

Interactive comment on “Phase relationships between orbital forcing and the composition of air trapped in Antarctic ice cores” by L. Bazin et al.

L. Bazin et al.

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We fully agree with the comment. The two chronologies are in agreement for the age of Termination II within their uncertainty range, as said in Bazin et al., 2013. However, the differences are quite large. We have performed the exercise to transfer both EDC and Dome F on the same chronology thought the synchronization of water stable isotopes when preparing the paper. We did not integrate it in the final paper because the synchronization do not reconcile the $\delta\text{O}_2/\text{N}_2$ records after tuning (lower correlation between $\delta\text{O}_2/\text{N}_2$ records: 0.119 when independent, 0.107 when tuned on EDC and -0.074 when tuned on Dome F).

If you think that this would benefit for the paper, we can include a new appendix as follow. Moreover, we can add a sentence with the reference to Fujita et al., 2015 as we

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have the same conclusion.

Appendix: We have used the water stable isotope records of EDC and Dome F in order to tune one chronology on the other. To do so, we have deduced 5 tie-points corresponding to clear optima seen in both Dome F $\delta^{18}\text{O}_{\text{ice}}$ and EDC δD (Fig. 1). This is based on the assumption that climate change in Antarctica should occur at the same time over the whole East Antarctic Plateau, a feature that is consistent with meteorological observations and ice core chronologies (Masson-Delmotte et al., 2011; Bazin et al., 2013; Veres et al., 2013; Kawamura et al., 2007). When tuning on either AICC2012 or DFO-2006, we do not see any clear correspondence in the EDC and Dome F $\delta\text{O}_2/\text{N}_2$ records. By contrast, the $\delta^{18}\text{O}_{\text{atm}}$ records are in phase after synchronisation of water stable isotope records, but display different lags with precession for Termination II (5.2 ka when tuned on AICC2012 and 2.7 ka when on DFO-2006).

Figure caption: Synchronisation of Dome F on AICC2012 (left) and EDC on DFO-2006 (right) using water stable isotope records (either δD or $\delta^{18}\text{O}_{\text{ice}}$). Positions of tie-points are indicated with the black markers on top. The data for Dome F are in blue and the data of EDC in orange. The grey curves correspond to data on their original age scale, before tuning. Top: Water isotopic composition: $\delta^{18}\text{O}_{\text{ice}}$ for Dome F and δD for EDC; middle: $\delta\text{O}_2/\text{N}_2$ (lines with markers) and local summer solstice insolation (dashed lines); bottom: $\delta^{18}\text{O}_{\text{atm}}$ (lines with markers) and precession parameter delayed of 5 ka (dashed grey line).

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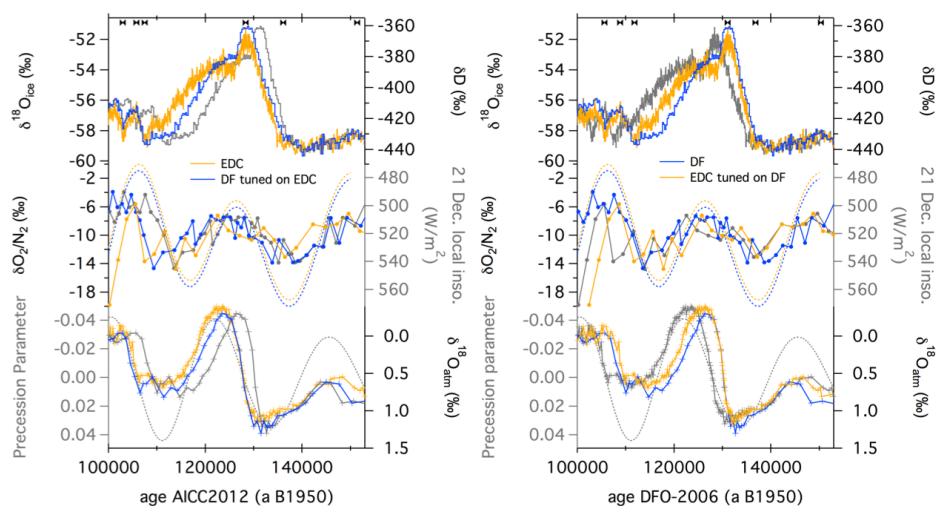


Fig. 1.

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