We sincerely appreciate both reviewers for their further reading and suggestions regarding technical issues in our revised manuscript. Our responses below are shown in blue, whilst the reviewers comments are in black.

Report #1:

I thank the authors for taking the time to address and respond to my comments so thoughtfully and for including additional information and analysis in their responses. In particular, the added details in section 3.1 of the manuscript regarding ice-ocean vs atmosphere-ocean drag and in section 3.2 regarding internal ice stress answer several of my initial questions, and better explain how the change in ice thickness distribution impacts each of the major terms of the ice momentum balance and atmosphere-ice-ocean coupling. I feel this information significantly improves the manuscript.

I am satisfied with the author's responses to my comments and have no further concerns about the manuscript. I am happy to recommend the study for publication in its current form, aside from a few small technical corrections (listed below). I have enjoyed reading this paper.

Thank you again for the comments on the original manuscript and further reading on the revised version, which helped to improve the quality and strengthen the scientific perspective of the manuscript.

Minor technical corrections (line number correspond to version without tracked changes):
- L285: Should reference Fig S5, not S52

Thanks for finding the typo. We corrected it accordingly. (line 285)

- L291: Should reference Fig S6, not S63

Corrected accordingly. (line 291)

- L349: Awkward phrasing or possible typo with "whereas contradict"

Thank you for pointing out the grammatical errors.
We revised the sentence as follows; *The decrease in ice-ocean coupling in the post regime-shift simulations is consistent with results regarding the long-term decline in ocean surface stress in ice-covered areas of the Arctic (e.g. Martin et al., 2016; Sterlin et al., 2023), whereas it contradicts results obtained from models with constant drag, where the increase in ice drift speed leads to increasing ocean surface stress in CMIP6 models (Muilwijk et al., 2024*). (line 349-353)

Report #2:

First, I want to thank you for your careful revision of the manuscript and clear response back to us reviewers. I find that you have solidly implemented the comments by us both and provided

well-motivated justifications for when keeping things 'as is' to remain at their intended scope. The revision has strengthened the manuscript with clarified scope, intentions, outputs and material (hence the change of Scientific Significance from (Very) Good to Excellent). I particularly value the addition of supplementary material.

Thank you for taking time for further reading and comments.

The only two details I would wish that you actually (briefly) include in the manuscript are the requested specifics on the mixed layer density threshold (R1 L262) and the filter type (R2 L261/265). This info was provided as replies to us but is valuable also to the readers and adds to the reproducibility/comparability aspect, since there are many ways to calculate/extract the ML and many various types of filters. These additions are the reason for my recommendation for the manuscript to be "Accepted subject to technical corrections", rather than "as is" (judging such edits as more straightforward than the “minor revisions” options). Congratulations on this strong piece of work. I look forward to seeing your future studies on sea-ice physical processes and biogeochemical implications.

Thank you, we agree with these suggestions.
We now mention the mixed layer density threshold in Figure 5 caption as follows; *The magenta lines in panels (a), (b) and (d) - (f) indicate the mixed layer depth, defined as the depth at which the local density exceeds the surface density by 0.03 kg* m^{-3}*, following de Boyer Montégut et al. (2004)* (line 302-304), and the reference has been added to the reference list.
We now mention the applied filtering method on line 272.

Finally, we thank both reviewers for taking the time to review our manuscript and for their thoughtful and constructive comments!