

Interactive comment on “Interpreting last glacial to Holocene dust changes at Talos Dome (East Antarctica): implications for atmospheric variations from regional to hemispheric scales” by S. Albani et al.

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General comments

This study investigates different regimes of aeolian dust provenance at the coastal Talos Dome site in the Ross Sea sector of East Antarctica during the period from the last glacial (23 ka BP) to the late Holocene, based on a dataset of dust particle concentration and size distribution from the Talos Dome ice core and its comparison with the corresponding record from the EPICA Dome C ice core on the East Antarctic plateau.

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The results confirm the findings from recent studies using complementary methods where the strong influence of local Antarctic dust sources during the Holocene has already been described. In addition, the authors suggest changing local wind circulation patterns in context with the deglaciation of the Ross Sea embayment which modulate the local dust flux at Talos Dome during the Holocene. This study contributes to the understanding of changes of regional atmospheric circulation patterns in the Talos Dome / Ross Sea area during the last deglaciation and the Holocene and I suggest publication in *Climate of the Past* after revising the manuscript as described in the following.

Specific comments

In the discussion TALDICE and EDC dust fluxes during LGM, ACR and early Holocene are compared. Looking at Fig. 4b it is evident that after approx. 5.5 kyr correlation of the two records becomes suddenly very high compared to the ACR and early Holocene periods. How does this correspond to the authors' hypothesis of changed wind patterns and strong local sources at Talos Dome during the Holocene? Extend the discussion with this part of the dust fluxes.

In general, the suggested wind pattern change leading to the changes in dust deposition at Talos Dome needs to be elaborated further:

1) It is mentioned that “advection from Antarctic sources varied only slightly in relation to the major climate changes” (p 156 lines 22-23). However, during the Holocene changes in wind directions/strength leading to reduced transport from local dust sources are suggested to explain the decreasing dust input during the Holocene (p 157 lines 15 – 21). On the other hand, additional wind pathways from the Ross Sea at present conditions are mentioned (p 156 lines 6 – 13), which would in turn lead to enhanced transport of local dust to Talos Dome. These arguments are contradicting each other.

2) Following the authors' arguments on p 157 line 24 to p157 line 5 the mechanism would be (strongly simplified): more ice in the Ross Sea = less winds from the Ross

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Sea area to Talos Dome, and vice versa. However, this contradicts the decreasing trend in dust flux at Talos Dome during the Holocene and the before suggested wind pattern changes.

Through these contradictions, the suggested wind pattern changes make a hypothetical impression; a more stringent argumentation would help to make the authors' conclusions stronger. Clarify the text/argumentation to exclude such contradictions.

Technical corrections

Text and figure 4a,c are not in agreement. Whenever you mention Fig. 4a in the text you actually refer to 4c and vice versa.

There are some very hard to understand sentences, try to revise the manuscript with regard to a better "read-flow" (e.g. p 152 lines 15 – 20, p 157 lines 1 – 6, these sentences could be split into two each).

p 146 line 1: replace "Antarctica" with "Antarctic"

line 17: replace "related" with "relate"

p 147 line 29: replace "provided" with "provides"

p 148 line 26: "Ross Seas" with "Ross Sea"

p 150 lines 5 – 13: This paragraph describes the uncertainties of the analytical methods and should therefore be part of Sect. 2 (Analytical methods) instead of Sect. 3 (The TALDICE dust profile: main features).

line 13: Delete this sentence, it does not make sense here. The results are already compared at line 18 (where it makes sense), and the preceding paragraph is describing the uncertainties, which are no results but describe the performance of your analyses.

lines 19 – 20: repetition of p149 lines 16 – 17. Delete this sentence here and insert the last part "... which show a similar pattern and absolute values (Fig. 3b)." at p149.

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line 24: delete comma

p 152 In this subsection (4.1) only the 1-5µm particle records are compared. State this clearly at the beginning. line 22: replace "liner" with "linear"

p 153 line 5: replace "Early and Late Holocene" with "early and late Holocene"

line 8: replace "...of the interplay between local and remote dust deposition at Talos Dome..." with "... of the contribution from local and remote dust sources at..."

line 11: replace "...of remote dust deposition..." with "...of dust deposition from remote sources..."

line 14: delete "the"

line 25: replace "... records show a decreasing trend with similar dust fluxes both ..." with "... dust flux records show a decreasing trend similar both ..."

p 154 line 5: replace "... Talos Dome has original features:..." with e.g. "... Talos Dome has additional/different features ..."

line 11: "preceded by ..." should presumably be "followed by ..."

line 19: replace "slightly" with "slight"

p 156 line 5: delete "inland" (it seems to be indeed correct, but is confusing in the context of this sentence)

p 157 line 29: "...marked the beginning of a new phase"...

p 158 line 17: replace "Aeolian" with "aeolian"

line 20: replace "Embayment" with "embayment"

figure 4 left axis legend: delete 0.01 and 100, a range from 0.1 to 10 is enough and reduces confusion with the other plots shown in this figure. caption: (a) and (c) are swapped

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