We thank Dr. Lamp for her constructive input and have done our best to address her comments, questions, and suggestions in red below.

RC2

In this technical note, the authors describe the new automated *in situ* cosmogenic carbon-14 (C-14) extraction system at Purdue University/PRIME Lab. The system is based on previous designs by N. Lifton and B. Goehring (formerly at Tulane) which use $LiBO_2$ flux to dissolve quartz sample grains, but upgraded with a glass coil to trap gases during sample extraction, and two extraction ovens isolated from the rest of the extraction/purification/graphitization processes, allowing for overlap. The paper presents the results of blank and interlaboratory standards (CRONUS-A, CoQtz-N) using different bottles of pre-fused $LiBO_2$ flux beads, various combustion and fusion temperatures/timings, and Al_2O_3 vs. Pt/Rh sample boats. The authors show that: (1) Pt/Rh boats heat more quickly and provide much lower blanks than Al_2O_3 boats, (2) a too aggressive combustion step results in diffusive loss of C-14, (3) bottles of flux from a certain manufacturer result in higher and increasing blanks, (4) standard measurements on the Purdue system are in line with accepted values from other laboratories.

For the most part the data contained in this technical note is presented well. I offer here some items that could be clarified for those less familiar with in situ C-14 extraction, and other suggestions/questions:

In general, I think a flow diagram of the procedures with approximate timings would be helpful. I found the discussion of “Day 1/Day 2 procedures” and degassing vs. combustion vs. extraction difficult to follow in the text.

Added a new Table 1 describing the procedural sequences on each day, and renumbered existing tables.

Lines 81-82. It would be nice to briefly describe the new CEGS LN_2 distribution system since the issues with the former design were discussed in detail.

The LN distribution system is described in Goehring et al. (2019) – added a citation indicating that.

Line 105: A comma after “downtube” would make this sentence clearer.

Done.

Lines 152-154: Specify which steps/traps are removing which gases.

Done.

Lines 197-198: Specify units of *Bg* (i.e., blank value in C-14 atoms or as $^{14}C/C_{total}$), and perhaps add a brief sentence on why this relationship exists.

Done.

Line 221: Does the etching pattern necessarily mean that the Pt/Rh boat heats more evenly, or just faster? The etching patten of the Al_2O_3 boats in Fig. 3 shows etching of the tube along the full length of the boat.

Most of the sample/boat heating likely occurs via conduction from the bottom edges of the boats in contact with the quartz sleeve. Metals conduct heat far more easily than ceramics. We speculate that the lower thermal conductivity of the Al_2O_3 boats may result in a thermal gradient from the base of the boat to the top, resulting in a lower equilibrium temperature of the melt and boat than the furnace set point. Conversely, we suggest that the more rapid conduction of heat throughout the Pt/Rh boats should prevent a thermal gradient within the boat, yielding an equilibrium temperature close to that of the set point, with correspondingly higher rates of vaporization of the flux than in the Al_2O_3 boats. We have no information as to what the apparent temperature difference between the two types of boats may be. Regardless, it seems that the less intense pattern of etching associated with the ceramic boats is related to the thermal conductivity differences between the two materials, as all other experimental equipment was the same. We believe that the text makes this point reasonably clearly already, but we have tried to clarify further.

Line 257: These two blanks are listed as Claisse Pure (“Batch 4”) on Fig. 4, but described as Ultra-Pure in the text.

Good catch – corrected on the Figure.

Lines 284-288: Add a short sentence or two describing the two quartz standards used (CRONUS-A, CoQtz-N). E.g., where they come from, approximate age/exposure history, etc.

Done

Fig. 3: Either use “(A)” or “A)” for consistency.

Done.

Fig. 4: Can the $LiBO_2$ Batch #s listed on the Figure (Batches 1-4) be updated to reflect the Batch #s/IDs used in the text (or can you list the Batch # used in Fig. 4 along with the actual bottle batch # in the text?) so the reader can more easily follow which blanks are from which bottle?

There’s not enough room on the Figure to add the full Batch #s for the bottles, but we have included the informal batch numbers in the text to assist the reader in following which is which. We have also added the full and informal batch numbers to the notes in Tables 3 and 4 (updated numbering).

Fig. 6: Can you add shading around the PCEGS mean value representing the 1 std dev (similar to how the Jull et al., 2015 data is presented)?

Done.

Tables 2, 3: Can you note in the tables which blanks used which batch/bottle of flux beads?

Done – added superscripts to the PCEGS numbers and defined in the notes.