Author's Response

Dear Dr. Wolff,

We thank Referee #2 for the effort to re-review the manuscript and appreciate your suggestions on the ice chronology. Per your recommendation, we have added a paragraph along with two figures in the Supplement (Line 71-82) to discuss the potential impact of mismatched δD_{ice} in the original ice timescale. It is demonstrated that in order for Δage to remain persistently above ~2,000 years during the LIG, there needs to be a mismatch in δD_{ice} peaks by ~1,000 years. While such a mismatch is not likely, we still acknowledge its possibility and make the following admission in the main text:

"… we acknowledge that given the noisy nature of the S27 δD_{ice} records (Figure 2 and Figure S7), it is possible that the Δage—and by inference the ice accumulation rates—could have larger errors than reported here, which we discuss in greater detail in the Supplement."

The two new figures added to the Supplement are also attached to this letter.

Finally, we agree that our work here is not the smoking gun on this important topic. Rather, it is our hope that the hypothesis presented in this work will spark future investigations such as ice core deuterium excess and major ion during the LIG to better understand the behaviors of the West Antarctic Ice Sheet.

Best regards,

Yuzhen Yan

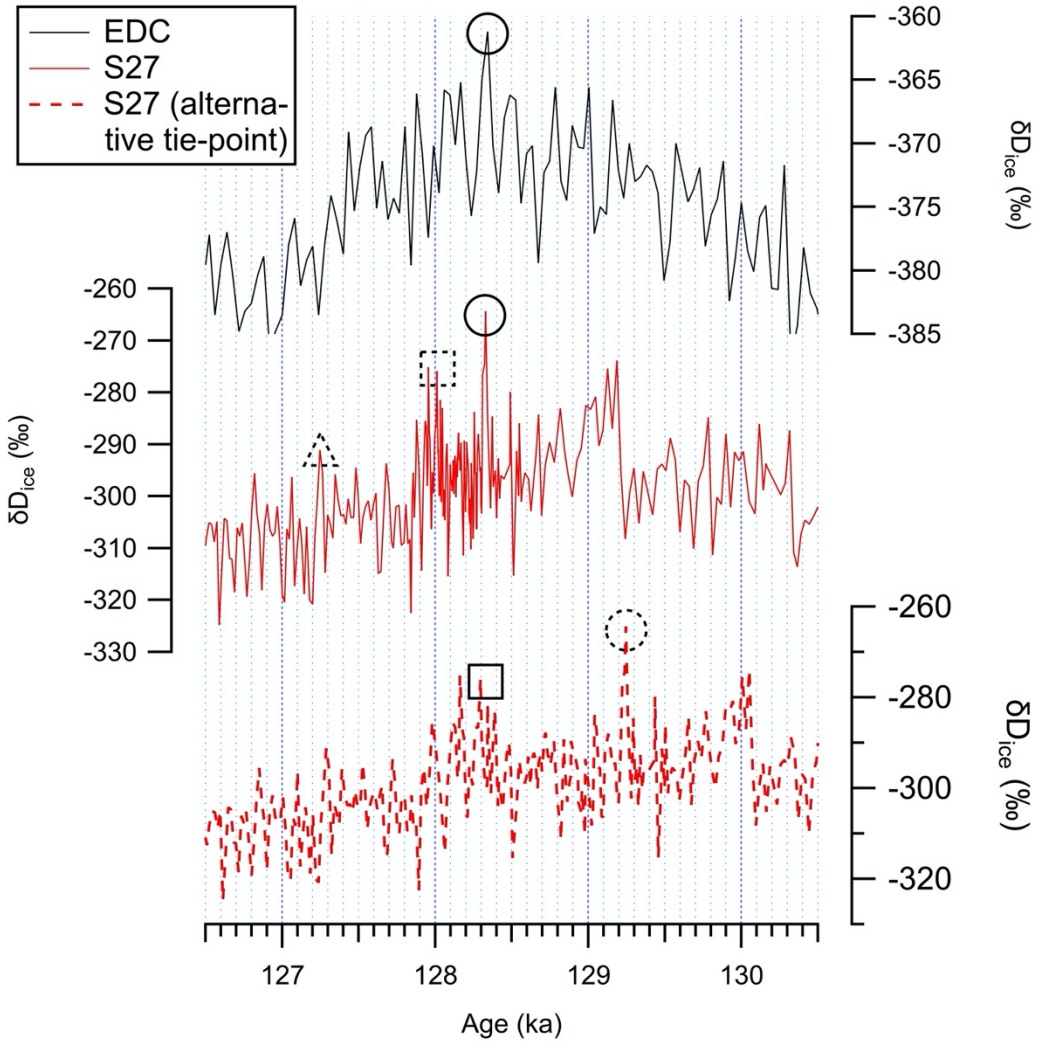

Figure S7. Evaluating alternative δD_{ice} tie-points around 128 ka and its impact on ice chronology. The top and middle panel are a zoom-in view of Figure 2 in the main text, with tie-points circled by solid lines. The lower panel shows the same δD_{ice} record under a different tie-point scheme: the δD_{ice} peak at 128.01 ka in the middle panel (dashed square) is tied to the EDC δD_{ice} peak at 128.33 ka. This new tie-point (square) leads to an older ice age at the same depth and hence larger Δage and smaller accumulation rates. In order for Δage to remain unchanged across the MIS 5e (Figure S8), the δD_{ice} peak around 127.25 ka (dashed triangle) needs to be tied to the 128.33 ka EDC δD_{ice} peak.

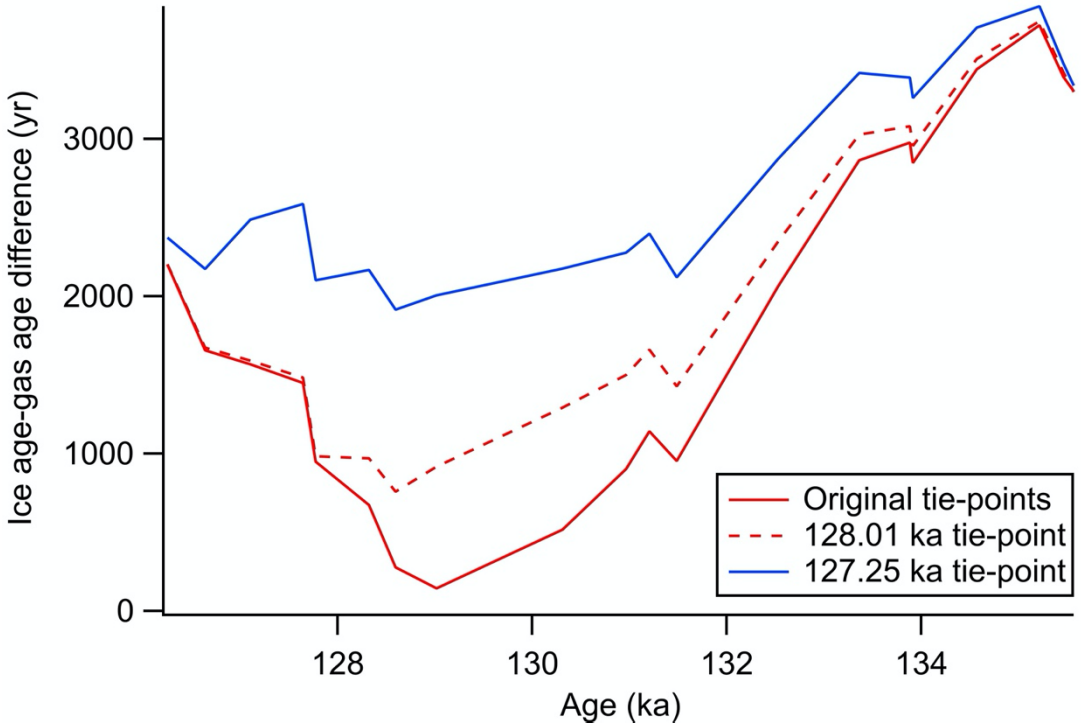

Figure S8. Δage estiamtes under different tie-point scenarios. Solid red: original tie-points adopted by Spaulding et al (2013) and used in this study (same as Figure 7 in the main text). Dashed red: S27 δD_{ice} at 128.01 ka tied to the EDC δD_{ice} at 128.33 ka (square in Figure S7). Solid blue: S27 δD_{ice} at 127.25 ka tied to the EDC δD_{ice} at 128.33 ka (triangle in Figure S7).