

Comments on Rousseau et al., for *Climate of the Past Discussions*, on loess in Ukraine:

Overall, a very interesting paper that should be published after some revision. Comments are keyed to page and line numbers:

--p. 1959, title: suggest changing to "Abrupt climatic events of the North Atlantic in the last glacial period may be recorded in Ukrainian loess deposits"

--p. 1961, introduction: in commenting on European loess studies, I suggest citing three recent review papers: Frechen et al., 2003, QSR; Rousseau et al., 2007, EQS; Zoller, 2010, CEJG.

--p. 1962, line 4: is Smiley et al. (1991) really the best reference here??

--p. 1964, lines 3-6: this is not always the case: note that in Siberia and Alaska, MS measurements show precisely the opposite trend. I suggest qualifying this statement accordingly.

--p. 1965, line 17: readers do not yet know what the Bug loess is: either explain here, or wait to refer to it until after you have explained what it is.

--p. 1965, line 21 and elsewhere in the manuscript (especially right below, on p. 1966): where you say "allocated to," I think you mean to say "correlated to" or "assigned to."

--p. 1965, line 23: upper case "M" on "Mollisol", unless you intend to mean a "mollic" horizon, which is lower case "m", but is "mollic", not "mollisol."

--p. 1966, lines 16-18: what is the basis for interpreting these as "tundra gley" soils? If they are grey colors, please give the Munsell soil colors you see, such that readers can tell what you mean by "grayish matrix", for example, you should see 2.5Y or 5Y hues, with relatively high chromas and intermediate-level values if they are truly gleyed. Even if they ARE gleyed, how do you know you had a tundra vegetation? No E horizons, therefore not boreal forest?

--p. 1968, lines 7-28: these interpretations all assume you have only a single loess source: do you know that for certain?

--p. 1969, lines 21-27: I agree that the sand content is very low, but you do have measurable amounts of it. If winds were from the west during all climate phases (stadial, interstadial, and Heinrich events), and if the sand is from the Dnieper River (to the east of Stayky), how do you explain it? Rare easterly winds? What would cause them throughout the whole glacial period?

--p. 1970, lines 10-22: I am a bit confused by the GSI as presented here. In Antoine et al. (2001), there is nothing on the GSI, although that paper IS about Nussloch. The GSI ratio IS, however, in Rousseau et al., 2002, QSR, which is also on Nussloch, so that

needs to be fixed. Nevertheless, in Rousseau et al., 2002, the GSI ratio is between 50-20 $\mu\text{m}$ / $<20\ \mu\text{m}$ . In lines 13-14 of p. 1970, it is said that the GSI ratio is between 52.6-26 $\mu\text{m}$ / $<26\mu\text{m}$ , but in your figure, it is given as 63-20.7 $\mu\text{m}$ / $<20.7\ \mu\text{m}$ . All this needs to get fixed for consistency.

--p. 1971, lines 4-7: if the loess at Stayky is derived from outwash plains of the Fennoscandian ice sheet (which sounds possible), and winds were from the west, then why is there little or no loess in southeastern Poland and Belarus (see map by Haase et al., 2007, QSR), which is to the west/northwest of Ukraine, but southeast of these outwash plains?

--p. 1972, line 12: rephrase: pollen says nothing about "loess formation"

--p. 1974, lines 13-16, referring to Jenny: actually, this book was NOT written in 1994, it was written in 1941; it was simply reprinted in 1994. At that time, there had been almost no chronosequence studies done and we knew very little about rates of soil formation (indeed, radiocarbon dating hadn't even been developed yet). Thus, Jenny's estimates of rates of soil formation, as he stated them in 1941, have little meaning today. Instead, I suggest the authors take a look at P.W. Birkeland's (1999) book "Soils and geomorphology." Birkeland was a student of Jenny's and devoted his career to understanding how to measure rates of soil formation.

--p. 1974, lines 20-21: I am not sure this statement is entirely true. At Nussloch, the GSI does indeed oscillate back and forth. At Stayky, it oscillates, but there is a broader, up-section trend of increasing GSI, suggesting progressively stronger winds through the last glacial period. This trend is not seen at Nussloch, so this is a significant difference.

--Fig. 1: I assume these maps are for MODERN conditions, correct? You should probably say this specifically in the figure caption.

--Figs. 3, 4, 6: the font size on these figures is so small that the text is difficult to read. If the journal reduces it further than this, it will be impossible to read. Can you please increase the font size?