reviews 169 (2017) 99-113 http://dx.doi.org/10.1016/j.quascirev.2017.05.020