

# Supporting Information for "Simple hybrid sea ice nudging method for improving control over partitioning of sea ice concentration and thickness"

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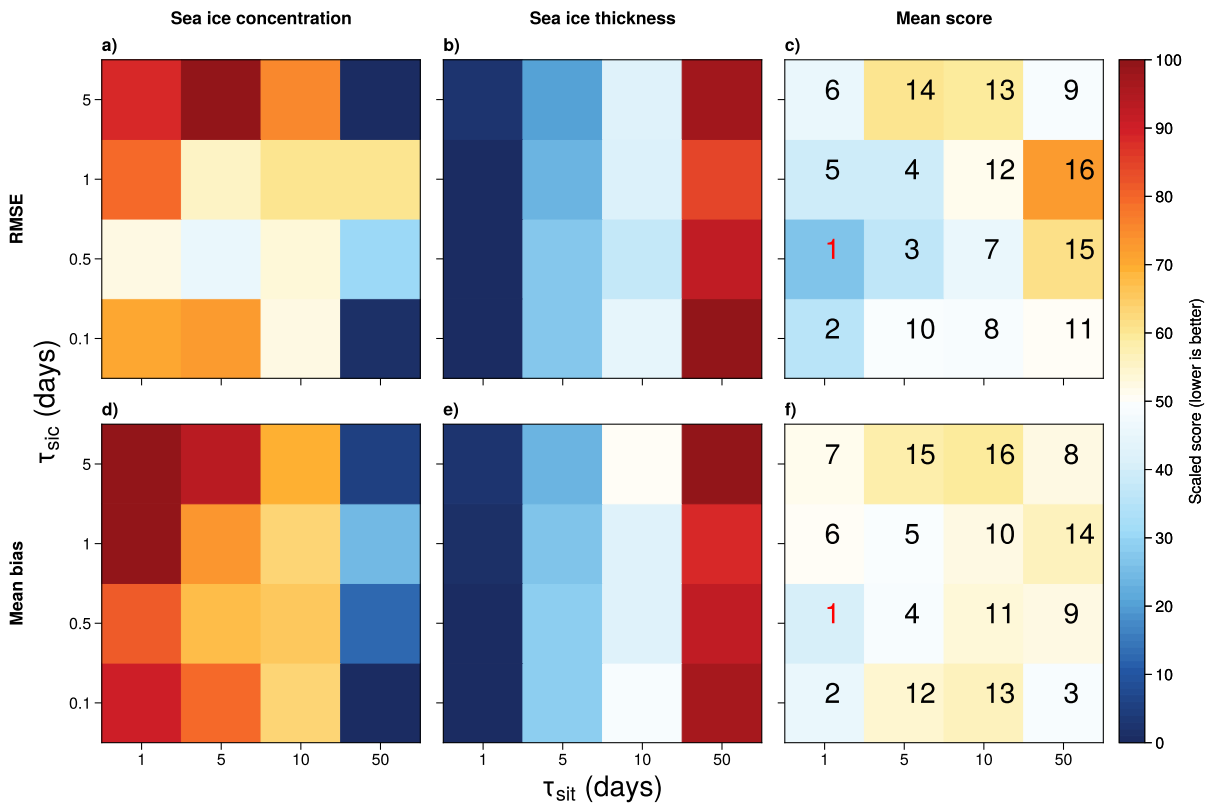
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1. Figures S1 to S3

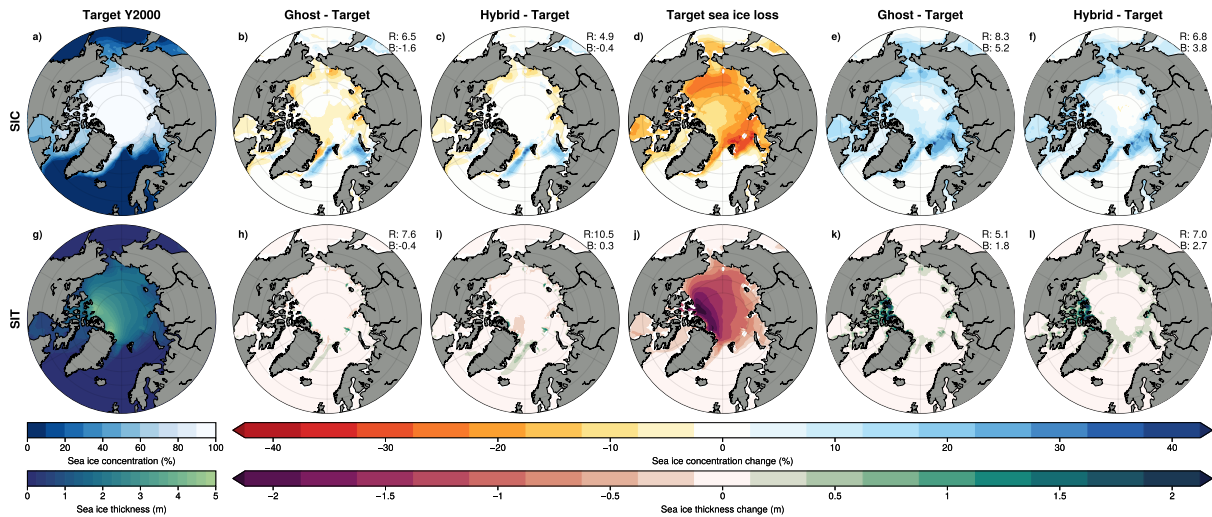
## Introduction

The supporting information to this paper contains three figures. The first one is the nudging timescale analysis for Antarctic sea ice as shown for Arctic sea ice in Figure 2 of the main paper. The last two figures show the agreement with the target for the CICE4 stand-alone runs.

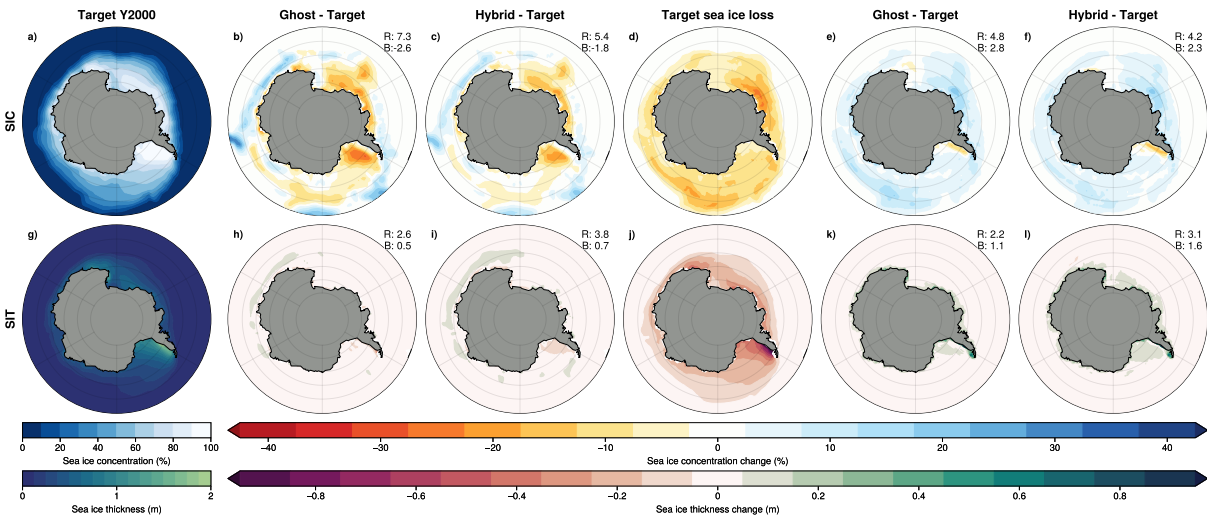
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**Figure S1.** Root mean square error and mean bias scores of different nudging timescale combinations for Antarctic sea ice. a) RMSE score of Antarctic SIC. b) As in a) but for Antarctic SIT. c) Mean RMSE score of both Antarctic SIC and SIT. In panel c), the numbers indicate the rank of each combination for the mean RMSE score. d)-f) As in a)-c) but for the mean bias. The numbers highlighted in red in panels c) and f) indicate the best overall score over both performance metrics.



**Figure S2.** Annual mean Arctic sea ice concentration and thickness in the CICE stand-alone simulations using ghost-flux and hybrid nudging methods. a) SIC target in pa-pdSIC-cice. b) Difference between simulated SIC and target SIC in pa-pdSIC-cice-ghost. c) As in b) but for the pa-pdSIC-cice-hyb experiment. d) Target SIC change between pa-futArcSIC-cice-hyb and pa-pdSIC-cice-hyb. e) Difference in simulated melt between pa-futArcSIC-cice-lw and pa-pdSIC-cice-ghost. f) As in e) but for pa-futArcSIC-cice-hyb and pa-pdSIC-cice-hyb. g)-l) as in a)-f) but for sea ice thickness. The numbers on the top right corner of the panels in columns 2,3,5 and 6 indicate the area weighted root mean square error (R) and mean bias (B). For SIT, the RMSE and mean bias are displayed in units of cm.



**Figure S3.** As in Figure S2 but for Antarctic sea ice using pa-futAntSIC-cice-hyb and pa-futAntSIC-cice-ghost instead of pa-futArcSIC-cice-hyb and pa-futArcSIC-cice-ghost