

Response to Referee #1 Dave prior
Manuscript review: tc-2018-275

Response to technical corrections

- 5 We would like to thank Dave Prior for the technical corrections. All the suggestions that Referee #1 made were implemented and it helped to make the manuscript more accurate and concise. The corrections made for Referee #1 and #2 are colored in red in the manuscript.

Response to technical corrections

5 We thank Adam Treverrow for providing us again with very valuable feedback. All comments were included in the revised version of the manuscript.

Below is our response to specific comments. The page and line numbers correspond to the first version of the manuscript.

10 **Specific comments**

P1 L13, P2 L23, P9 (Section 4.2): We agree with the referee. Throughout the manuscript we have replaced 'water-like' for 'liquid-like'.

P4 L34: We clarified in P4 L34 that it's the second order orientation tensor. We also clarified in section 3.2 that with 'c-axes eigenvalue' we mean λ_3

15 **P5 L26:** This reference was added to P5 L26 and to the reference list.

P6 L3: We agree that the way it was written down here was incorrect. Glen's flow law (with $n=3$) is correct, but only under a certain set of circumstances (initially isotropic ice at secondary creep), which might not be the most relevant conditions for ice sheets. We have rewritten this part of the paragraph.

20 **P6 L25:** We replaced delta O18 for $\delta^{18}\text{O}_{\text{ice}}$.

Figure 1: A axis label was added to the $\delta^{18}\text{O}_{\text{ice}}$ axis.

Table 1: We agree that expressing the age of the ice at the transition in Marine Isotope Stages (MIS) can make it harder to interpret the data for someone who is not familiar with this terminology. We added the age (in ka BP) in the table as well.

25 **P10 L25:** This sentence was adjusted like Referee #2 proposed it.

Table 3: We added the reference of G&K (1997, 2001) and mentioned that some of the parameters remained the same.

Section 4.5: P11 L40 is changed as suggested by the referee.

Alley (1988) was replaced with Budd and Jacka (1989) and Faria et al. (2014b).

30 **P12 L15:** We have changed the terminology into 'premelting zone' to describe the deeper ice where the temperatures are high enough for premelting to occur. We did not use the term temperate since this implies bulk melting of the ice.

P12 L25-32: We expanded this sentence as suggested by the reviewer.