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Interactive comment on "Global CO_2 uptake of cement in 1930–2019" *by* Rui Guo et al.

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Thanks again for your kind and swift response. Please see the following for our responses to your suggestions: Line 49: We can agree on this. In addition, cement additives such as blast-furnace slag can accelerate carbonation rate of concrete and mortar (https://doi.org/10.3390/en12122346), this factor has been explicitly considered in our study (see the SI data 9 in the 'Input model parameters of cement carbon emission and uptake' file). Meanwhile, calcium oxide in cement additives also carbonates (https://doi.org/10.3390/en12122346). However, in order to meet the performance standards for cement materials, the CaO content usually does not change noticeably. In our study, we took this aspect of uncertainty into account as well, hence did not use the constant value. Line 395: In the revised manuscript, we will add necessary comparative analysis. The paper by Cao et al. (2020) (doi: 10.1038/s41467-020-17583-w) is a proper candidate. The literature you referred to is only concerning Spain using

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a simple transformation approach according to IPCC Guidelines (ACDU (service life) = $\alpha\times$IPCC reported emissions due to the calcination process; ACDU (end-of-life) = $\beta\times$IPCC reported emissions due to the calcination process, with α and β being 0.20 and 0.03, respectively), which is totally different to our cement uptake models. There is little comparability between them. Line 475: The same as Line 395. Line 479: This seems reasonable. Thanks. Regarding the uncertainty calculation bit, thank you for your advice here. We are aware that providing the uncertainty calculation code is necessary for our results to be included in the IPCC Emission Factor database. At this stage, however, we are still in the process of copyrighting the code thus decided not to publish the code, yet. Thank you for recognising the importance of this piece of research.

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