

## Response to RC2

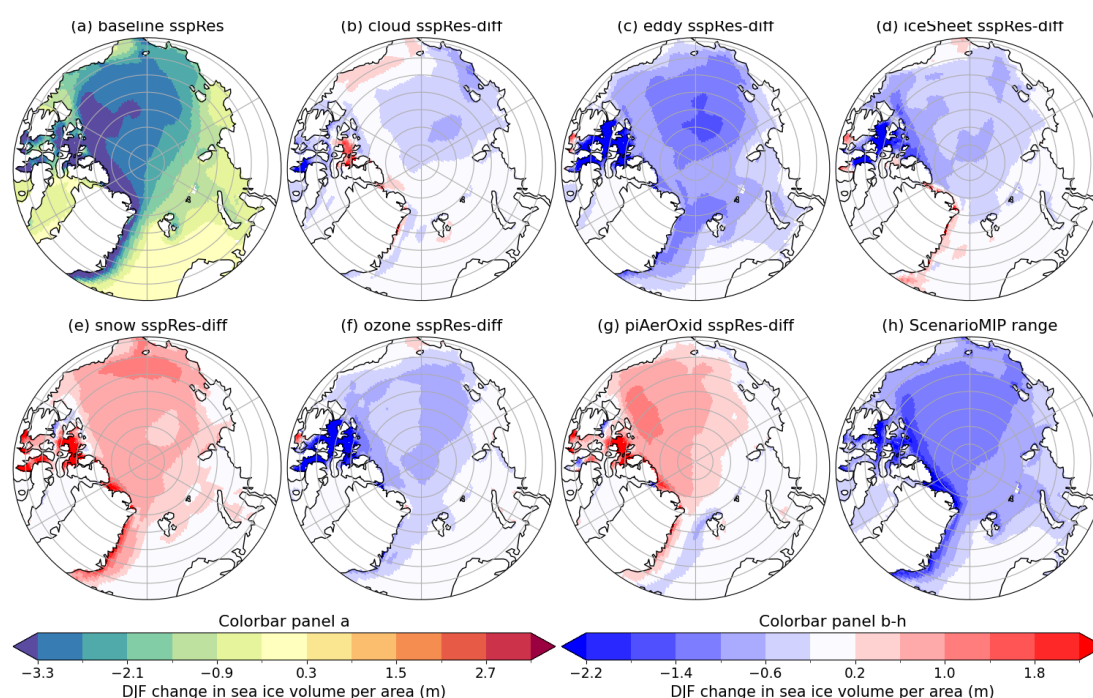
This manuscript clearly presents the experimental setup and effectively addresses key parameters contributing to uncertainties in climate projections. The methods are clearly described and outlined to the reader. In my opinion, the removal of a known bug affecting mixed-phase clouds is more of an update and not an independent experiment.

*Response: Thank you very much for your comments. We are happy to hear that you find the manuscript to be clear and effectively address key parameters contributing to uncertainties in climate projections. Regarding the cloud experiment, it actually involves multiple changes beyond the ice nucleation bug fix. Changes were made both to the efficiency of the Wegener-Bergeron-Findeisen process (liquid-to-ice conversion), to the phase of detrained cloud water from convection, and to the fraction of dust and soot particles assumed to be able to nucleate ice, with the goal of obtaining a control simulation that is consistent with cloud phase based on satellite retrievals. We will revise the text describing the cloud experiments in the introduction and in section 3.1 to place more emphasis on these parameterization changes and less on the bug fix. Please see the response to the first main comment from reviewer 1 for a detailed overview of the suggested changes to the text.*

Enclosed below you can find some minor technical comments regarding the figures:

Fig. 5: Include units in the colorbar within the figure.

*Response: We will change the figure as follows:*



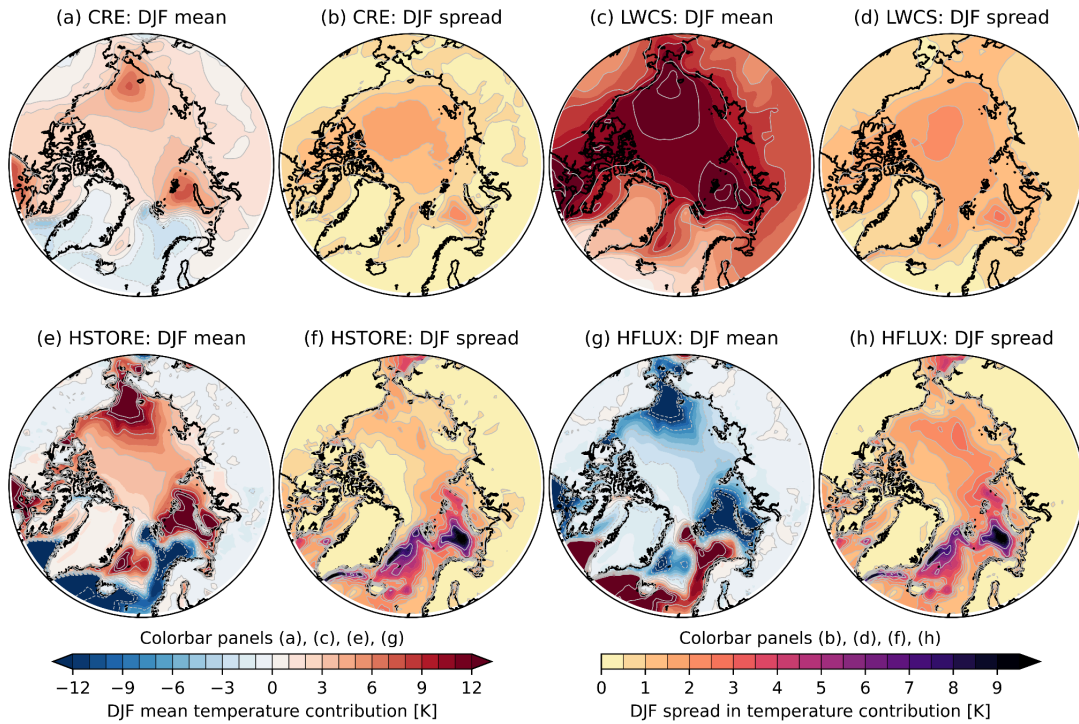
**Figure RC2.1:** As Fig. 5, but with units shown below the color bar.

Fig. 7: Indicate lack of units in the colorbar with something like [-]

*Response: We will add “unitless” to the colorbar title to indicate the lack of units.*

Fig. 13: Include units in the colorbar within the figure.

*Response: We will add units to the colorbars as shown below.*



**Figure RC2.2:** As Fig. 13, but with units shown below the colorbars.