Dear editors:

Thank you for your comments on the manuscript. Here are our responses:

Public justification:
The authors have sufficiently addressed reviewer comments. There was one additional concern that was submitted in private. I consulted with co-editors of this Special Issue about this concern. We agree with the reviewer and so request a minor revision.
We believe there are two places where the conclusions of this paper are too assertive: L34-36 and L759-764. We request a revision to avoid future misinterpretation of this paper that steel slag is a better/safer/more favorable material for OAE than olivine, which this experimental design cannot conclude given that the real-world applications would produce conditions that are different from those tested in this experiment.
In my opinion, the most informative conclusion from this important experimental work to highlight is that steel slag could be an effective material to use for OAE and thus ought to be explored further and, secondarily, the results of olivine ought to be understood in the context of realistic olivine applications and exposure conditions.
The manuscript does not require a direct comparison statement in order to be complete. Moreover, I think that adding such a comparison introduces a weakness to the paper, as it invites readers to question the quality and value of that comparison (as exemplified in the review process).

Response: Thank you for your comment. We are somewhat hesitant to alter the text based on a private statement. Please let us explain why with a couple of arguments:

1) After carefully analysing our conclusions, we think our text is balanced and fact-based and also within the constraints how these alkalinity sources may need to be applied (see point 2). We acknowledge the time-dependency of the experiment (mention short-term effects) and also that olivine (with the 1.9 g L^{-1} of added material) has potential to increase alkalinity in a longer-term.
2) We are not fully agreeing that our olivine experiments were that unrealistic. It may be necessary to add quite large amounts of olivine to a given water body because otherwise there is no chance to measure its CDR effect. If MRV

frameworks require the measurement of alkalinity release, then the added amounts are on the conservative end because our experiment did not include dilution. To be even more clear about the time-scale dependency and the issues this creates we added a sentence at lines 545 of the revised manuscript.

3) We are concerned that changing the paper based on a private statement lacks transparency as the motivation for the comment is unclear. It could be a bad look for the paper if we alter what we think are data-based conclusions (within the frequently mentioned limitations of the experimental design) towards a very late stage of the process.

Perhaps one way out could be that the private statement is posted on the peer-review forum? That way we could openly address the issue and maintain full transparency.

Additional private note:
I recommend updating 'kg' in L544 to 'kg CO_2'.

Response: Changed as requested.

Kind regards,

Jiaying Guo and Lennart Bach