

Interactive comment on “Excursions to C₄ vegetation recorded in the Upper Pleistocene loess of Surduk (Northern Serbia): an organic isotope geochemistry study” by C. Hatté et al.

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see attached doc

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/9/C344/2013/cpd-9-C344-2013-supplement.pdf>

Interactive comment on Clim. Past Discuss., 9, 187, 2013.

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Interactive Discussion

Discussion Paper



Interactive
Comment1 Excursions to C4 vegetation recorded in the Upper Pleistocene loess
2 of Surduk (Northern Serbia): an organic isotope geochemistry study.3
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21 Abstract:

22 Loess sequences have been intensively studied to characterize past glacial climates of
23 the 40–50° North and South latitude zones. Combining different approaches of

24 sedimentology, magnetism, geochemistry, geochronology and malacology allows the

25 general pattern of the climate and environment of the last interglacial-glacial cycle in

26 Eurasia and America to be characterized. Previous studies performed in Europe have

27 highlighted the predominance (if not the sole occurrence) of C3 vegetation. The

28 presence of C3 plants suggests a regular distribution of precipitation along the year.

29 Therefore, even if the mean annual precipitation remained very low during the most

30 extensive glacial times, free water was available for more than 2 months per year.

31 Contrarily, the $\delta^{13}\text{C}$ record of Surduk (Serbia) clearly shows the occurrence and

32 dominance of C4 plants during at least 4 episodes of the last glacial times at [28.0 - 26.0],

33 [31.4 - 30.0], [53.4 - 44.5] and [86.8 - 66.1] (in kyrs cal. B.P.). The C4 plant development

34 is interpreted as a specific atmospheric circulation pattern that induces short and dry

35 summer conditions. As possible explanation, we propose that during "C4 episodes", the

36 Mediterranean Sea would have been under the combined influence of the following: i- a

37 strong meridional circulation unfavorable to water evaporation that reduced the

38 Mediterranean precipitation on the Balkans; and ii- a high positive North Atlantic

39 Western Russian (NAWR)-like atmospheric pattern that favored northerlies over

40 westerlies and reduced Atlantic precipitation over the Balkans. This configuration would

41 imply very dry summers that did not allow C3 plants to grow, thus supporting C4

42 development. The intra "C4 episode" periods would have occurred under less drastic

43 oceanic and atmospheric patterns that made the influence of westerlies on the Balkans

44 possible.

Christine Hatté 23/3/13 14:53
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Fig. 1.

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