

Interactive comment on “A 70-yr record of oxygen-18 variability in accumulation from the Tanggula Mountains, central Tibetan Plateau” by D. R. Joswiak et al.

Anonymous Referee #2

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General comments

This paper presented a new 70yr-long ice core data (TGL05 core) from the Longxia Zailongba glacier, central Tibetan Plateau. The record is based on oxygen isotope and meteorological data from two nearby stations. The authors compared their record with a selected ice core data, and found negative correlation between oxygen isotope and N. India monsoon precipitation. This correlation between the N. India precipitation and the TGL05 isotope record is interesting and the ice core data is important. However, there are several important issues (see following specific comments) regarding interpretation of the data. Further the text must be significantly improved. The paper is not suitable

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for publication in its current form. I therefore suggest major revisions.

Specific comments

1. The authors should discuss the similarities and differences between the new TGL05 core and previous 14m ice core from the same Tanggula Mountains (Yao et al., 1995). Please show the previous data in figure4.

2. The author compared their data with Geladaindong ice core, and discussed spatial variability of $\delta^{18}\text{O}$ in the central Tibetan plateau. I can't understand why the authors compared only with the Geladaindong core because there are several other published ice core data. For example, Yao et al. (Annals of Glaciology 43, 2006) compared four Tibetan ice cores and classified into two groups (Please show all these coring sites in Fig.1). At least, comparison with the Puruogangri core (which is located in central TP) should be added.

3. The authors argued that "isotope ratios did not show well-preserved annual variation consistent with peaks in seasonal ion concentrations (Fig. 3)". This statement should be proved quantitatively (i.e., spectral analysis). In my opinion, small peaks of $\delta^{18}\text{O}$ appear to be consistent with those of ion concentrations. Further, this statement somewhat in consistent with the sentence in the next paragraph; "Due to the low annual accumulation preserved in the ice core, seasonal separation of $\delta^{18}\text{O}$ was not possible with the 5cm sampling resolution". Did the sampling resolution hamper seasonal separation of $\delta^{18}\text{O}$? Why did you obtain the clear seasonal signals in ion concentrations with the same resolution?

4. The authors conducted correlation analysis using JJAS temperature because these months accounted for about 80% of the annual accumulation. However, it is an approximation. If there is monthly precipitation data, it is better to use precipitation-weighted temperature for the correlation analysis.

5. The text must be improved for better presentation. In particular, I recommend that

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the authors follow the normal structure of the paper published in CP. For example, it is better to separate “Conclusions” from your “Conclusions and discussion”.

Technical corrections

Title; “in accumulation”. “Ice core” or “ice” would be better because accumulation has several meanings.

Abstract and text; $\delta^{18}\text{O}$ ratio (for example in P1931 L29). I don’t think this expression is accurate. You can say $^{18}\text{O}/^{16}\text{O}$ ratio or $\delta^{18}\text{O}$ value.

Abstract, “based on multiparameter dating techniques”. This sentence should be removed from Abstract because dating method is not included in this paper but in another paper.

P1931. In Introduction, the authors mentioned Northern, Southern, and Central TP. Please show the author’s definition of these areas in Fig 1.

P1932 L9; “In addition, a 14 m ice core from the Tanggula Mtns previously presented by Yao et al. (1995) provided a comparison for the time period 1940–1990 (Yao et al., 1995)”. The same reference in a sentence is redundant. Remove “previously presented by Yao et al. (1995)”.

P1932 L19; “depleted monsoon moisture”. “Isotopically” depleted monsoon moisture?

P1932 L24; “subsequently referred to TGL05”. This abbreviation has been explained before (P1932 L17).

P1933 L3; “CO₂ in He₂”. Helium is normally a monatomic molecule (I mean He instead of He₂).

P1933 L1 to L5; You use GasBench II with Continuous Flow IRMS. Cite more recent (appropriate) literatures for this method. Epstein and Mayeda (1953) did not invent the Gasbench with CF IRMS.

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P1933 L20; “did not display any signs of annual melt”. No melting is surprising because, based on Fig2 with the lapse rate, the coring site will be about 0 to 2 degree C in summer. Thus, the core potentially melts in summer. Please show more detailed information or data to support your statement.

P1934 L18; “TGL05 ice core ratio”. TGL05 isotope ratio?

P1937 L4 “TP”. Remove period after “TP”.

P1937 L6 “two locations despite the”. Remove “despite the”.

Fig2 y-axis, “Ave JJAS temp”. Remove “Ave JJAS”.

Fig4 . To compare these panels, I suggest removing x-axis label and add grid lines (as in Fig 3).

Interactive comment on Clim. Past Discuss., 5, 1929, 2009.

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