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3   Supporting Information for

4   **Cloud Phase Simulation at High Latitudes in EAMv2: Evaluation using CALIPSO**

5   **Observations and Comparison with EAMv1**

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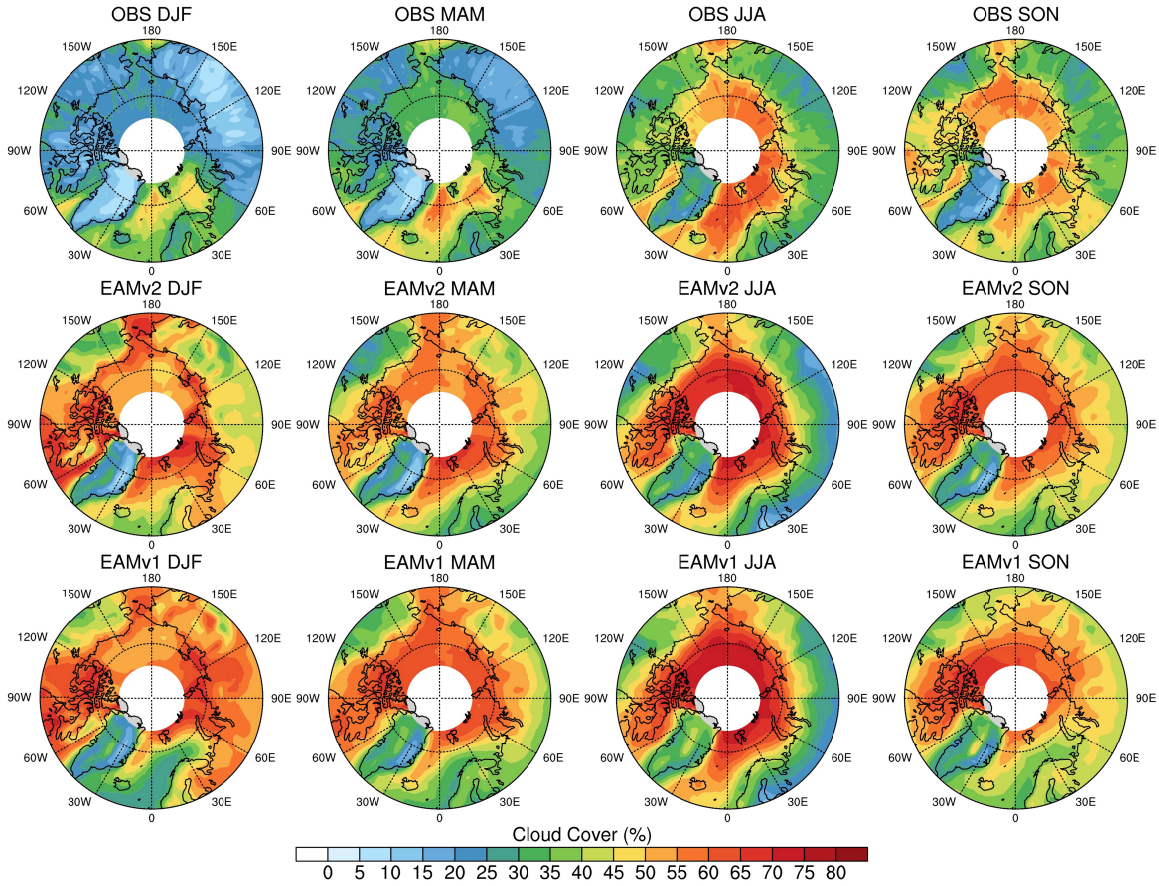18   Figures S1

19   Tables S1

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Introduction

This supporting information includes Table S1 and Figure S1. Table S1 lists the major

differences in tuning parameters in cloud physics schemes between EAMv2 and EAMv1.

Figure S1 shows the seasonal variability of liquid phase cloud cover from CALIPSO-

GOCCP data and that simulated from EAMv2 and EAMv1 in the Arctic region.

Table S1. List of parameters that are different between EAMv2 and EAMv1. Parameters

highlighted in blue (i.e., deep convection related) and red are used in the sensitivity

experiments analyzed in the main context.

Model Parameter	EAMv2	EAMv1
micro_mincdnc	1×10^6	0
micro_mg_berg_eff_factor	0.7	0.1
microp_aero_wsubmin	0.001	0.2
micro_mg_accre_enhan_fac	1.75	1.5
prc_exp1	-1.4	-1.2
so4_sz_thresh_icenuc	8×10^{-8}	5×10^{-8}
clubb_c1	2.4	1.335
clubb_c1b	2.8	1.335
clubb_c1c	0.75	1.0
clubb_c6rtb	7.5	6.0
clubb_c6rtc	0.5	1.0
clubb_c6thlb	7.5	6.0
clubb_c6thlc	0.5	1.0
clubb_c8	5.2	4.3
clubb_c11	0.7	0.8
clubb_c11b	0.2	0.35
clubb_c11c	0.85	0.5
clubb_c14	2.5	1.06
clubb_c_k10	0.35	0.3
clubb_c_k10h	0.35	0.3
clubb_gamma_coef	0.12	0.32
clubb_gamma_coefb	0.28	0.32
clubb_gamma_coefc	1.2	5.0
clubb_mu	5×10^{-4}	1×10^{-3}

clubb_wpxp_l_thresh	100	60
clubb_ice_deep	1.4×10^{-5}	1.6×10^{-5}
clubb_ipdf_call_placement	2	1
clubb_use_sgv	.true.	.false.
zmconv_trigdcape_ull	.true.	
zmconv_alfa	0.14	0.1
zmconv_c0_lnd	0.002	0.007
zmconv_c0_ocn	0.002	0.007
zmconv_mx_bot_lyr_adj	1	2
zmconv_tp_fac	2	0
cldfrc_dp1	0.018	0.045
seasalt_emis_scale	0.6	0.85
dust_emis_fact	1.5	2.05
effgw_beres	0.35	0.4
effgw_oro	0.375	0.25
gw_convect_hct	10	20
use_gw_energy_fix	.true.	.false.
linoz_psc_t	197.5	193

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Figure S1. Arctic polar map of the seasonality of liquid cloud cover from CALIPSO-

GOCCP, EAMv2 and EAMv1. Liquid cloud covers from EAM models are predicted

using the CALIPSO simulator.