

## Supplementary Material

**Table S1:** Glacier mass budget organized by basins A to K' as in ref. 20. Sectors corresponding to unnamed glaciers were named after a bay or an ice shelf. Area, drainage basin in million square km. A, snow accumulation in Gigatons of water per year (Gt/yr). F, solid ice flux in Gt/yr and uncertainty in flux  $\sigma$  calculated from the error in ice velocity,  $\delta V$ , ice thickness,  $\delta H$ , the center ice thickness, H, and the velocity, V as,  $\sigma / F = \delta H/H + \delta V/V$ .  $\Delta H$ , firn depth correction in m (ISR indicates ice sounding radar thickness instead). Mass balance is A minus F. Year, year of velocity data. GL, grounding line determined from InSAR or MOA<sup>13</sup>. Ice fluxes for F'E are from ref. 23. Ice thickness for SUL (ref. S1), for FLE, PIG, TWG, HSK<sup>10</sup>, and BEDMAP for SUF.

LAB = Larsen A and B glaciers<sup>6</sup>. FLE = Fleming and other glaciers<sup>8</sup>. RYM, ENG = Rymill and English coasts. LID = Lidke and other glaciers. BER, FER = Berg and Ferrigno ice streams. VIS, ABB, COS, GET, SUL = Glaciers flowing into Venable, Abbot, Cosgrove, Getz and Sulzberger ice shelves. PIG, TWG, HSK, HUL, LAN = Pine Island, Thwaites, Haynes, Pope, Smith, Kohler, Hull and Land glaciers. MER, WHI, KAM, BIN, MAC, ECH = Mercer, Whillans, Kamb, Bindshadler, MacAyeal and Echelmeyer ice streams. BEA, NIM, BYR, MUL, DAV, REN = Beardmore, Nimrod, Byrd, Mullock, David and Rennick glaciers. COO, MOS = Glaciers flowing into Cook and Moscow University ice shelves. NIN, MER, DIB, FRO, TOT, DEN, PHI, LAM, SCY = Ninnis, Mertz, Dibble, Frost, Totten, Denman, Philippi and others, Lambert and others, and Scylla and other glaciers. BUD, RAG, AST = Budd, Princess Ragnhild and Princess Astrid coasts. AME = American Highland glaciers. ROB, RAY, SHI = Robert, Rayner and Thyer, Shirase glaciers. JUT = Jutulstraumen. JEL, EKS, RIL = Glaciers flowing into Jelbart, Ekstrom, and Riiser-Larsen ice shelves. VES, STA = Veststraumen, Stancomb-Wills glaciers. COA = Coats Land. BAI, SLE, REC, FOU, MOL, INS, RUT, EVA = Bailey, Slessor, Recovery, Foundation, Moller, Institute, Rutford, Evans ice streams. CAR = Carlson Inlet. ORV, WIL = Orville and Wilkins coasts.

Flux gates are wider than in ref. 12 because of the availability of additional ice velocity and thickness data across larger sectors of ice.

### Supplementary References

S1. B. Luyendyk, D. Wilson, *Surface elevation and ice thickness, Western Marie Byrd Land, Antarctica*, Boulder, CO, USA: National Snow and Ice Data Center (2003).

Basin	Area	A	F	$\sigma$	V	H	$\delta V$	$\delta H$	$\Delta H$	A - F	Year	GL
	Mkm <sup>2</sup>	Gt/yr	Gt/yr		km/yr	km			m	Gt/yr		
I"J	WIL	11	8.1	9.4	2	0.4	0.6	20	80	16	-1	2000 InSAR
II"	LAB	6	11.0	36.1	8	2.0	0.6	20	120	12	-25	2004 InSAR
II"	FLE	7	3.7	6.2	0	2.0	0.4	10	10	ISR	-3	2000 ISR
H'I	RYM	17	10.6	12.9	2	0.4	0.8	20	80	6	-2	1994 InSAR
H'I	ENG	54	39.2	31.6	5	0.4	0.9	20	100	15	8	1996 InSAR
H'I	LID	17	16.0	23.3	5	0.4	0.8	50	80	17	-7	1996 InSAR
H'I	BER	5	5.5	10.1	1	1.2	1.2	50	120	18	-5	1996 InSAR
<b>Peninsula</b>		<b>116</b>	<b>94</b>	<b>130</b>	<b>11</b>						<b>-36</b>	
HH'	FER	14	12.7	25.8	3	1.7	1.5	50	120	18	-13	1992 InSAR
HH'	VEN	14	13.4	21.0	3	0.6	1.0	50	80	17	-8	1996 InSAR
HH'	ABO	19	18.7	31.7	9	0.3	0.8	50	80	17	-14	1992 InSAR
HH'	COS	9	6.3	7.5	3	0.2	1.5	50	80	16	-1	1992 InSAR
GH	PIG	164	61.3	84.9	1	2.5	1.1	20	10	ISR	-24	2000 ISR
GH	THW	182	75.0	97.1	2	2.0	1.1	20	10	ISR	-22	2000 ISR
GH	INT	11	8.9	7.9	0	0.5	1.0	20	10	ISR	1	1996 ISR
GH	HSK	37	31.4	47.2	3	0.8	1.5	50	10	ISR	-16	2000 ISR
F'G	GET	92	85.8	97.8	18	0.5	0.9	50	80	19	-11	1996 InSAR
F'G	HUL	14	12.7	15.8	2	1.1	1.7	50	80	19	-4	1996 InSAR
F'G	LAN	13	9.9	14.2	2	1.0	1.3	50	80	18	-4	1996 InSAR
E'F'	SUL	34	14.3	7.8	0	0.3	0.9	10	10	ISR	7	2000 ISR
E'F'	WHI	232	35.1	30.3	1	0.5	0.6	10	10	ISR	5	1997 ISR
E'F'	KAM	153	18.3	0.5	0	0.0	0.6	10	10	ISR	18	1997 ISR
E'F'	BIN	140	16.9	15.3	1	0.3	0.6	10	10	ISR	2	1997 ISR
E'F'	MAC	175	22.3	24.4	1	0.3	0.6	10	10	ISR	-2	1997 ISR
E'F'	ECH	17	3.4	1.5	0	0.3	0.6	10	10	ISR	2	1997 ISR
JJ"	ORV	36	11.0	11.6	3	0.1	0.6	10	80	16	0	2000 InSAR
JJ"	EVA	109	44.4	44.0	4	0.6	1.5	20	80	19	0	1996 InSAR
JJ"	CAR	9	3.6	0.5	1	0.1	1.8	25	80	22	1	1992 InSAR
JJ"	RUT	53	18.5	19.1	3	0.4	2.0	50	80	20	0	1992 InSAR
JJ"	INS	149	21.9	25.6	3	0.4	1.3	20	80	19	-3	1997 Moa
JJ"	MOL	62	7.4	6.5	1	0.1	1.1	10	80	19	1	1997 Moa
JJ"	FOU	515	35.0	38.1	3	0.6	2.3	20	80	14	-1	1997 Moa
<b>West</b>		<b>2251</b>	<b>588</b>	<b>676</b>	<b>22</b>						<b>-88</b>	
J"K	SUP	133	7.0	3.9	1	0.1	1.6	20	80	ISR	3	1997 ISR
J"K	REC	996	48.6	39.2	3	0.8	1.8	20	80	15	9	1997 Moa
J"K	SLE	499	30.6	26.1	3	0.5	1.3	20	80	16	5	1997 InSAR
J"K	BAI	71	6.6	5.9	1	0.2	2.0	20	80	17	1	1997 InSAR
D'E	DAV	214	10.8	14.6	2	0.5	2.7	50	100	14	-4	1996 InSAR
D'E	REN	53	9.4	7.4	3	0.2	1.5	50	100	14	2	2000 InSAR
DD'	COO	243	32.2	37.0	5	1.8	1.0	50	100	17	-5	2000 InSAR
DD'	NIN	205	25.1	25.3	3	0.8	1.5	50	100	17	0	1996 InSAR
DD'	MER	82	19.9	18.5	2	0.8	1.8	50	100	17	1	1996 InSAR
DD'	DIB	33	15.1	13.8	2	0.8	1.5	50	100	17	1	1996 InSAR
C'D	FRO	136	32.6	36.1	3	1.7	2.0	50	100	16	-4	1996 InSAR
C'D	HOL	49	24.5	20.6	2	1.5	2.0	50	100	16	4	1996 InSAR
C'D	MOS	181	35.9	41.1	7	0.4	2.5	50	100	16	-6	1996 InSAR
C'D	TOT	570	67.9	73.6	8	0.8	2.0	50	100	17	-6	1996 InSAR
C'D	BUD	117	37.5	35.3	7	0.5	1.0	50	100	13	3	1996 InSAR
CC'	DEN	226	40.7	43.6	3	1.5	2.5	50	100	14	-3	1996 InSAR
CC'	PHI	208	40.0	43.7	6	0.5	0.8	20	80	14	-3	2000 InSAR
BC	LAM	957	55.8	56.7	3	0.7	3.0	20	100	13	1	1996 InSAR
BC	SCY	42	6.4	8.5	2	0.2	1.6	20	80	12	-2	2000 InSAR
BC	AME	198	11.3	12.3	2	0.3	1.2	20	80	11	-1	2000 InSAR
A'B	ROB	51	10.8	8.0	1	0.8	1.7	20	80	18	3	2000 InSAR
A'B	RAY	104	14.2	10.7	1	1.0	1.0	20	80	12	3	2000 InSAR
A'B	SHI	199	14.3	21.1	1	2.2	1.3	20	80	15	-7	1996 InSAR
AA'	QML	615	59.9	60.1	7	0.2	0.7	20	80	13	1	2000 InSAR
K'A	JUT	123	14.1	14.2	1	0.7	2.0	20	80	15	0	1994 InSAR
K'A	JEL	19	8.6	9.6	1	0.3	1.0	20	80	16	-1	2000 InSAR
K'A	EKS	17	3.8	3.9	1	0.1	0.9	20	80	16	0	2000 InSAR
KK'	RIL	51	9.3	11.1	3	0.1	0.7	20	80	15	-1	2000 InSAR
KK'	VES	39	8.1	7.7	1	0.2	1.2	20	80	14	0	1996 InSAR
KK'	STA	108	16.3	17.5	2	0.7	1.4	20	80	17	-1	1996 InSAR
KK'	COA	19	8.2	8.3	2	0.2	0.8	20	80	17	0	2000 InSAR
E E'	BYR	997	39.1	30.4	4	0.8	2.0	20	200	12	8	1997 Moa
E E'	MUL	119	6.1	5.7	1	0.4	1.0	20	80	13	0	1997 Moa
E E'	BEA	102	5.7	6.3	1	0.3	1.3	20	80	13	-1	1997 Moa
E E'	NIM	222	9.9	6.9	1	0.4	2.4	20	100	6	3	1997 Moa
<b>East</b>		<b>7998</b>	<b>786</b>	<b>785</b>	<b>20</b>						<b>1</b>	