

Authors' response to reviewer 1

We thank the reviewer for the constructive and insightful comments which helped us to improve the manuscript.

In the following we respond to the specific comments. (Reviewer comments are repeated in *italic*.)

1) Part 9.2 line 1312. Suggestions regarding “ a SLB misclosure in the early years of Argo 2003–2006 is likely due to an underestimation of the steric sea-level rise”. I would suggest to include the reference to support the statement regarding the underestimation of the steric sea-level rise, or add a sentence to clarify this statement.

We elaborated this statement and made explicit reference to Section 3.2.2 where it is discussed in detail. Now the sentence reads: “When the SLBC_cci steric product is used, a SLB misclosure in the early years of Argo 2003–2006 is likely due to an underestimation of the steric sea-level rise associated to the global sampling error in conjunction with the constraints towards a static climatology, as discussed in Sect. 3.2.2.”

*2) Part 3.2.3 Deep ocean steric contribution
This part needs some comment (just a comment) regarding the estimate... 0.1 ± 0.1 mm/yr based on Purkey and Johnson (2010), to address the optimistic uncertainties in this estimate, suggesting that some very limited data sets are available to calculate this estimate, mainly to bring the issue of the need for observations in the deep ocean.*

We added two sentences to discuss the issue: “Note that this estimate is based on sparse in situ sampling. Corresponding evolutions of the ocean observing system are under way (Roemmich et al., 2019).”

3) It would be good to see some statement, providing a clear message (maybe in abstract), that availability of the data (e.g. results from P1 vs P2) is important to improve our understanding about sea level components, and to understand the source of uncertainties.... Something like that. However, I do not inflict any specific statement, I just would like to suggest a message about the importance of observations for sea level components. It is a very minor suggestion.

Thank you for this suggestion. We added a sentence in the Introduction, §2: “Clearly, as a prerequisite of progress in SLB studies, datasets on the mentioned budget elements must be accessible.”