We thank all reviewers for their time in reviewing the manuscript, and appreciate their detailed and insightful comments and suggestions. Here we summarize the comments from reviewers as blue, and include our respective responses as below in black.

Reviewer 1

The marine low-cloud pattern effect is an important and widely studied topic, but one that is far from being well understood. This manuscript analyzes this effect in detail in an ensemble of models using the cloud controlling factors (CCFs) method, and obtains results that are very clear, very interesting, and, in my opinion, represent a very significant advance. While the essential role of EIS has already been well established, the use of meteorological cloud radiative kernels, on the one hand, and the sensitivity of meteorological variables to average temperature, on the other, makes it possible to clearly separate what is related to the SST pattern from what is related to the response to this SST pattern. In my opinion, this is a very good manuscript that fully deserves to be published in ACP. I have only a few minor comments to make, which are presented below.

The difference between estimates using different data sets is mentioned in the manuscript without being really discussed. The manuscript highlights the importance of a good estimate of (\partial R)/(\partial EIS) for the pattern effect. But if we compare Figure 1b with Figure A1, it seems to me that the estimate of (\partial R)/(\partial EIS) differs significantly depending on the data set used. This is a point that could be further emphasized, as well as the importance of having a better estimate of this term based on observations, with possibly a discussion of the strengths and weaknesses of the different datasets and possible avenues for improvement.

We thank Reviewer 1 for the constructive feedback on the sensitivity of feedback on choice of observational datasets. We agree there is significant uncertainty in the different datasets, and have added an additional supplementary figure S2 to visualize the spread due to the differences in estimates of (\partial R) /\partial CCF). The spread of observational kernels is smaller than the spread of model kernels, yet still significant.

Past work with observational kernels (e.g. Myers et al 2021) has generally treated the spread as an indication of uncertainty, with unweighted averages of different kernels taken as a best estimate. While assessing the relative strengths and weaknesses of each dataset in detail is outside the scope of this paper, we have added a summary of key differences between datasets in the summary and conclusion section:

"Considerable spread remains across estimates derived with observational meteorological kernels (Fig. S2), due to the differences in instrument capabilities, cloud detection algorithms and selection of cloud retrievals in each observational dataset (e.g. Stubenrauch et al., 2013; Minnis et al., 2011). For example, ISCCP uses IR-VIS methods to provide cloud properties that correspond to the radiative mean from both high and low clouds and tend to misidentify high clouds that overlay low clouds and return biased-high mid-level cloud amounts. MODIS, CERES-FBCT and PATMOS-x products retrieve high cloud properties using IR methods, but distinct biases remain. Using all four observational kernels therefore provides a comprehensive range of low cloud amounts and the resulting feed-back and pattern effect estimates. However, additional observations will remain pivotal in narrowing the range of radiative sensitivities to meteorology."

pages 3-4, Eqs 1-3 and corresponding text: adding a subscript i to R_low would make the equations and text clearer.
l 62: dR/dTg => dR_low/dT_g ; \partial R / \partial CCF_i => \partial R_low,i / \partial CCF_i
l 69: d CCF/dT_g => d CCF_i/dT_g

We thank the reviewer for their detailed comments, and have modified the in-text notations as suggested in equation 1-3 for identifying Line 62 and 69.