

# Supporting Information for ”Using satellite observations to evaluate model representation of Arctic mixed-phase clouds”

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Run name	Total Cloud Bias (%)	Liquid Cloud Bias (%)	Ice Cloud Bias (%)	Undefined Cloud Bias (%)	Shortwave CRE Bias (W/m <sup>2</sup> )	Longwave CRE Bias (W/m <sup>2</sup> )
CAM6-Oslo	-2.0	-0.7	0.7	-1.8	-3.5	-0.1
CAM6	2.1	11.2	-7.9	-0.8	-4.0	-0.8
CAM6-OsloIce	-5.8	-8.2	6.1	-3.4	-2.9	0.3
CAM6-Oslo Fit 1	-3.6	-2.2	1.1	-2.2	-3.0	-0.6
CAM6-OsloIce Fit 2	-2.0	-0.9	1.6	-2.4	-3.7	0.4
CAM6-OsloIce Fit 3	-0.3	-1.3	3.6	-2.3	-5.1	1.8
CAM6 Fit 4	-5.1	5.4	-8.1	-2.0	-3.3	-1.9

**Table S1.** Annual model cloud biases for the region 66°N-82°N. Cloud cover biases are calculated relative to CALIOP GOCCP observations. Surface cloud radiative effect (CRE) biases are calculated relative to CERES-EBAF observations with a positive downward sign convention.

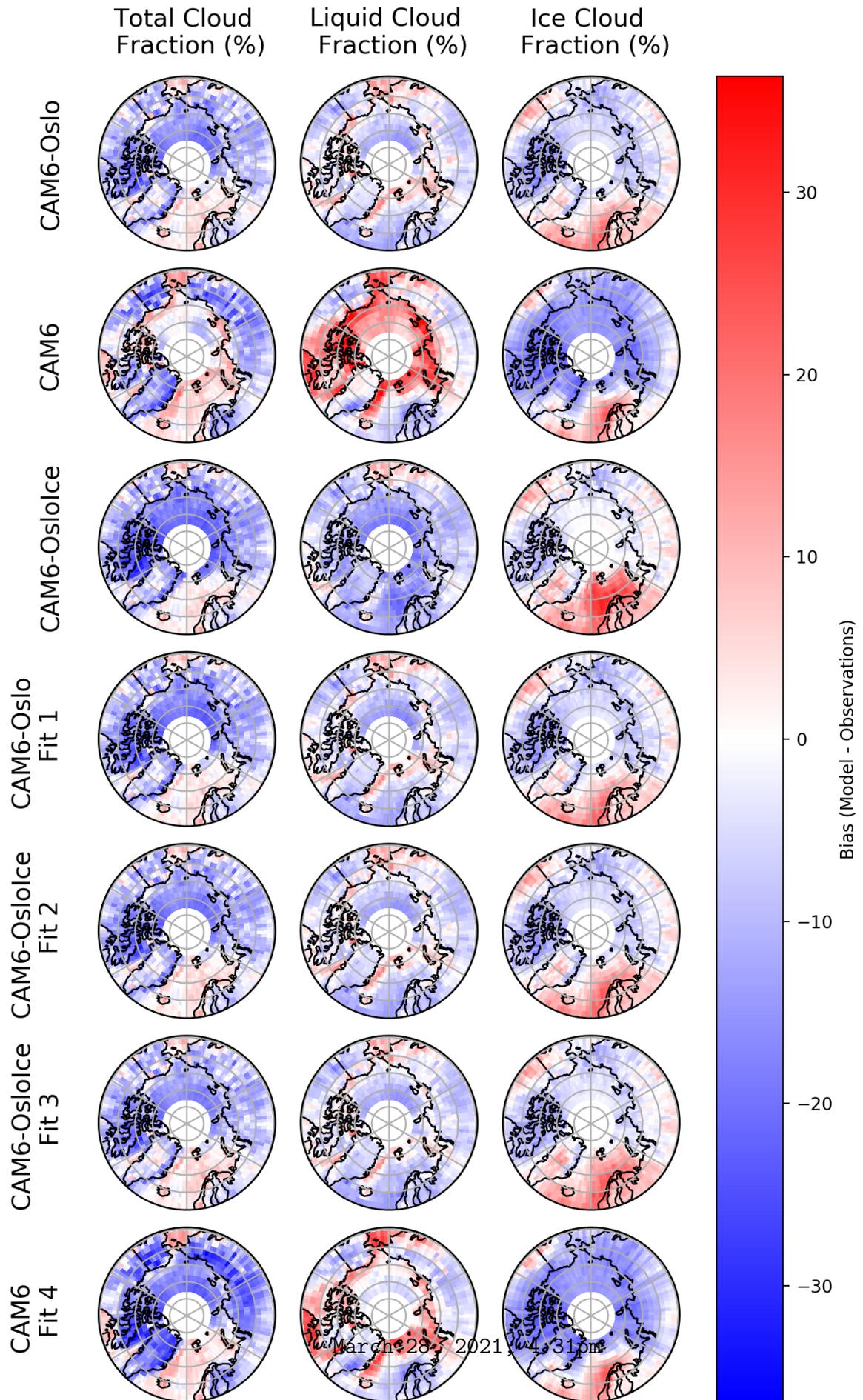
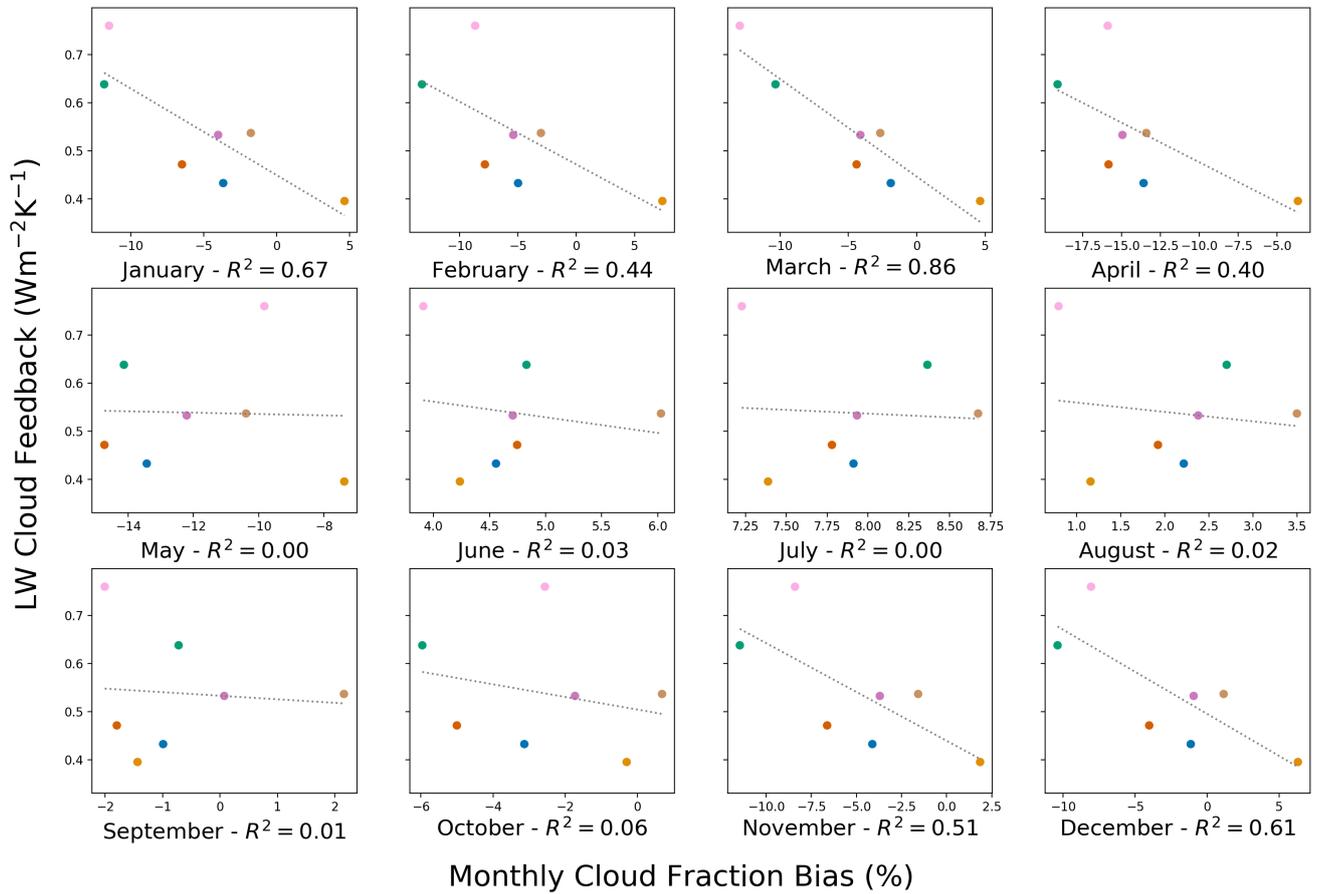


Figure S1. North Pole maps (60–90°N) of cloud cover bias by CALIOP phase designation.



**Figure S2.** Longwave cloud feedback as a function of the average cloud cover by month in the simulated present-day.