

Figure S1: A–D: Estimated altimetry-derived surface elevation change (SEC) from Multi-Mission-Altimetry (MM) and analogous Single-Mission-Processing. Estimation period: 2003-03/2009-09. E, F: MM altimetry for periods specified in the title.

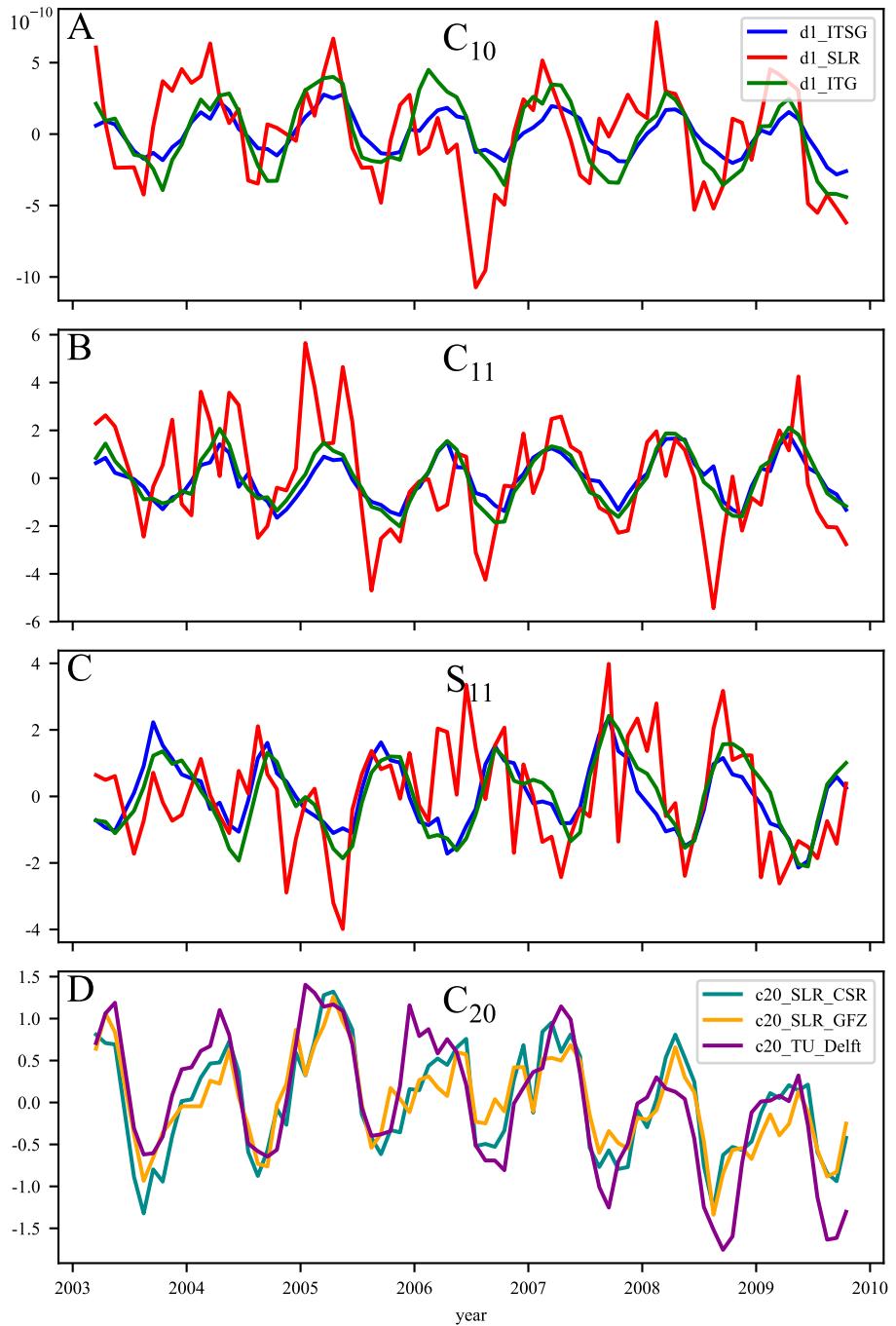


Figure S2: Degree-1 and C_{20} time series (2003-03/2009-09) of products used for replacement in GRACE gravity field solutions.

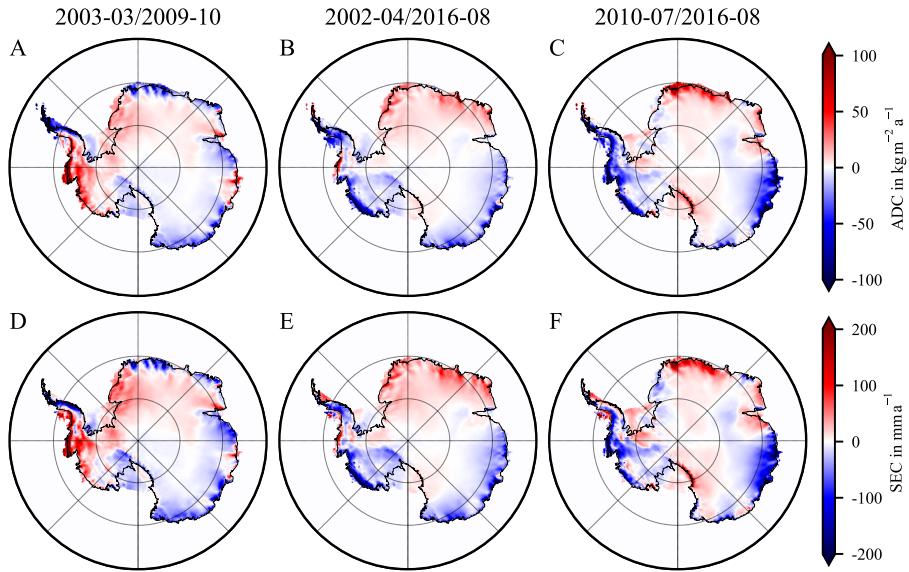


Figure S3: A–C: Estimated area-density change (ADC) of cumulated surface mass balance anomalies (cSMBA) and D–F: the firn densification model derived surface elevation change (SEC) for the used time periods.

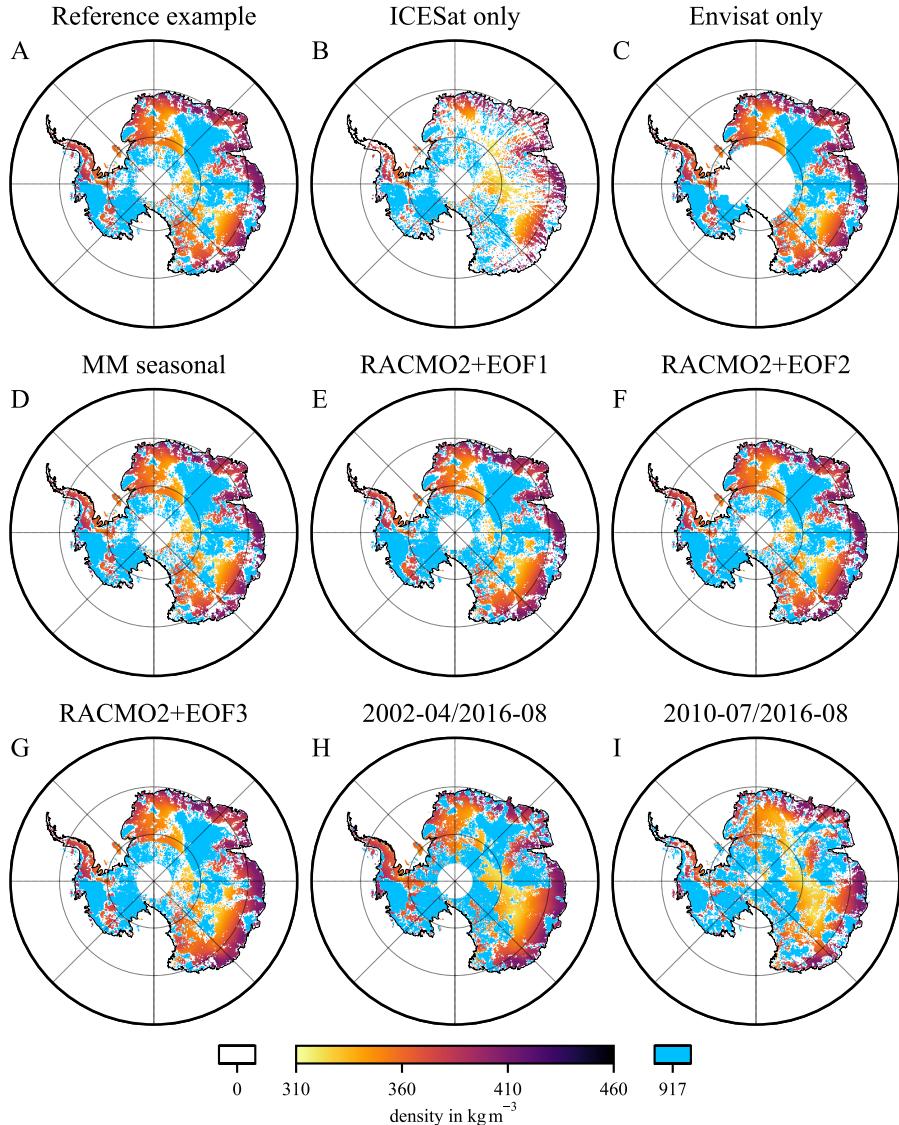


Figure S4: The density ρ_α as determined by Eq. 10 for the different sensitivity experiments (cf. subfigure captions and Table 1).

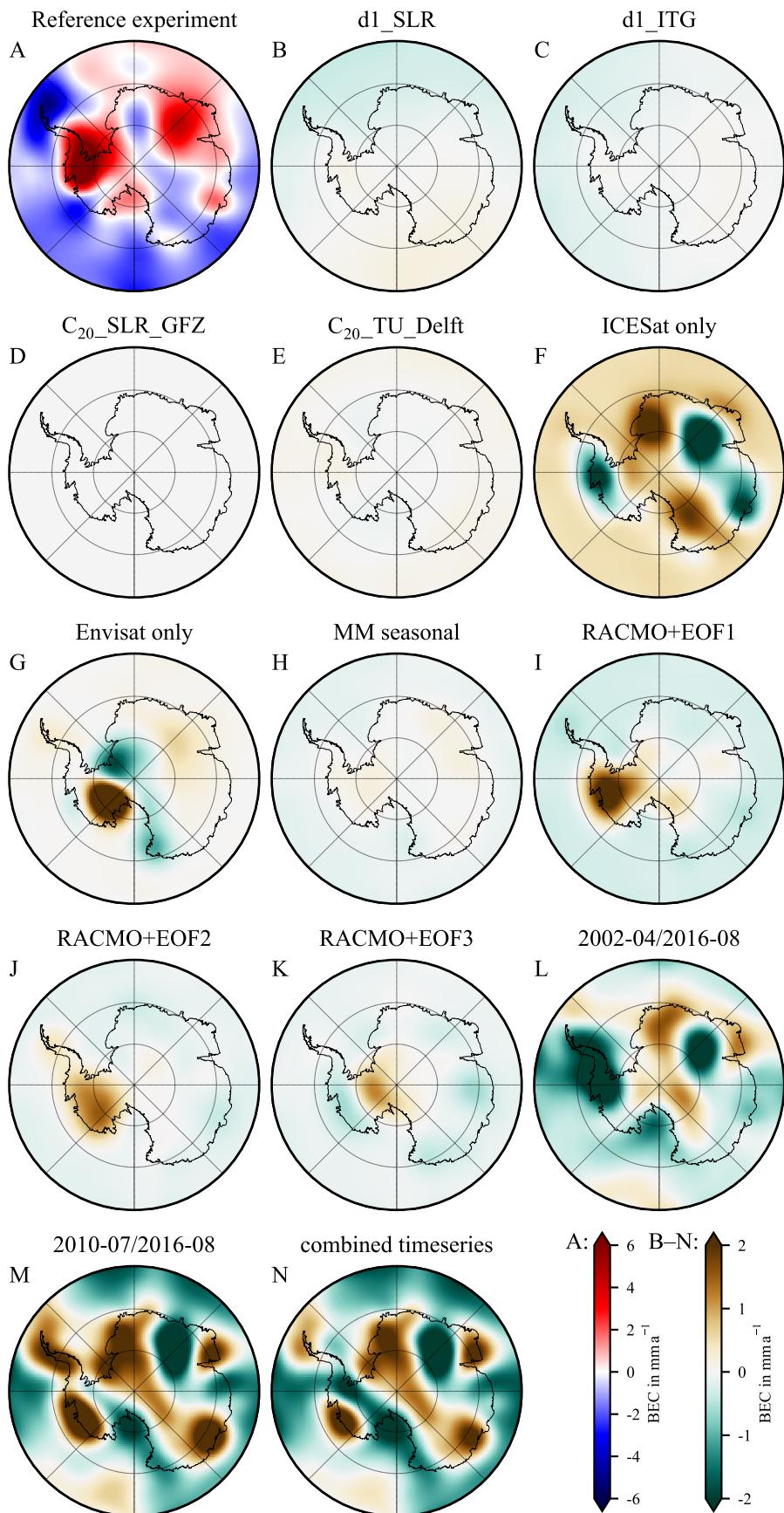


Figure S5: All GIA inverse estimates of bedrock elevation change (BEC) with LPZ-based bias correction obtained in the sensitivity analysis (Sect. 4.2). Subplots B–N show differences with regard to the reference experiment (A).

Table S1: Integrated mass changes using differing degree-1 (d1) and C₂₀ products depending on the four options applying the bias corrections (2003-03/2009-10). The table is structured like Table 2.

Bias corr.	LPZ bias		Total-mass change			apparent GIA-mass change			Ice-mass change		
	GIA mm a ⁻¹	GRACE kg m ⁻² a ⁻¹	AIS	WAIS Gt a ⁻¹	EAIS	AIS	WAIS Gt a ⁻¹	EAIS	AIS	WAIS Gt a ⁻¹	EAIS
d1_ITSG, c20_SLR_CSR											
GIA + GRACE	1.6	1.9	-40	-78	39	44	21	24	-84	-99	15
none	0.0	0.0	0	-68	68	172	53	119	-173	-121	-51
GIA only	1.6	0.0	0	-68	68	44	21	24	-45	-89	44
GRACE only	0.0	1.9	-40	-78	39	172	53	119	-212	-131	-80
d1_SLR, c20_SLR_CSR											
GIA + GRACE	2.0	3.2	-42	-79	38	43	20	23	-85	-99	15
none	0.0	0.0	25	-62	86	199	60	139	-174	-122	-53
GIA only	2.0	0.0	25	-62	86	43	20	23	-18	-82	64
GRACE only	0.0	3.2	-42	-79	38	199	60	139	-240	-139	-101
d1_ITG, c20_SLR_CSR											
GIA + GRACE	1.8	2.5	-41	-80	39	43	19	24	-84	-99	15
none	0.0	0.0	12	-66	78	185	55	130	-173	-121	-52
GIA only	1.8	0.0	12	-66	78	43	19	24	-31	-85	54
GRACE only	0.0	2.5	-41	-80	39	185	55	130	-227	-135	-91
d1_ITSG, c20_SLR_GFZ											
GIA + GRACE	1.4	1.2	-39	-78	39	46	21	25	-85	-99	15
none	0.0	0.0	-14	-72	57	157	49	108	-171	-121	-50
GIA only	1.4	0.0	-14	-72	57	46	21	25	-60	-93	33
GRACE only	0.0	1.2	-39	-78	39	157	49	108	-196	-127	-69
d1_ITSG, c20_TU_Delft											
GIA + GRACE	1.0	-0.4	-36	-77	42	48	21	26	-83	-99	15
none	0.0	0.0	-43	-79	36	127	41	85	-170	-121	-49
GIA only	1.0	0.0	-43	-79	36	48	21	26	-91	-101	10
GRACE only	0.0	-0.4	-36	-77	42	127	41	85	-162	-119	-44

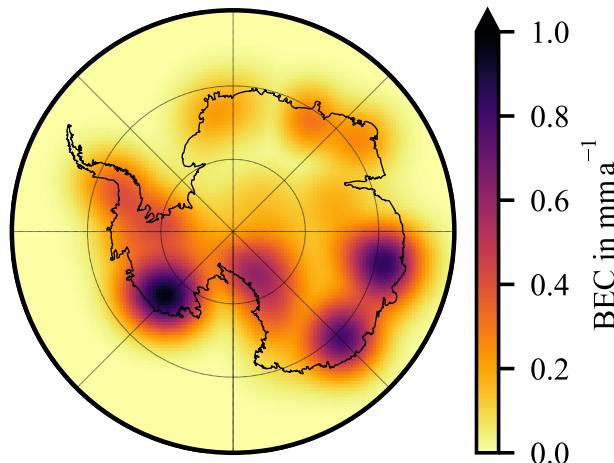


Figure S6: The single standard deviation of the 32 biased estimates of GIA-induced bedrock elevation change (BEC) from propagating the trend differences between RACMO2.3p2 and MAR. The mass change integrated for AIS is 19 Gt a⁻¹.

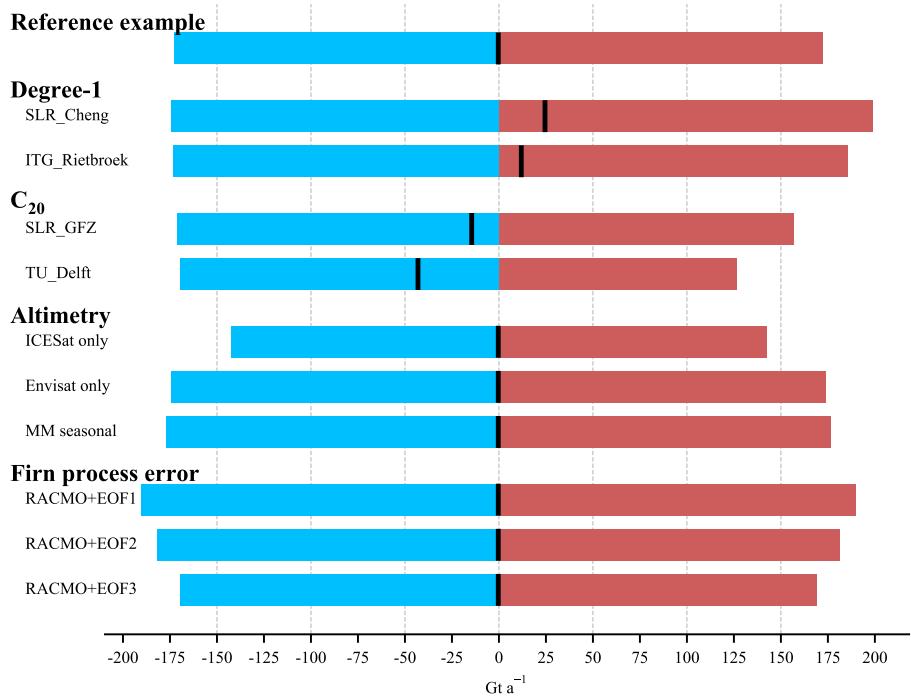


Figure S7: Biased mass change results of the sensitivity study (cf. Fig. 6). Biased total-mass change (solid black lines) is separated into biased GIA-mass (red) and ice-mass change (blue). Note that total-mass change of 0 Gt a⁻¹ arises coincidentally by used input data.