Overview:

The manuscript “Atmospheric radiocarbon measurements to quantify CO_2 emissions in the UK from 2014 to 2015” by Wenger et al. makes interesting use of measurements of atmospheric 14C in CO2 in order to attempt to estimate fossil fuel emissions from the United Kingdom. This is an interesting and potentially useful approach and the publication of the data and the model comparisons would certainly be beneficial. The methodology appears to be thorough and robust. Whilst it is disappointing that the measurement uncertainly appears to prohibit a thorough understanding of the emissions, the work carried out merits documentation. Whilst, previously, much of the manuscript text was unclear and made it difficult to assess the method and results, the text has been significantly changed since the original submission. The authors have clearly made every effort to improve the manuscript based on the comments provided in the previous reviews, and the study is therefore much easier to follow than before.

The manuscript now reads well, with only a few technical corrections remaining. The figures are generally clear and well chosen and the methods and models used within the manuscript are appropriate for such a study. The terminology is consistent and the chosen equations are clear and appropriate.

I recommend publication of this manuscript subject to the following minor and technical changes.

Minor changes & technical corrections:

Page 1, line 12-13: should be “as emissions from fossil fuels, *which* do not contain 14CO2, cause a depletion…”

Page 1, line 14: radiocarbon-derived *fossil fuel* CO2 (ffCO2)

Page 1, line 20: $CO_{enhanced}$ has not been defined in the abstract. Better to describe fully e.g. ‘by deriving a constant ratio of CO enhancements to ffCO2 for the mix of…’

Page 2, line 39: ‘to disentangle’ or ‘of disentangling’

Page 2, lines 64-70: These sentences need rewriting a little. Make it clear that this paragraph describes the forthcoming sections. The second sentence in particular is unclear: ‘In this study we use these observations to…’

Page 4, line 115: delete one instance of ‘CO2’, and comma after ‘trajectory’

Page 4, line 126: delete ‘was’

Page 5, line 133: ‘tool *to* investigate’

Page 5, line 135: The ‘$CO_{2\ obs}$’ in brackets here seems like it might be wrong. Should be ‘$CO_{2\ i}$’?

Page 5, lines 143 and 147: enhancement, or mole fraction?

Page 7, line 190: ‘assimilated’

Page 9, line 260: where -> were

Page 10, line 295: break up this sentence

Page 10, line 302-303: Justify/explain this statement. The model would not respond well to these conditions for what reason?

page 10, line 304: replace ‘modelled emissions’ here. They’re simulated mixing ratios derived from modelling using reported inventories.

Figure 4: I’m unclear about the corrections shown in this plot. If I understand correctly they should match the corrections shown by the black dots in Figure 3, but that doesn’t appear to be the case. Whilst all of the corrections is Figure 3 are negative, the corrections in Figure 4 occur in both directions, and never seem to be as large as those shown in Figure 3. Is this correct?

Page 10, line 311: Remove question mark in this title

Page 12, line 349: ‘impact *on*’

Page 12, line 365: only the nuclear 14CO2 signal is modelled, correct?

Page 12, lines 367-369: clarify the sentence beginning ‘These two simulations are combined…’

Page 12, line 374: You mean ‘cost-intensive’?