Clim. Past Discuss.,
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Climate of the Past Discussions

Interactive comment on "Snapshots of mean ocean temperature over the last 700,000 yr using noble gases in the EPICA Dome C ice core" *by* Marcel Haeberli et al.

Anonymous Referee #1

Received and published: 27 November 2020

The reconstruction of mean ocean temperature from past gas composition from ice cores is very complicated and tricky. Numerous corrections need to be applied and the authors go through great length to explain what they do and why. I understand that they want to be maximum transparent on the method they use. However, the manuscript is very long, and requires endurance to read. It would profit from being split into a main text and an appendix section with all the technical details. A sketch in isotope space showing the various corrections and their magnitude along with the respective effect on MOT would be useful. The temperature gradient in the firn layer is an important correction. The authors favor a model based approach for that correction that fits the long term average of the individual reconstructions based on the data. This

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I find troublesome. From the denser measurements up to 40 kyr BP it looks like the signal is not random.

Specific comments: Page 4 line 17.. : How is Kr affected by drill fluid when all other components have been gettered away? Page 8, lines 11-17: Instead of writing DT is negative write that the temperature is higher at depth due to geothermal heat flow (or do I misunderstand what is said here?) Figure 3: Please lower the top tags slightly so they do not interfere with the frame. Page 14, last paragraph: First, you argue that there may be a signal in the data then you invalidate that statement but do not say it. Page 18, line 7,8: What is the argument to assume no change in the saturation state?

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