

Interactive comment on “A few prospective ideas on climate reconstruction: from a statistical single proxy approach towards a multi-proxy and dynamical approach” by J. Guiot et al.

J. Guiot et al.

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Dear editor

To summarize your comments, you requested the following improvements of our paper :

1) correction of English

Reply: We have read carefully the ms and tried to improve it thanks to the help of the editor

2) transparency of model assumptions should better appear in the ms

R: We have tried to do that at several places (in reply to your own comments)

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There is a number of comments and suggested corrections in the annotated ms, that we have tried to take into account. We will now list them with the reply that we propose. We re-submit a new version of the paper.

Page 4. We list four reasons for explaining the fact that pollen assemblages are noisy records of climate.

R: Editor is right : reasons (3) and (4) do not cause noise but rather biases. It has been added.

Page 6 (end). The subdivision of PFTs by using pollen has been clarified by the following sentence : "The pollen PFTs are sometimes more precise and pollen information is sufficient to recognise several varieties of the same model PFT, for example pollen is able to separate warm and cool ts"

Page 7. About deterministic dynamical models :

R: In vegetation models, there is some stochastic processes, as mortality, which makes that two runs in the same conditions do not give exactly the same results.

Page 7 (end). Change the order of the sentences

R: We did

Page 7 and following: we cannot find a better word than tricky;

Page 8 (equation). Integration is necessary

R: It is true, we have corrected

Page 9 (end of section 2.3). Clarify dimension reduction

R: We have done by this sentence: n ; which is equal to the number of samples in the reconstructed climatic time-series.

Page 10. Concerning the justification to use annual variables

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R: The main reason is that they are synthetic and combine the effects on the different proxies.

Page 11 (end of section 3.1). change of forest into steppes

R: We have added this sentence: So the CO₂ lowering is large enough to reduce forest extent: under a high CO₂ level, temperature must fall sufficiently to reduce the growing season under a certain level, and under a low CO₂ level, the forest reduction is due to both temperature lowering and carbon limitation.

Page 11 (end). Question of rev#3 remains unaddressed

R: It is true and we did an error. Here we work only at the level of the biome and not the PFT. We did the next correction in §1: Second, the ANN-relationship between NPP simulations of the model PFT's and pollen PFT scores has been replaced by a correspondence matrix between the model biomes and the biome scores calculated from pollen. (model PFT has been replaced by model biome)

Page 12: acronyms

R: MTCO and MTWA have been replaced by winter and summer temperature (it is not fully correct but it facilitates reading)

Page 13: corrections of grammar done

Page 14: trials and errors (done)

Page 15. About 1/S²

R: It is true that S² is the variance and by definition 1/S² is the precision of the method. We do not agree that S² include also observation error. We think that it is more intuitive to present the equation as a function of the precision than as a function of the variance.

Page 15. About oceanic effect on d13C.

R: There is no oceanic effect. This measurement depends on the fractionation accord-

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ing to the Farhquar equation and atmospheric d13C.

Page 16. Validation requires independent observations

R: It is true when this validation intends to test the effect of noise on the estimates. But here, we want to test the plasticity; of the plant according to climate. And the validation we did on the size of the niches seems to be adequate.

Page 17. Precise the type of particle filter

R: We do not think that it is here necessary to go at that technical level.

Page 17. Filter versus smoother

R: It is right and we have corrected

Page 18 (end of section 3.5). Precise improvements

R: It is done: … improvements, in both the vegetation model and the inversion scheme, are still necessary.

Page 19. Similarity of data and similarity of processes

R: Right, similarity of processes& is not the proper expression. We have replaced it by uniformity of processes;

Pages 19-20. Editor found the conclusion section too long

R: We have divided it into two parts: the first one present the main results for palaeoclimatology and the second part is more a conclusion, giving a few directions for future.

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