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Interactive comment on "Connecting the Greenland ice-core and U / Th timescales via cosmogenic radionuclides: Testing the synchronicity of Dansgaard-Oeschger events" *by* Florian Adolphi et al.

P. Reimer (Referee)

p.j.reimer@qub.ac.uk

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This manuscript uses cosmogenic isotopes to synchronize the Greenland ice core timescale with the U-Th timescale through a meticulous, multi-step process. The authors minimize the root mean square error in the production rate models from geomagnetic field based reconstructions and the ice cores to resolve the scaling factor for 10Be. They then compare 14C archives from around the Lachamps event with the reconstruction from the scaled ice core stack to select the most suitable ocean ventilation rate for the carbon cycle. The investigation into the effect of delay between ice

core reconstructed atmospheric 14C changes and the marine and speleothem archives was insightful. Once the ice cores were synchronized to the U-Th (and dendrochronological) timescale the synchroneity of the proxy response to D-O cycles in a number of speleothem climate records was tested. This represents a very important step in interpretation of palaeoclimate records. The ice core based 14C reconstruction will also provide a guide to improvements for the next IntCal radiocarbon calibration curve update.

Specific comments: p. 2, line 52-54 'About one third of the data underlying the current radiocarbon calibration curve, IntCal13 (Reimer et al., 2013), obtain their absolute age from climate wiggle-matching.' The climate wiggle-match records make up about 6% of the total data used in IntCal13 not 1/3 as stated (423 out of 7019 data points; IntCal13 database accessed 9 August 2018 http://intcal.qub.ac.uk/intcal13/)

p. 7, lines 208-210 'The timescale of the Lake Suigetsu record has been inferred from matching its 14C record to the 14C variations in speleothems, additionally constrained by varve counting (Bronk Ramsey et al., 2012).' This statement seems a bit backwards to me since the varve counting provided the initial timescale which was then adjusted by matching the 14C records in speleothems, but if co-author CBR is happy with the way it's written then that is fine.

p.10, Figure 4. How are the 14C anomalies calculated here? Filtering is mentioned in line 292 but details are not given until section 3.4 and in section 4.3 where the error weighted mean is removed from the data for the Laschamp period. Obviously that was not the case for Figure 4. What do the dashed boxes represent?

Section 3.5 Change-point detection in climate records This is an abrupt shift from synchronizing 14C records and 10Be in ice core records to comparing to the timing or d18O shifts in climate records. The climate records considered are not even identified here except by a site name in Table 1. Presumably this should be part of Section 5 ?

Section 5. Figure 13. Why is the NGRIP Ca record used instead of d18O? A word of explanation here would be useful.

p.24-25 line 722-723 ‘Since IntCal13 in principle should be tied to the U/Th-age scale. . ..’. This phrase needs some qualification since IntCal13 is tied to dendrochronological time scale for 0 to 14,000 cal BP and while the Hulu cave U-Th agrees well with the tree-ring data it only begins at 10,730 cal BP.

‘Since IntCal13 in principle should be tied to the U/Th and dendrochronological age scale . . .. . .’

All figures would benefit from being presented in a larger size.

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