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# SI for Detailing Cloud Property Feedbacks with a Regime-Based Decomposition

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## 1 Introduction

In this document we provide five supplementary figures. In Figure 1a we show the zonal mean multi-model mean across-regime components (with inter-model standard deviation indicated with shading) from Equation 8. From this it is clear that at every latitude, the third term ($\Delta f_r C'_r \overline{K}$; green line) dominates and is very close in magnitude to the total across-regime term (black dashed line; shading omitted for clarity). Term 1 ($\Delta f_r \overline{C}\,\overline{K}$; blue line) and term 2 ($\Delta f_r \overline{C} K'_r$; orange line) are very small at all locations, while term 4 ($\Delta f_r C'_r K'_r$; red line) is non-negligible but still smaller than term 3 at middle latitudes. The global means of all terms of Equation 8 are shown in Figure 1b. This demonstrates the dominance of term 3 for the global mean in each individual model.

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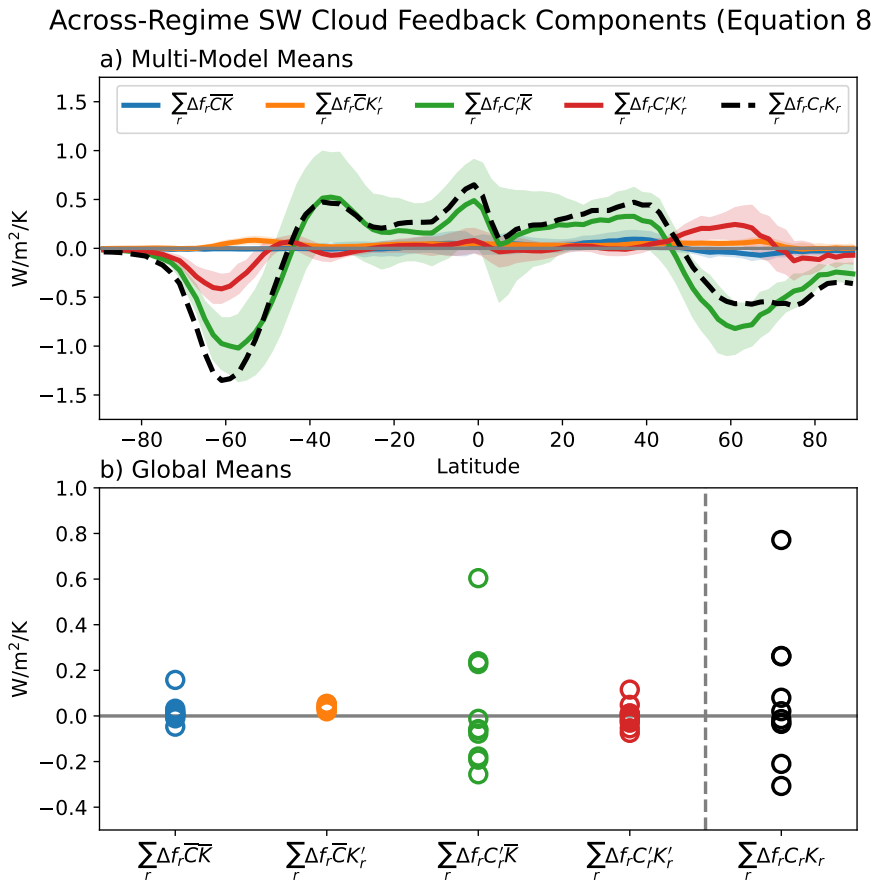


**Fig. 1** (a) Zonal-mean across-regime SW cloud feedback components from Equation 8. Multi-model means and standard deviations are indicated with lines and shading, respectively. For clarity, the total across-regime component (black dashed) is shown without shading. (b) Global mean across-regime SW cloud feedback components for each model.

The remaining four figures show results derived from projecting model cloud fields onto the 11 MODIS cloud regimes of Cho et al (2021) rather than the 8 ISCCP cloud regimes of Tselioudis et al (2021). Because there is no 1:1 match between ISCCP and MODIS regimes, we show in this document the results that are integrated across regimes, that is, the MODIS regime equivalent of Figures 7, 8, 10, and 11 of the main text.

## References

Cho N, Tan J, Oreopoulos L (2021) Classifying Planetary Cloudiness with an Updated Set of MODIS Cloud Regimes. Journal of Applied Meteorology and Climatology 60(7):981–997, DOI 10.1175/JAMC-D-20-0247.1,

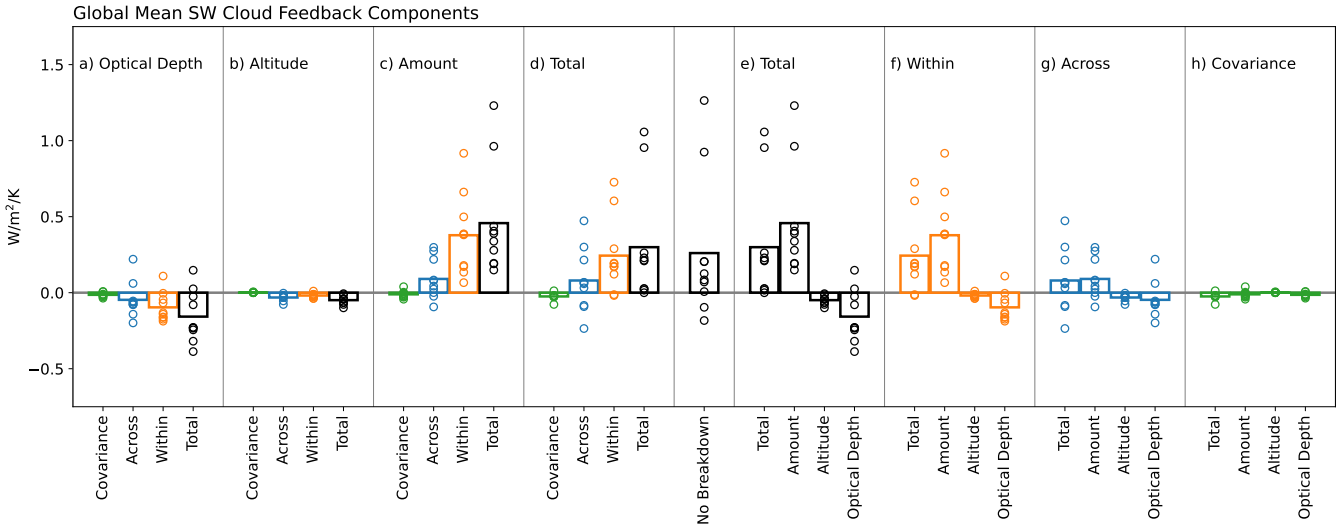


**Fig. 2** As in Figure 7 of the main text, but for GCM cloud fields matched to the 11 MODIS cloud regimes.

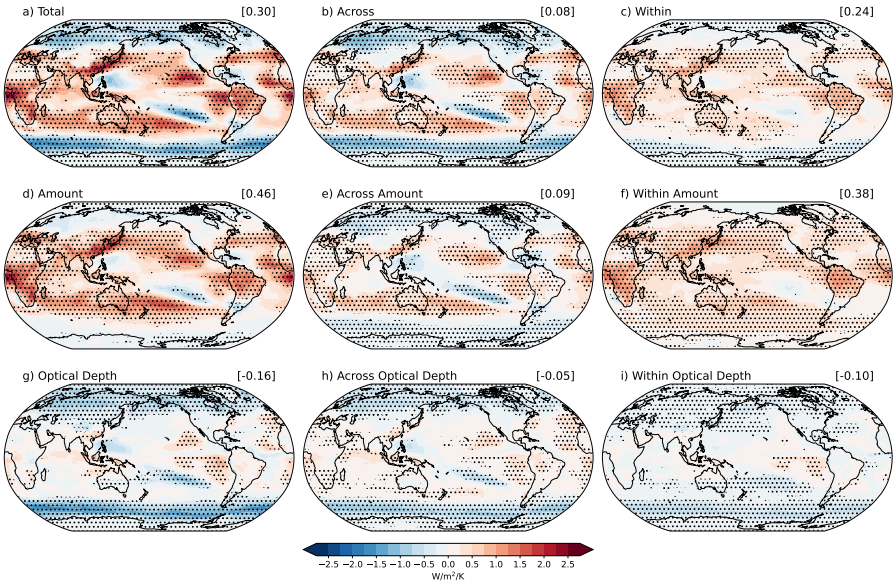


**Fig. 3** As in Figure 8 of the main text, but for GCM cloud fields matched to the 11 MODIS cloud regimes.

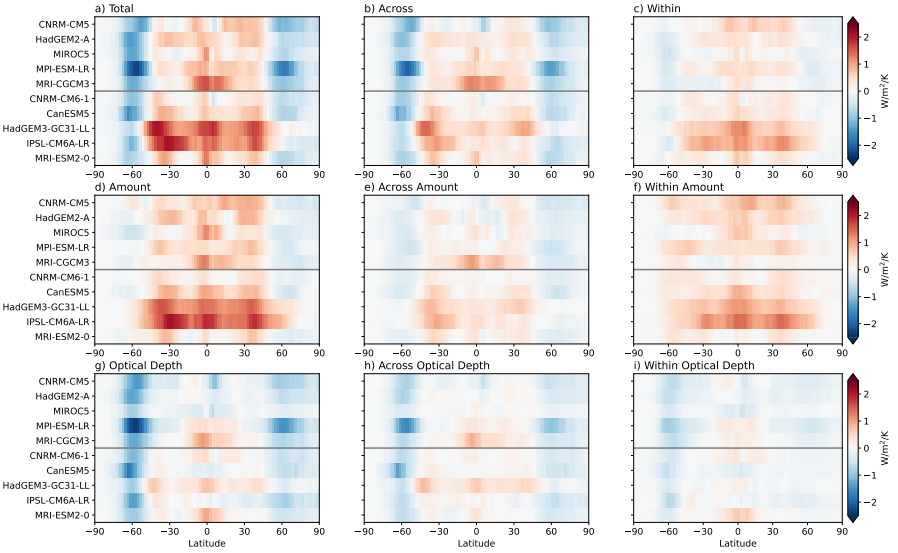


**Fig. 4** As in Figure 10 of the main text, but for GCM cloud fields matched to the 11 MODIS cloud regimes.

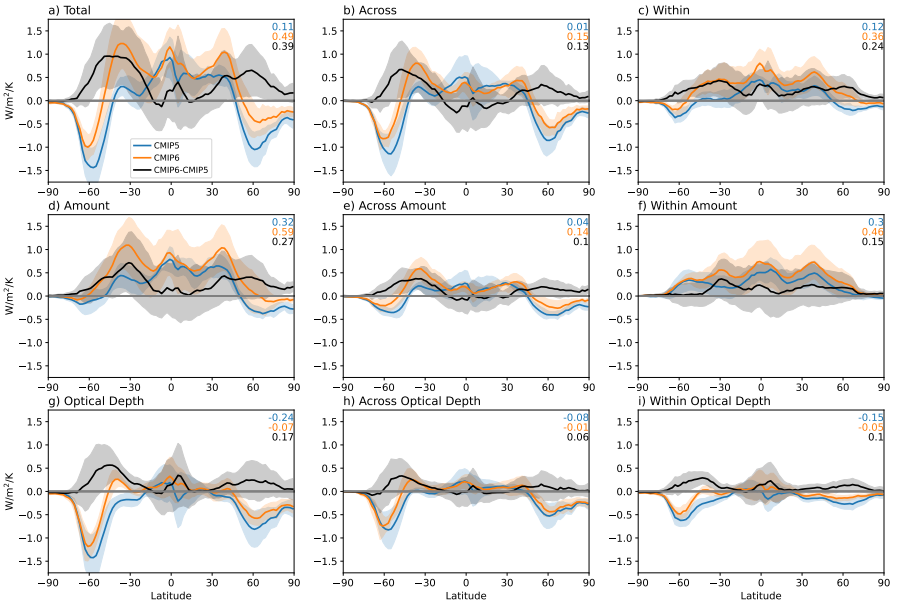


**Fig. 5** As in Figure 11 of the main text, but for GCM cloud fields matched to the 11 MODIS cloud regimes.

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