Reviewer Comments:

- The authors should indicate that ocean-CDR/OAE has the potential to compensate for CO2 degassing associated with large-scale removal of CO2 from the atmosphere. This makes ocean-CDR one of the only pathways that delivers CO2 removal with no CO2 release consequences ensuring that it is one of the most (the most?) resource efficient means for large scale CDR.

- The figure number needs to be corrected: “The two primary electrochemical processes used to generate alkalinity from brine are electrolysis (O’Brien, Bommaraju, and Hine, 2005, pp.31-34) and electrodialysis (Strathmann, 2011, pp.163-167), as shown in Fig. 3.3.” ***Figure 3

- Regarding Figure 3: It is not always necessary to have pretreatment, and to segregate the brine into divalent-rich, and -poor streams. The process flow could be shown more generally, and it could be indicated that many possible configurations exist.

- The authors may wish to consider the following two publications which are relevant to one particular approach for ocean-based CDR, but which contain commentary of relevance to many ocean-based CDR approaches:
  a. https://pubs.acs.org/doi/full/10.1021/acssuschemeng.0c08561
  b. https://pubs.acs.org/doi/full/10.1021/acsestengg.3c00004

- The authors are correct in that CO2 is released in a static seawater system wherein CaCO3’s precipitation is induced. However, when CaCO3 precipitates under conditions of constant alkalinity generation (i.e., in the presence of a constant pH pump as proposed via the La Plante et al. process), as noted in the second reference above – no CO2 is released. Furthermore, the process of La Plante et al. is not based only on CaCO3 precipitation. Rather, CaCO3 precipitation is the secondary contributor to CDR, the primary contributor being Mg(OH)2 derived alkalinity. As such, the second sentence is inaccurate and should be corrected for content, and for its indication regarding efficiency which is not assessed herein. “In a second version of this approach, the NaOH(aq) is added to seawater to remove CO2 as CaCO3(s), with additional NaOH(aq) then added to restore this lost alkalinity and draw CO2 from the air to replace the removed CO2 (de Lannoy et al. 2018; Eisaman et al. 2018; La Plante et al. 2021). The precipitation of CaCO3(s) releases CO2, making this second version relatively inefficient from a CO2-removal perspective, but may be pursued if other considerations such as ease of verification outweigh this inefficiency.”

- Line 259: reactions at anode and cathode are interchanged. H2 is produced at the cathode and Cl2/O2 at the anode

- Line 263: LaPlante (2023) discusses the approach described here to neutralize the acidic efflux of an electrolyzer using the acid-neutralization capacity of different solutes. It would be appropriate to cite this work.

- It is worth mentioning that the development of efficient and durable oxygen selective electrodes would be an important direction to make seawater electrolysis more feasible –
because otherwise the large-scale production and handling of gaseous chlorine (in addition to acid) could make standard electrolysis processes difficult to scale.

- Many figure numbers are written as 3.x. These should be updated/corrected.