

Interactive comment on “Modelling the evolution of the Antarctic Ice Sheet since the last interglacial” by M. N. A. Maris et al.

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The reviews were of much help in improving the paper. Below is our response on the comments by James Fastook:

Both reviewers mention that it is unclear why we did the interpolation between the LGM and PD climate states the way we did it. One suggestion is to interpolate in proportion to the ice core, but here is an example of a result of this method: When the ice core temperature reconstruction would reach -5°C (halfway between -10°C at 21 kyr ago and 0°C at the PD), which happens around 16 kyr ago, the patterns would already be halfway between the LGM and PD fields as well (because they are now linked to the ice core), while the ice sheet still has to react to the increasing temperature and is

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actually still at its LGM state at 16 kyr ago. When following the method as described in the paper and interpolating the patterns linearly in time they will be at only 25% away from the LGM state around 16 kyr ago, which is not a perfect, but a better match to the ice sheet topography. This is also briefly explained in the manuscript now. Indeed it would be best to couple RACMO and ANICE every 1000 years for instance, but due to a lack of time and computer power we have not done this. We used a normalization method of $T_{norm} = T/T_{mean}$ instead of $T_{norm} = (T - T_{mean})/T_{std}$ because for our interpolation method the mean of both normalized fields (PD and LGM) should be 1, since the objective is to interpolate the patterns and not the amplitudes. It has been clarified in the manuscript that this interpolation method is done for every spatial point, temperature is in K (and the SMB in m i.e./yr) and means are taken over the continent.

1. The sliding fraction has been computed by dividing the sliding velocity by the total velocity, where the sliding velocity is determined by the viscosity, the type of bedrock and the ice thickness (amongst others). The exact method is described in Section 2.4.2 in the paper.
2. Line 7, page 87: It should have been ‘to account for’ here, which might clarify the meaning of this sentence. This has been corrected.
3. Line 26, page 88: We have chosen to write in British English, which uses an ‘s’ in parameterisation instead of the American ‘z’.
4. Line 17, page 89: This has been changed.
5. Lines 20 and 24, page 92: The equations are now separated from the text.
6. Lines 15-16, page 93: This has been corrected.
7. Line 14, page 96: This has been corrected.
8. Lines 15-16, page 96: This has been corrected.

9. Lines 6-9, page 101: This sentence has been reformulated.

Interactive comment on The Cryosphere Discuss., 8, 85, 2014.

TCD

8, C736–C738, 2014

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