

## ***Interactive comment on “Atmospheric gas records from Taylor Glacier, Antarctica, reveal ancient ice with ages spanning the entire last glacial cycle” by Daniel Bagenstos et al.***

**Anonymous Referee #2**

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This manuscript deals with the challenges of dating a horizontal ice core. Taylor glacier served as a climate archive for research that demands large samples. Proper dating is a prerequisite for a climatic interpretation of the results. Dating is achieved via “global” atmospheric gases. The glaciological interpretation involves a lot of hand waving but this is in the nature of it. The manuscript is well written and I have only very few comments that can easily be implemented in minor revisions. 1) The synchronization is done with atmospheric gases. Therefore, it is on the gas time scale. The ice of the sample is older than the gas. This fact needs to be mentioned in the introduction. I would also appreciate a bulk number on the order magnitude of Dage. 2) Other than  $d_{18}O_{atm}$ , methane has a concentration gradient over the globe. “Value-matching”

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(p2, line 32) of methane is only possible since Taylor glacier, WAIS, and EDC are in latitudinal proximity. This needs to be mentioned. 3) The manuscript is well referenced but I miss Chappellaz et al., J Geophys Res 102, 26547-26558 (1997) who was the first to my knowledge that has used CH<sub>4</sub> and  $d_{18}O_{atm}$  to reconstruct the chronology of an ice core.

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