**Climate
of the Past**
Discussions

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Interactive comment on "Spiky Fluctuations and Scaling in High-Resolution EPICA Ice Core Dust Fluxes" *by* Shaun Lovejoy and Fabrice Lambert

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The present manuscript has undergone a first review round in Climate of the Past. Previous reviews had not formulated strong objections about the statistical treatment of the data, but were worried about poor presentation and lack of focus. The manuscript was rejected and resubmitted, which unfortunately resulted in depriving the current reviewers from the benefits of a point-by-point rebuttal to the first review. Upon inspection, most figures are the same, key equations are unchanged, but more room is given to the interpretation of the results, and the abstract is more informative and, to my opinion, better written.

Given these improvements, and given the fact that there is no major objection to the

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Discussion paper

interest of the statistical approach (see however specific comments below), the study should be published. This said, the authors may want to seize the opportunity of this review to clarify or perhaps improve a few zones of discomfort that, I think, has somewhat hindered the reception of their recent works.

First, something needs to be done about graphics. There are many problems. To cite but a few: vertical axes with different tick marks have been superimposed (Figures 4 and 5), labels show aberrant disproportions caused by vertical stretching (many figures), numbers alignment is sometimes inconsistent (horizontal axis on Figure 6), horizontal ticks seem to have been added by hand, with shadows (Figure 5), or inconsistently aligned (Figure 2), and colour legends are missing (Figure 9).

Second, it would be useful to have some estimates of the variance of estimators. Assuming a stationary signal, and given the amount of data at hand, which variance do we expect for the estimate of τ_c, or H, or even C_1 ? Figure 10 seems indeed to make it clear that there is a significant difference between τ_c of phase 1 and 8; trends on Fig. 12 are much less obvious and having clearer ideas as to whether variations can be attributed to statistical sampling, and to non-stationarity (or at least, whether they are a sign that null-hypothesis of stationarity should be rejected), would be helpful.

I leave it to the editor whether addressing these two comments in full is a hard request, especially the second one. This brings me to the point by point comments:

- p. 2: "two extremes" : They are not "extremes". Perhaps write again: between daily and orbital time scales...

- p. 2 l. 30: "temperature record" → "deuterium record" (especially for readers of Climate of the Past, they know that deuterium concentration and temperature are not the same)

- p. 2 l. 34: "The analysis of the dust record" → "The dust record"

- p. 3, l. 10: "can themselves be power laws" : be more specific about the conditions that generate power laws

- p. 3, l. 18: "In particular, etc." this is not a sentence.

- p. 5, l. 8: "Since K(1)=0" add "by definition".

- p. 5, l. 8: "While the mean to RMS ratio is intuitive" : the sentence is unclear. In what sense is C_1 a 'mean to RMS' ?

- p. 5 Eq(9) : use standard notation $\lim_{\Delta q \to 0}$.

- p. 6, l. 13: full sentence needed after a semicolon ";"

- p. 8, l. 13: "The plot graphically conterposes two views of variability". I suspect you mean Figure 4, but yet what is meant by this sentence is still not clear to me.

- p. 8, l. 20: 100 ka is *not* a Milankovitch frequency (Milankovitch was unaware of 100-ka cycles, he focused on 40-ka cycles).

- p. 8, overall, I found the lines 17-30 difficult to read. Consider whether it is possible to express the same message more concisely. - p. 9, l. 5 "possibly (but not obviously) scaling". In order to be possible but not obvious, a strict definition of what scaling means is needed. - p. 10, l. 22: we compare, without 's' - p. 11, l. 13: "p value of 0.12". See the above comment. We do not really know whether the distribution is normal. Do we know anything about a theoretical distribution, or perhaps one that could be simulated ? - p. 13, l. 9: "low internal feedback" → "low response"