

Interactive comment on “Volcanic synchronisation of the EPICA-DC and TALDICE ice cores for the last 42 kyr BP” by M. Severi et al.

M. Severi et al.

mirko.severi@unifi.it

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Authors' response to reviewer1 in bold.

In this work the authors produce a new chronology for the Talos Dome ice core by volcanic peak matching with the Dome C record. The matching of peak patterns is convincing, as far as presented in the paper, and therefore produces straight-forward synchronization with the EDC3 or the Lemieux-Doudon age scale. The paper is clearly structured. However it needs to be clarified with which age scale the improved TD chronology has eventually been matched: historic eruptions, Lemieux-Dudon, EDC3 (see specific comments).

The improved TD chronology has been matched with the age model by Lemieux-

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Dudon as stated at page 3729, lines 9-12. A sentence was added in the abstract to clarify this point.

The new chronology should be made available either as supplement or with a link to a database.

The new chronology will be available as a supplementary worksheet on the CP website.

The manuscript should be checked throughout for correct use of tenses.

The manuscript has been thoroughly checked and revised as necessary for bad expressions and for the correct use of tenses.

Specific comments Page 3720, line 7: “..producing a new age scale..” Is a synchronized age scale a “new” age scale?

Our synchronised age scale is a “new” one with respect to the first official age model “TALDICE-1”.

p. 3721, l. 25: 60 thousand yr

Changed

p. 3722, l. 4-6: “Aside. . .” This sentence is not very clear. Relative dating vs. absolute dating vs. dating by flow models; advantages and limitations. All this is somehow in that sentence, but not well understandable.

A sentence was added in this section to make the concept more clear.

p. 3722, l. 15: Wolff et al. 2005 not in references

Added in reference list.

p. 3727, l. 4: “. . . but they are reported here to show the consistency of our volcanic match”. How can events that are not necessarily synchronous, as stated just before, help to corroborate the volcanic match?

As suggested by the referee, volcanic signals are not identified by chemical signature but solely by pattern matching. This procedure could bring to wrong matches mainly due to very similar patterns of volcanic peaks. This is the main reason why isotopic or dust striking features can be used to corroborate volcanic matches.

p. 3728, l. 5: The top panel of Fig. 6 shows the deviations. . .

Text was changed as suggested by the reviewer.

p. 3728, l. 14: “. . . or an error in the volcanic synchronization process.” I think it would be helpful to state in the beginning of the paper that volcanic signals are not identified by chemical signature but solely by pattern matching.

A sentence was added in the “Volcanic matching” paragraph to better explain this concept.

p. 3728, l. 24: Vinther et al. 2005 not in references

A wrong reference was cited. The right reference is Vinther et al. 2006.

p. 3729, l. 6: Age differences (delta age). The term delta age is commonly used for the age difference between the ice and the gas record. This could potentially lead to confusion. In addition the term is not consistently used: here as an offset between age scales and at other places as time between events. I suggest to use the term “age offset” for differences between age scales, and age difference and duration for time differences between events and length of events.

The reviewer’s suggestion was taken into account and the text was thoroughly checked to avoid confusion. The captions as well were changed accordingly.

p. 3729, l. 26: “. . . pairs of consecutive common eruptions have been used as tool . . .”

Changed

p. 3729, l. 1: “. . .has pointed out..”

Changed

p. 3730, l. 2-4: Lemieux-Dudon has been used for the last 12 kyr. What about 12-42 kyr? In particular, here in the conclusion stands: “Thus a new age scale covering the whole Holocene was proposed for the Talos Dome . . .”, while you state in the abstract: “. . .producing a new age scale for the last 42 kyr”.

The 12-42 kyr section was not taken into account in the age-scale transfer from Lemieux-Dudon’s model. We synchronised the EDC and TALDICE records for the whole period (0-42 kyr), but produced a revised age-scale just for the Holocene (0-12 kyr) to avoid confusion with the official TALDICE age-scale. We changed the sentence in the abstract in “. . . producing a new age scale for the last 12 kyr”.

p. 3730, l. 5: “. . . is proposed ..”

Changed

Fig. 2 caption: “. . . 1259 AD eruption of an unknown volcano . . .”

Caption was changed

Fig. 5 caption: “Depth-to-depth relationship of the common volcanic events detected in the two ice cores and pairs of synchronous events identified using other parameters (isotopes and dust).”

Changed as suggested.

Fig. 7 caption: As mentioned, I suggest to name the ‘age difference’ between chronologies an ‘offset’ (it is only a virtual difference).

As already said above, the captions was changed according to the suggested nomenclature.

We hope to have fully answered the questions raised by the referee and we thank

him/her for his/her useful comments that improved the scientific quality of the paper.

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