Comments: Hou, *et al.* Age of Tibetan ice cores by L.G. Thompson

The authors raise an important point about the age of the Guliya record as it is unusual in light of previous Tibetan Plateau (TP) records from the Dunde ice cap, Dasuopu Glacier (col) and Puruogangri ice cap. For their Chongce ice cores, the authors used a novel method of radiocarbon dating water-insoluble organic carbon (WIOC) particles at the microgram level from carbonaceous aerosols embedded in the glacier ice from 44 meters to 216.6 meters depth.

They import these dates into a simple two dimensional flow model to develop a time-depth profile. Questions should be raised concerning the use of such a model, given the complex flow regimes in these western Kunlun glaciers. More importantly the authors do not show any climate record derived from stable isotopes from these ice cores so that the reader can evaluate the quality and continuity of the record and how it compares to the other TP climate records (especially the 1992 Guliya record). Guliya is unusual in that it shows large and abrupt variations in $\delta^{18}O$ below ~150 m, which other TP records do not contain. Does the longest record from Chongce show similar variations?

Another concern about the Chongce record is geophysical in nature. In 1991 Chinese scientists published a Quaternary Glacial Distribution Map of the TP. According to this map, the terminal moraines around the Guliya ice cap are very close to their maximum position during the last two glaciations. However, this is not the case for the Chongce ice cap located just ~30 km to the west. Chongce shows the greatest variations in ice extent of any of the ice caps in this region. In addition, the Chongce glacier, which flows from the Chongce ice cap, surged between 1992 and 2014 while the Guliya ice cap remained static (Yasuda and Furuya, 2015; Fig. 3). Therefore, it might be inaccurate to assume that the timescale developed for the Chongce cores should reflect that of Guliya. In light of the evidence indicating the instability of the Chongce's ice flow, the longest core drilled in the deepest section of a valley glacier which flows through a bedrock trough (fig. S2) is very unlikely to be an optimal site for retrieving an undisturbed paleoclimate record. In light of the geophysical considerations discussed above it would be premature to conclude that these results invalidate the much longer Guliya timescale.

Note that the location shown for the 1992 Guliya core in Fig. S1 is incorrect. This should be corrected.

We strongly agree with the authors that more effort is necessary to explore multiple dating techniques to confirm the ages of the TP glaciers, including those from Chongce and Guliya. The Western Kunlun region, located at the intersection of the regions dominated by the westerlies and the SW Monsoon, is climatologically complex and the interactions of multiple air masses makes stable isotope interpretation challenging. Multiple aerosol sources also complicate the reconstruction of the paleo-environmental records preserved in these ice fields.

Yasuda, T. and Furuya, M. (2015) Dynamics of surge-type glaciers in West Kunlun Shan, Northwestern Tibet. *J. Geophys. Res.-Earth Surface*, https://doi.org/10.1002/2015JF003511