Reply to comments from anonymous referee #2

We thank this referee for their useful and constructive comments and feedback, which have been very helpful in improving our manuscript. Our responses to the referee's text (in blue) are listed below (in black).

Specific comments:

"…CCGCRV (or CCGvu) is available on the NOAA/ESRL website the authors mentioned (currently the link is not working)…"

We have inserted the correct link provided by the referee (ftp://ftp.cmdl.noaa.gov/pub/john/ccgcrv) into the text of section 2.1.2, but also kept the existing link as a source of information about the program (the link that is broken is not the one in our manuscript, but one in the NOAA website; we are very grateful for the referee discovering this for us).

"…a quick search on "HPspline" shows only a few results (does this method go by another name since the Keeling et al. (1989) paper?"

HPspline is the current name for this program. There are numerous published papers since Keeling et al. (1989) that imply the use of HPspline (and we know this implication to be true in many cases owing to direct contact with the authors), but the program is not specifically named in any papers that we are aware of. We hope that our paper will increase awareness of HPspline amongst the scientific community.

"Some guidelines on how to retrieve the programs…would be very helpful for a potential reader."

We agree that lack of access to the three programs may well restrict data users to using only one program. Hence, we have added some extra information on who the current contact is for HPspline, and where more information about the STL R package can be found. Now that we have updated the CCGCRV C code link, we think that there is sufficient information on who to contact/how to obtain both the C and IDL versions of CCGCRV.

"As shown in section 3.5, the difference introduced by setting different input parameters is comparable with using different methods. I think this is a very important finding of this paper, and recommendation #11 can be better highlighted."

We agree with this feedback (also made by referee #1), and have moved recommendation 11 to the top of the list. We have also changed recommendations 12 and 13 to become recommendations 2 and 3.

"It would be very interesting if the author conduct more thorough sensitivity testing, and show some figures similar to Figures 1-9 (three or five curves of the same method, but different input parameters)."

Thank you for this feedback – we agree with this comment (similar to a comment made by referee #1), and have conducted some more sensitivity tests. Thus, we have included

new text in section 3.5, and two additional figures (figures 9 and 10). To keep the number of figures reasonable, we have removed figure 1, as we think the information conveyed in this figure about comparing the curve fitting programs is very similar to that conveyed in figure 2.

"…the description of STL could be improved."

We thank you for your comments regarding the STL description. We hope to have rectified any ambiguities and errors, while ensuring the program description is not getting too long (the more mathematically-inclined reader is referred to the underlying literature describing in detail all three curve fitting techniques).

"The authors are correct to state that the STL program is unable to recognize the artificial gaps, however this is a limitation of the currently available programming code… not a limitation of the STL method itself."

We thank the referee for pointing out this distinction, and we have added a few words of text throughout the manuscript and a few sentences in section 2.1.3. to make this clearer to the reader.