

EGUSPHERE-2025-3345

## Reply to Review Comments

Apr 29, 2026

We thank Sophie Valcke for the review of our manuscript and the helpful comments. To address the concerns, we made the minor changes outlined below. In red, we repeat verbatim the comment from the reviewer. Continuing in normal font, we give our reply and revisions. Page and line numbers given for our changes refer to the author's tracked changes document submitted with the revised manuscript.

### Comments:

**P.3, l.55-58 : The sentence “However, the missing specialization of preCICE is less important in non-global ESM scenarios, such as the setup of this paper, and it also provides features such as implicit coupling schemes (Mehl et al., 2016) and time interpolation (Rodenberg and Uekermann, 2025) that are not typically offered by ESM couplers and could provide benefits to some applications.” seems wrong to me. Given the structure of the sentence, the “it” in “and it also provides” refers to “the missing specialization”, while it should be referring to preCICE itself. I would suggest to cut it in two sentences such as: “However, the missing specialization of preCICE is less important in non-global ESM scenarios, such as the setup of this paper. Furthermore, preCICE also provides features such as implicit coupling schemes (Mehl et al., 2016) and time interpolation (Rodenberg and Uekermann, 2025) that are not typically offered by ESM couplers and could provide benefits to some applications.”**

This is true, we split up the sentence as suggested (page 3, line 56).

**P.5, l. 101 : I think what you call “implicit coupling” should be called “iterative coupling” as in Marti et al. 2021 (<https://doi.org/10.5194/gmd-14-2959-2021>). I think the iterative coupling you describe here is different from the implicit coupling usually considered in geophysical coupling, such as in [https://cice-consortium-cice.readthedocs.io/en/cice6.1.1/science\\_guide/sg\\_coupling.html](https://cice-consortium-cice.readthedocs.io/en/cice6.1.1/science_guide/sg_coupling.html) (“First, some of the fluxes depend strongly on the state of the ice, and vice versa, implying that an implicit, simultaneous determination of the ice state and the surface fluxes is necessary for consistency and stability.”). Please consider changing “implicit” for “iterative”.**

It is true that the term “iterative” is more common, at least in the ESM literature. However, since we are specifically referring to a feature of preCICE, we think it is appropriate to use the term that preCICE uses throughout its documentation and related papers. The preCICE feature is named such for the same reason as the quoted statement from the CICE documentation. Section 2.1 also explains the feature.

To help understanding, we added a notice about the different terminology and a reference to the Marti 2021 paper as an example (page 3, line 57 and page 5, line 102).

**P.5, l.106-107 : The addition of the sentence “Multi-scale coupling (Desai et al., 2023) allows the coupling of macro-scale solvers with large numbers of micro-scale solvers.” seems a bit out-of-phase here. I do not see preCICE advantages regarding multi-scale coupling. M Hanke was also bothered by this unclear statement on multi-scale coupling. Please consider simply removing this sentence, or clearly describing preCICE functionality regarding multi-scale coupling.**

We opted to remove the statement (page 5, line 107), the limited importance of the statement for the manuscript would not justify in-depth explanation.

**P.28, l.563: missing parenthesis before Liu et al**

Changed (page 28, line 564)

**P.29, l581: consider changing “on” for “for” in “on Earth System Models”**

Changed (page 29, line 582)

**P.30, l.592: Consider removing the coma after “We think”**

Changed (page 29, line 593)