



Supplement of

Snow-induced buffering in aerosol-cloud interactions

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Figure S1. Geographical distribution of cloud cover for (**a**–**c**) total, (**d**–**f**) high-level, (**g**–**i**) middle-level, and (**j**–**l**) low-level clouds, obtained from (left) CALIPSO–GOCCP observations and MIROC6 simulations using the (center) diagnostic and (right) prognostic schemes via the COSP satellite simulator. Global means of the cloud cover are shown at the top right in each panel.



Figure S2. Annual zonal mean distributions of (**a**, **c**) cloud water and (**b**, **d**) cloud ice mass mixing ratios $(10^{-6} \text{ kg kg}^{-1})$ obtained from the MIROC6 (**a**, **b**) diagnostic and (**c**, **d**) prognostic precipitation schemes. The prognostic scheme also shows (**e**) rainwater and (**f**) snow water mass mixing ratios $(10^{-6} \text{ kg kg}^{-1})$. Note that the color scale for cloud water content (**a**, **c**) differs from the others.



Figure S3. Geographical distribution of SWP $(g m^{-2})$ simulated by the MIROC6 prognostic precipitation scheme.



Figure S4. Changes in CLWP $(g m^{-2})$ from the pre-industrial (PI) to the present-day (PD) for the (a) diagnostic and (b) prognostic schemes.