@article{Peings2021,
abstract = {This study presents results from the Polar Amplification Multimodel Intercomparison Project (PAMIP) single-year time-slice experiments that aim to isolate the atmospheric response to Arctic sea ice loss at global warming levels of +2°C. Using two General Circulation Models (GCMs), the ensemble size is increased up to 300 ensemble members, beyond the recommended 100 members. After partitioning the response in groups of 100-ensemble members, the reproducibility of the results is evaluated, with a focus on the response of the mid-latitude jet streams in the North Atlantic and North Pacific. Both atmosphere-only and coupled ocean-atmosphere PAMIP experiments are analyzed. Substantial differences in the mid-latitude response are found among the different experiment subsets, suggesting that 100-member ensembles are still significantly influenced by internal variability, which can mislead conclusions. Despite an overall stronger response, the coupled ocean-atmosphere runs exhibit greater spread due to additional ENSO-related internal variability when the ocean is interactive. The lack of consistency in the response is true for anomalies that are statistically significant according to Student's-t and False Discovery Rate tests. This is problematic for the multi-model assessment of the response, as some of the spread may be attributed to different model sensitivities while it is due to internal variability. We propose a method to overcome this consistency issue, that allows for more robust conclusions when only 100 ensemble members are used.},
author = {Peings, Yannick and Labe, Zachary M. and Magnusdottir, Gudrun},
doi = {10.1175/JCLI-D-20-0613.1.},
file = {:Users/zlabe/Documents/Research/Publications/ENS{_}JCLI{_}2021/PeingsLabeMagnusdottir{_}JCLI{_}2021{_}ms.pdf:pdf},
journal = {Journal of Climate},
keywords = {Arctic sea ice,Atmosphere-ocean interaction,Climate Variability,Northern Annular Mode,Numerical analysis/modeling,Sea Ice Thickness,large ensembles},
mendeley-tags = {Arctic sea ice,Atmosphere-ocean interaction,Climate Variability,Northern Annular Mode,Numerical analysis/modeling,Sea Ice Thickness,large ensembles},
number = {10},
pages = {3751--3769},
title = {{Are 100 ensemble members enough to capture the remote atmospheric response to + 2 °C Arctic sea ice loss ?}},
url = {https://journals.ametsoc.org/view/journals/clim/aop/JCLI-D-20-0613.1/JCLI-D-20-0613.1.xml},
volume = {34},
year = {2021}
}