S 1 GPS site overview

Table S1: Overview of the GPS sites in Antarctica considered in this analysis, together with their approximate coordinates. The IERS dome code is provided if assigned to the site by the responsible operator. The occupation mode (occ) is given as episodic (e), continuous (c) or mixed (m). The DOI of the original raw data is provided if available. The network assigned to the GPS station or the station operator is provided; note, that a station may be assigned to several networks.

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	elev. [m]	occ mode	networks/ operator	DOI for raw observation data
A351		Grove Mountains	-72.908104	74.910121	1907	e	Geoscience Australia	
A368	66075M001	Wilson Bluff Base	-74.290577	66.792233	1236	m	Geoscience Australia	
ABBZ		Abbott Peak	-77.456880	166.908946	1736	m	POLENET, Erebus GPS Network	10.7283/T58W3BDX
ABE1		Abendberg	-67.660386	46.107822	297	e	TU Dresden	
ABOA		ABOA	-73.043771	-13.407135	469	c	Finish Geodetic Institute	
AERO		Aerodromnaja	-70.794363	11.620468	515	e	TU Dresden	
ALN0		Allan Hills	-76.710825	159.528484	1961	e	TAMDEF	
ANT0		Ant Hill	-78.775735	161.455286	1052	e	TAMDEF	
ARHT	66001M005	Arrival Heights, McMurdo	-77.829437	166.663653	135	c	IGS	
ARR0		Arrival Heights 0	-77.837921	166.664064	95	e	TAMDEF	
ARR1		Arrival Heights 1	-77.837882	166.660445	89	e	TAMDEF	
ARR2		Arrival Heights 2	-77.837594	166.682458	107	e	TAMDEF	
ARR3		Arrival Heights 3	-77.839397	166.645938	79	e	TAMDEF	
ARR5		Arrival Heights 5	-77.842016	166.696815	70	e	TAMDEF	
ARR6		Arrival Heights 6	-77.844829	166.641699	-35	e	TAMDEF	
ART1	66017M001	Base Artigas	-62.184508	-58.902522	33	e	SCAR	
BACK		Backer Island	-74.430442	-102.478189	32	m	POLENET	10.7283/T5D21VWM
BEA0		bea0	-77.808721	160.617983	1823	e	TAMDEF	
BEA2		bea2	-77.831434	160.560641	1913	e	TAMDEF	
BEA3		bea3	-77.849496	160.778475	2147	e	TAMDEF	
BEA4		bea4	-77.862592	160.759832	2142	e	TAMDEF	
BEAN	66077M001	Bean Peaks	-75.956299	-69.302167	892	c	UKANET, CAPGIA	10.7283/287S-DC54
BEAR		Bear Peninsula	-74.579003	-111.887680	439	e	TU Dresden	
BEJ2		BEJ2	-62.663026	-60.385953	56	e	RGAE	
BELG	66018M002	Belgrano II	-77.874803	-34.626749	246	c	Instituto Antártico Argentino, SCAR	10.1594/PANGAEA.913837
BELL		Bellingshausen	-62.197580	-58.958291	30	e	SCAR	
BENN		Bennett Nunatak	-84.786458	-116.459808	1416	c	POLENET	10.7283/T5891447
BERP		Bear Peninsula	-74.545937	-111.884589	312	m	POLENET	10.7283/T54J0CC2
BFT0		Beaufort Island	-76.948850	166.979861	465	e	TAMDEF	
BHIL	66073M001	Bunger Hills	-66.251367	100.598580	18	c	Geoscience Australia	
BIR0		Cape Bird	-77.277980	166.395121	106	e	TAMDEF	
BOMZ		Bombs	-77.508950	167.440189	1961	m	POLENET,Antarctica L1 GPS Network	10.7283/T5DN4353
BORC		Base Orcadas	-60.739784	-44.740623	121	c	RAMSAC	
BRA0		Bratina Island	-78.006515	165.547788	36	e	TAMDEF	
BREN	66080M001	Brennecke Nunataks	-72.672886	-63.025734	1645	c	UKANET	
BRIP		Brimstone Peak	-75.795669	158.469144	2111	c	POLENET	10.7283/T5W09473

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
BRM0		Brimstone Peak	-75.800251	158.468787	2084	e	TAMDEF	
BRO0		Brosnahan Island	-79.478749	160.972322	151	e	TAMDEF	
BSA1	66081M001	Horseshoe Harbour	-67.816043	-67.290711	128	c	UKANET	10.7283/A0W2-7N29
BTL0		Bettle Peak	-77.782905	163.528692	1385	e	TAMDEF	
BUMS		Bumstead Nunatak	-85.961493	174.499139	2642	c	POLENET	10.7283/T50R9MP7
BUR0		Butcher Ridge	-79.149222	155.906070	2009	e	TAMDEF	
BURI	66065M002	Butcher Ridge	-79.147437	155.894158	2006	c	POLENET (New Zealand)	10.7283/T5RB72W7
BVLK		Beaver Lake	-70.813962	68.074513	145	e	ANU	
CAD2	66092M001	Mt Brown	-68.566501	86.100619	1943	c	Geoscience Australia	10.1029/2021GL097232
CAD3	66101M001	Gillies Island	-66.521067	96.363661	83	c	Geoscience Australia	10.1029/2021GL097232
CAD4	66093M001	Mt Strathcona	-67.419666	99.143784	1272	c	Geoscience Australia	10.1029/2021GL097232
CAD5	66091M001	Snyder Rocks	-66.552462	107.764010	48	c	Geoscience Australia	10.1029/2021GL097232
CAD6	66099M001	Chick Island	-66.789281	120.990851	-14	c	Geoscience Australia	10.1029/2021GL097232
CAPF		Cape Framnes	-66.012072	-60.558358	100	c	UKANET, LARISSA	10.7283/MYTG-8B17
CAS1	66011M001	Casey	-66.283359	110.519706	22	c	IGS	
CJAM		Cape James Smith Is.	-63.096525	-62.716202	21	e	TAMDEF	
CLRK		Clarke Mountains	-77.340077	-141.873812	1000	c	POLENET	10.7283/T5MK6B6C
COAT		Mt. Coates	-77.805887	161.998181	1877	e	POLENET	10.7283/T5GT5KGN
CON0		Conway Range	-79.207734	159.930212	1261	e	TAMDEF	
CON1		Conrad1	-71.716658	9.649710	1704	e	TUD	
CON2		Truncated Cones	-77.534919	167.084376	3400	c	POLENET, Erebus GPS Network	10.7283/T5QZ282Z
CONG		Truncated Cones	-77.534591	167.085475	3403	c	POLENET, Erebus GPS Network	10.7283/T5RX996S
COTE	66096M001	Mt. Coates	-77.805902	161.997808	1878	c	IGS	10.7283/T5GT5KGN
CRDI		Cordiner Peak	-82.861523	-53.199140	945	m	POLENET	10.7283/T5C24TQS
CRN0		Mount Crean	-77.872151	159.531092	2627	e	TAMDEF	
CRZ0		Cape Crozier	-77.512964	169.333036	314	e	TAMDEF	
CWAL		Cape Wallace Low Is.	-63.245315	-62.183299	37	e	TAMDEF	
DAL1	66019M001	Jubany, Dallmann	-62.240714	-58.677792	41	e	AWI	
DAL2		Jubany, Dallmann	-62.240743	-58.678298	44	c	AWI	
DAL5	66019M003	Jubany, Dallman	-62.240741	-58.678296	44	c	AWI	10.1594/PANGAEA.941497
DALL	66019M002	Jubany, Dallmann	-62.237871	-58.664545	39	c	AWI	
DALT		Dalton Corner	-73.677868	68.505588	1127	e	ANU	
DAV1	66010M001	Davis Station	-68.577323	77.972614	44	c	IGS	
DEV0		Deveall Island	-81.475844	161.974907	68	e	TAMDEF	
DEVI		Deverall Island	-81.476721	161.977078	67	c	POLENET	10.7283/T57942Z0
DLM1		Dallmann 1	-71.762479	10.172421	1729	e	TU Dresden	
DOO1		Mount Doorly 1	-77.366617	163.024393	461	e	TAMDEF	
DOO2		Mount Doorly 2	-77.391699	162.758466	1147	e	TAMDEF	
DRY1		Drygalski1	-71.698028	7.977026	1519	e	TU Dresden	
DUM1	91501M001	Dumont d'Urville	-66.665084	140.001931	-1	c	IGS	
DUMG	91501M003	Dumont d'Urville	-66.665185	140.002188	-2	c	IGS	
DUPT		Duthiers Point	-64.804951	-62.816901	43	c	UKNET, LARISSA	10.7283/3PEK-C029

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
DWT0		Mount Dewitt	-77.217167	159.854155	2100	e	TAMDEF	
E1G2		E1G2	-77.530377	167.139552	3654	c	POLENET, Erebus GPS Network	10.7283/T57W69BF
ELE1	66021M001	Elephant Island	-61.480723	-55.631354	124	e	TU Dresden	
ELHT		Mt. Erebus Lower Hut	-77.510450	167.146065	3347	c	POLENET, Erebus GPS Network	10.7283/T5N58JGC
ELPH		Elephant Island	-61.220044	-55.136564	26	e	SCARP	
ERE0		Erebus 0	-77.511132	167.153466	3357	e	TAMDEF	
ESH0		Esser Hill	-77.936587	164.080773	1182	e	TAMDEF	
ESP1	66022M001	Esperanza	-63.395088	-56.996083	27	e	Instituto Antártico Argentino, SCAR	
FALL		Fallone Nunataks	-85.306416	-143.631699	260	c	POLENET	10.7283/T53J3B84
FIE0		Franklin Island	-76.144593	168.423526	154	c	POLENET, TAMDEF	10.7283/T5KK993F
FLM0		Mt. Fleming	-77.533391	160.272527	1868	e	POLENET TAMDEF	
FLM5	66061M002	Mt. Fleming	-77.532729	160.271408	1870	c	POLENET UNAVCO	10.7283/T5V40SH6
FONP		Foyn Point	-65.245353	-61.646851	95	c	UKANET LARISSA	10.7283/T5668BG6
FOR1	66023M001	Forster 1	-70.777940	11.825064	153	e	TUD	
FOR2	66023M002	Forster 2	-70.774226	11.836787	129	e	TUD	
FOR3		Forster 3	-70.774259	11.836294	128	e	TUD	
FOS1	66024M001	Fossil Bluff	-71.313347	-68.320844	159	m	UKANET, CAPGIA	10.7283/EM8S-B968
FREI	66012S001	Base Frei	-62.194103	-58.980503	72	c	SCARP	
FRK0		Franklin Island	-76.164283	168.381718	192	e	TAMDEF	
FTP0		Fishtail Point	-78.927279	162.564386	245	e	TAMDEF	
FTP4	66062M002	Fishtail Point	-78.927673	162.564700	243	c	POLENET, UNAVCO	10.7283/T5B27SKD
GLDK		Gould Knoll	-72.233050	-100.587581	55	c	POLENET	
GMEZ	66083M001	Gomez Nunatak	-73.885468	-68.536465	1420	c	UKNET, CAPGIA	10.7283/96BX-MN68
GRA1		Granat	-67.659328	45.853488	75	e	TUD	
HAA1	66025M001	Haag Nunatak	-77.038103	-78.285829	1173	e	SCAR	
HAAG		Haag Nunatak	-77.038052	-78.287116	1171	m	POLENET	10.7283/T5FT8JB8
HOG2		Hooper Shoulder	-77.531451	166.933616	2072	c	POLENET, Erebus GPS Network	10.7283/T5HT2MM1
HOOZ		Hoopers Shoulder	-77.531605	166.932629	2070	c	POLENET, Erebus GPS Network	10.7283/T5HD7SRN
HOWE		Mt. Howe	-87.415655	-149.433285	2582	m	POLENET	10.7283/T5ZW1J65
HOWN		Howard Nunatak	-77.528038	-86.767337	1478	m	POLENET	10.7283/T56971WH
HTON	66084M001	Hutton Mountains	-74.080008	-61.730593	950	c	UKANET, CAPGIA	10.7283/W4VM-G659
HUGO		Hugo Island	-64.962562	-65.667541	21	m	UKANET, CAPGIA	10.7283/KN7J-R036
HUM1		Humboldt	-71.593699	11.295748	1736	e	TUD	
IGGY		Iggy Ridge	-83.307206	156.249740	1898	c	POLENET	10.7283/T5QC01T9
INMN		Inman Nunatak	-74.820865	-98.880467	678	c	POLENET	10.7283/T52N50J2
INS1		Insel	-71.435266	11.565761	1456	e	TU Dresden	

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
IZR0		IZR0	-75.453784	162.571416	179	e	TAMDEF	
JNSN	66085M001	Jensen Nunataks	-73.076505	-66.102197	1374	c	UKANET, CAPGIA	10.7283/GBH7-V292
JUAN		Base Juan Carlos Livingston Island	-62.662286	-60.396096	66	e	SCARP	
KEPA	42701M001	King Edward Point	-54.295245	-36.514290	346	c	Antarctica PI Continuous	
KER0		Cape Kerr	-80.067298	160.347700	60	e	TAMDEF	
KOH1	66026M001	Kliment Ohridski	-62.641598	-60.363736	44	e	SCAR	
KOH2	66026M002	St. Kliment Ohridski	-62.640081	-60.363768	53	e	University of Architecture, Civil Engineering and Geodesy (UACEG), Bulgaria	
KOTA	66027M001	Kottas Mountains	-74.300049	-9.756480	1423	e	TU Dresden	
LANG		Langhovde	-69.242795	39.714108	28	e	JARE	
LDBF		Landing Bluff	-69.742292	73.710389	133	m	ANU	
LEHG		Lower Erebus Hut	-77.510663	167.141074	3346	c	POLENET, Erebus GPS Network	10.7283/T54747ZF
LEN1		Leningradskaya	-69.501026	159.396010	259	c	TUD	
LNTK	66086M001	Lyon Nunataks	-74.835160	-73.903222	1191	c	UKANET, CAPGIA	10.7283/Z236-VE05
LPLY		Lepley Nunatak	-73.111116	-90.299470	127	c	POLENET	10.7283/T5DV1H50
LWN0	66068M001	Lonewolf Nunatak	-81.345940	152.731609	1529	c	POLENET, TAMDEF	10.7283/T5T43RD8
LXAA	66072M002	LXAA	-71.946578	23.346158	1389	c	University of Luxembourg	
MACG		MacIntosh	-77.532531	167.246639	3279	c	POLENET, Erebus GPS Network	10.7283/T5VQ30S8
MAJK		Najak Nunatak	-81.660988	-21.873793	1447	c	UKANET	
MANT		Mount Manthe	-74.779277	-99.368076	467	e	TU Dresden	
MAR1	66029M001	Marambio	-64.244942	-56.656961	230	e	SCAR	
MAS0		Mason Spur	-78.545457	164.416526	1011	e	TAMDEF	
MAW1	66004M001	Mawson Station	-67.604766	62.870716	59	c	IGS	
MBF0		Minna Bluff	-78.646824	167.157732	735	e	TAMDEF	
MBIO	41577M001	Base Marambio	-64.240391	-56.622731	222	c	RAMSAC	
MBL1		MBL1	-78.029048	-155.021083	502	e	WAGN	
MBL2		MBL2	-76.322242	-144.305124	966	e	WAGN	
MBL3		MBL3	-77.339997	-141.873615	998	e	WAGN	
MCAR		Mount Carbone	-76.322196	-144.303518	965	c	POLENET	10.7283/T55D8Q41
MCG2		MacIntosh Ridge2	-77.532248	167.245230	3291	e	POLENET, Erebus GPS Network	10.7283/T5VT1QFR
MCM4	66001M003	McMurdo GPS Station	-77.838348	166.669324	98	c	IGS	
MCMC	66001M003	McMurdo L2C	-77.838349	166.669329	98	c	other	10.7283/ZWER-J158
MCMD		McMurdo Community Base Station	-77.838349	166.669329	98	c	other	10.7283/T5FB514D
MCRG		Miller Crag	-73.667799	-94.646322	1334	c	POLENET	
MELM	66088M001	Mid-Ellsworth Mountains	-79.190845	-85.499756	1441	c	UKANET, iSTAR-D	10.7283/T5PR7TC4

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
MIN0		Minna Bluff	-78.650308	167.163793	677	c	POLENET, (New Zealand)	10.7283/T5TM78BX
MIR3		Mirny 3	-66.552511	93.007095	11	e	TU Dresden	
MKIB	66076M001	Mt. McKibben	-75.276195	-65.603149	1156	c	UKANET, CAPGIA	10.7283/SDBA-D262
MRAN		Morro Rancagua	-63.321022	-57.894394	53	e	SCARP	
MRTP		Martin Peninsula	-74.180405	-115.102136	96	c	POLENET	
MTAK		Mount Takahe	-76.315041	-112.800012	1328	c	POLENET	
MTCX		Mount Cox	-78.520240	162.533824	2131	e	JPL	10.7283/T5FQ9TR9
MTJN	66090M001	Mount Johns	-79.627018	-91.281288	2161	m	UKANET, iSTAR-D	10.7283/WKTB-DM81
MURP		Mt. Murphy	-75.369283	-111.294097	657	e	TU Dresden	
NAUS		Nausea Knob	-77.521960	167.147143	3572	c	POLENET, Erebus GPS Network	10.7283/T5CN721Q
NONS		Nonshøgda	-72.007755	2.529787	1427	c	Norwegian Polar Institute	
NOT1	66031M001	Notter Point	-63.674190	-59.208200	65	e	SCAR	
OHG1	66008M003	O'Higgins	-63.321506	-57.899841	30	e	SCAR	
OHI2	66008M005	O'Higgins / Antarctica	-63.321081	-57.901334	32	c	IGS	
OHI3	66008M006	O'Higgins	-63.321093	-57.901387	33	c	IGS	
OHIG	66008M001	O'Higgins / Antarctica	-63.320724	-57.900341	31	c	IGS (former), BKG	
OTR1		Otradnaja1	-71.205133	13.559419	1030	e	TU Dresden	
PADD		Padda Island	-69.618213	38.276018	121	e	JARE	
PAL1	66005M001	Palmer	-64.773784	-64.046603	41	e	SCAR	
PAL2	66005M002	Palmer Community Base Station	-64.775090	-64.051122	31	c	OSU	10.7283/T5PV6HKR
PALM	66005M002	Palmer Community Base Station P.S.	-64.775091	-64.051125	31	c	IGS	10.7283/T5PV6HKR
PALV	66005M002	Palmer Station	-64.775090	-64.051121	31	c	other	
PATN		Mount Paterson	-78.030046	-155.022892	514	m	POLENET	10.7283/T5PC30PX
PECE		Pecora Escarpment	-85.611920	-68.556334	1490	m	POLENET	10.7283/T5930RG1
PET1	66032M001	Peter I Island	-68.863514	-90.426153	32	e	TU Dresden	
PET1		Kontaktnaja	-71.372231	12.617846	1252	e	TU Dresden	
PHIG		Mount Erebus West	-77.525494	167.049920	3126	c	POLENET, Erebus GPS Network	10.7283/T5WQ01XN
PIG2		Pine Island 2	-74.510972	-102.439378	15	e	TU Dresden	
PIRT		Pirrot Hills	-81.103206	-85.142569	1257	c	POLENET	10.7283/T5WW7FZF
PRA1	66033M001	Arturo Prat	-62.477579	-59.650271	81	e	SCAR	
PRAT		Arturo Prat IGM mark	-62.477873	-59.649584	80	e	SCARP	
PROA		Progress Astropunkt	-69.380848	76.386542	65	e	TU Dresden	
PROG		Progress	-69.379143	76.379906	70	e	TU Dresden	
PRPT		Prospect Point	-66.006716	-65.339350	18	c	UKANET, LARISSA	10.7283/Q1FR-9E17
PRTT		Arturo Prat Greenwhich Is	-62.484294	-59.666132	33	e	SCARP	

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
RAMG		Ramsey Glacier	-84.338425	178.047113	1062	c	POLENET	10.7283/T51N7ZFR
RAYG		Ray Seismic Site	-77.528772	167.170576	3715	c	POLENET, Erebus GPS Network	10.7283/T50G3H8K
REYJ	66012M002	Rey Jorge	-62.201112	-58.979211	113	e	SCAR, Instituto Geografico Militar de Chile	
RMBO		Rambo Nunatak	-83.873240	-66.393882	777	c	POLENET	10.7283/T5JM27XR
ROB0		Cape Roberts 0	-77.035657	163.178209	-54	e	TAMDEF	
ROB4	66063M002	Cape Roberts	-77.034439	163.190108	-42	c	POLENET (New Zealand)	10.7283/T5NC5ZG8
ROBN		Robertson Island	-65.246500	-59.444633	58	c	UKANET, LARISSA	10.7283/KY2W-7C65
ROS0		Cape Ross	-76.729986	163.015926	-26	e	TAMDEF	
ROTA	66007M001	Rothera	-67.571713	-68.125205	32	e	SCAR	
ROTB		Rothera	-67.571320	-68.126869	33	c	IGS, UKANET	10.7283/T56M34Z7
ROTH	66007M003	Rothera	-67.571388	-68.125776	40	c	IGS	
ROY0		Cape Royds	-77.551568	166.170624	-28	e	TAMDEF	
RUS1		Russkaya	-74.767155	-136.798889	96	m	TU Dresden	
RYN0		Cape Reynolds	-75.453784	162.571416	179	e	TAMDEF	
SCTB	66071M001	Scott Base	-77.848986	166.758018	-19	c	IGS, POLENET	10.7283/T5CF9N6P
SDLY		Mount Sidley	-77.135313	-125.974578	2097	c	POLENET	10.7283/T5S46Q7F
SGP1		Cape Disappointment	-65.557030	-61.721642	250	c	UKANET	
SGP3		Mount Ivins	-65.941365	-63.588045	1647	c	UKANET	
SGP4		Cape Alexander	-66.685968	-62.460193	258	c	UKANET	
SGP5		Marmelon Point	-67.281975	-64.890570	272	c	UKANET	
SIG1	30607M001	Signy Island	-60.707729	-45.592652	49	e	SCAR	
SKA1		Skali AANI SE	-71.308725	11.445805	1461	e	TU Dresden	
SKLN		Skallen	-69.670993	39.398710	61	e	JARE	
SKRV		Skarvsness	-69.473792	39.607089	31	e	JARE	
SLTR		Slater Rocks	-75.098157	-113.879552	513	c	POLENET	
SMR5	66034M002	San Martin	-68.129682	-67.103227	27	c	AWI, IAA	
SMRT	43102S001	San Martin	-68.129652	-67.103244	26	m	TU Dresden	10.7283/T5X34VKQ
SOG1		South Georgia 01	-54.874391	-36.043754	63	c	Antarctica PI Continuous	10.7283/T5BZ649J
SOG2		South Georgia 02	-54.003231	-38.048434	181	c	Antarctica PI Continuous	10.7283/T5765CMK
SOG3		South Georgia 03	-54.493940	-37.037863	29	c	Antarctica PI Continuous	10.7283/T53J3B7P
SPGT		Spring Point	-64.294729	-61.051988	34	c	UKANET, LARISSA	10.7283/ZHFM-ZE59
SPPT		Spring Point	-64.294429	-61.051563	29	e	SCARP	
SPR1	66035M001	Punta Spring	-64.295332	-61.051900	49	e	SCAR	
SPRZ	41576M001	Base Esperanza	-63.395120	-56.995861	28	c	IGN - Instituto Geografico Nationale	
STEW		Steward Hills	-84.187015	-86.247299	1587	c	POLENET	10.7283/T5HM56QG
SUGG		Mt. Suggs	-75.280605	-72.180134	1092	m	POLENET	10.7283/T5CV4G1M

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
SVEA		SVEA	-74.576037	-11.225196	1261	c	KTH Royal Institute of Technology, Sweden, SCAR	
SYOG	66006S002	Syowa	-69.006958	39.583745	50	c	IGS	
THRO		Theron Mountains	-79.126689	-28.318908	1058	c	UKNET	
THUR		Thurston Island	-72.530066	-97.559605	212	m	POLENET	10.7283/T5862DRZ
TNB1	66036M001	Terra Nova Bay	-74.698805	164.102939	72	c	VLNDEF	
TNB2		Terra Nova Bay 2	-74.698924	164.102805	72	c	VLNDEF	
TOMO		Toney Mountain	-75.801867	-114.661904	1171	c	POLENET	10.7283/T5BZ64B0
TOTK		Tottuki Misaki	-68.911207	39.819399	38	e	JARE	
TROL	66037M001	Nonshøgda	-72.012034	2.538084	1314	c	other	
TRVE	66078M001	Traverse Mountains	-69.988824	-67.554711	1064	c	UKANET, CAPGIA	10.7283/49BA-YD89
USE1		Untersee1	-71.344924	13.524812	814	e	TU Dresden	
VER1	66038M001	Vernadsky	-65.246156	-64.253418	20	e	SCAR	
VER3		Vernadsky	-65.245264	-64.257339	19	c	SCAR	
VESL	66009M001	Vesleskarvet	-71.673797	-2.841783	862	c	Hartebeesthoek Radio Astronomy Observatory	
VL01		Tombstone Hill	-72.450137	169.725070	597	m	POLENET, VLNDEF	10.7283/T5VX0DTM
VL02		Mt Finch	-72.564875	167.378141	2047	e	VLNDEF	
VL03		Mt Masley	-72.950512	162.926406	2470	e	VLNDEF	
VL04		Hawkes Heights	-73.518211	169.748653	1835	e	VLNDEF	
VL05		Cape Phillips	-73.063070	169.612187	478	e	VLNDEF	
VL06		Mt Melbourne	-74.350001	164.690648	2671	e	VLNDEF	
VL07		Mt Monteagle	-73.759899	165.379301	2039	e	VLNDEF	
VL08		Mt Jiracek	-73.764284	163.739534	2655	e	VLNDEF	
VL09		Lichen Hills	-73.330783	162.169395	2270	e	VLNDEF	
VL10		Archambault Ridge	-73.688455	162.768592	2619	e	VLNDEF	
VL11		Mt Baxter	-74.371428	162.541667	2362	e	VLNDEF	
VL12		Monte Cassino	-72.274440	163.726997	1933	m	POLENET, VLNDEF	10.7283/T5MC8X9F
VL13		Mt Larsen	-74.847797	162.204967	1460	e	VLNDEF	
VL14		Mt Kinet	-73.228247	165.905697	2084	e	VLNDEF	
VL15		Inexpressible Island	-74.934264	163.715667	-28	e	VLNDEF	
VL16		Cape Philippi	-75.232561	162.545486	311	e	VLNDEF	
VL17		Evans Height	-75.095134	161.538743	684	e	VLNDEF	
VL18		Starr Nunatak	-75.898532	162.593711	58	e	VLNDEF	
VL19		Mc Daniel Nunatak	-75.804973	161.781614	810	e	VLNDEF	
VL20		Thompson Spur	-71.543155	160.454783	1442	e	VLNDEF	
VL21		Husky Pass	-71.668655	163.732935	1899	e	VLNDEF	
VL22		Little Rock	-71.421871	162.040434	275	e	VLNDEF	
VL23		Cape Adare	-71.345819	170.304674	1119	e	VLNDEF	
VL27		Dunedin Range	-71.357348	167.802012	1765	e	VLNDEF	
VL29		Mt Draeger	-71.154077	163.896282	1624	e	VLNDEF	

ID (chr4)	IERS dome code	site name	latitude [deg]	longitude [deg]	height [m]	occ mode	networks/ operator	DOI for raw observation data
VL30		Monte Bruce	-70.598721	162.525141	1492	m	POLENET, VLNDEF	10.7283/T54F1P23
VL32		Mt Seitz	-71.733103	166.164565	1784	e	VLNDEF	
VLHG		Hughes Bluff	-75.397967	162.201717	166	e	VLNDEF	
VNAD		Vernadsky Station	-65.246005	-64.254163	21	c	UKANET, LARISSA	10.7283/T52F7KQ1
W01B		W01B	-87.415176	-149.443111	2583	e	WAGN	
W02B		W02B	-85.611852	-68.555464	1490	e	WAGN	
W03B		W03B	-81.576975	-28.402599	1195	e	WAGN	
W04A		W04A	-82.861557	-53.200097	944	e	WAGN	
W05A		W05A	-80.039816	-80.558617	664	e	WAGN	
W05B		W05B	-80.039801	-80.564443	661	e	WAGN	
W07A		W07A	-80.320660	-81.433424	784	e	WAGN	
W07B		W07B	-80.322777	-81.540316	918	e	WAGN	
W08A		W08A	-75.280382	-72.180052	1093	e	WAGN	
W09A		W09A	-82.683220	-104.395563	2350	e	WAGN	
W10B		W10B	-74.545977	-111.883925	313	e	WAGN	
W14B		W14B	-77.528742	-86.765069	1473	e	WAGN	
W17B		W17B	-72.530030	-97.559792	211	e	WAGN	
WAL0		Marble Point	-77.432452	163.820835	-22	e	TAMDEF	
WHN0	66069M001	Westhaven Nunatak	-79.845698	154.220119	2193	c	POLENET, TAMDEF	10.7283/T5R49P2M
WHTM		Whitmore Mountains	-82.683233	-104.393202	2347	m	POLENET, TAMDEF	10.7283/T5ZP44DZ
WILN		Wilson Nunatak	-80.039838	-80.557942	667	c	POLENET	10.7283/T53F4MX9
WLCH	66079M001	Welch Mountains	-70.729355	-63.820411	1534	c	UKANET, CAPGIA	10.7283/5XVC-2N29
WLCT		Mount Walcott	-85.369264	-87.392687	1851	c	POLENET	10.7283/T5TX3CNS
WLRD	66089M001	Mount Woollard	-80.544112	-96.637705	2317	c	UKANET, iSTAR-D	10.7283/WP73-9Q90
WRN0		Warren Range	-78.417327	158.296107	2479	e	TAMDEF	
WTE0		White Island	-78.189746	167.495910	400	e	TAMDEF	
WWAY		Whichaway Nunata	-81.577005	-28.402677	1196	m	POLENET, TAMDEF	10.7283/T5765CN1
ZHON	66030M001	Zhong Shan	-69.371052	76.369851	41	e	SCAR	

S 2 GNSS processing

S 2.1 Processing setup for each analysis center

Table S2. GPS processing setups, products and parametrization by the four analysis centres TU Dresden (TUD), Ohio State University (OSU), University of Tasmania (UTAS) and Newcastle University (NEWC)

	TUD	UTAS	OSU	NEWC
Processing strategy	DGPS	PPP	DGPS	DGPS
Processing software	Bernese v5.2	GISPY v6.4	GAMIT/GLOBK 10.71	GAMIT/GLOBK 10.70
Reference frame	IGb14	IGb14	IGb14	IGb14
Reference frame realization strategy	Daily NNT condition on regional IGS core sites	Daily 7-parameter tranformation (provided by JPL)	As described in Gómez et al. (2022)	Daily 6-parameter transformation w.r.t. global IGS core sites
GNSS	GPS only	GPS only	GPS only	GPS only
Loading corrections				
NATL	not considered	not considered	not considered	applied
NTOL	not considered	not considered	not considered	not considered
OTL	FES2014b	TPXO7.2 and SPOTL	FES2014b	FES2014b
ATL	S1/S2 (Ray and Ponte, 2003)	not considered	not considered	not considered
solid earth tides	IERS 2010	IERS 2010	IERS 2010	IERS 2010
Orbit products	CODE final (repro2 + operational)	JPL (repro3 + operational)	IGS final	IGS final (repro3 + operational)
Earth Orientation parameters	CODE final (repro2 and operational)	JPL final (repro3 and operational)	UNSO final	UNSO final
solar radiation pressure model	ECOM1	ECOM1	ECOM1	ECOM1
Earth albedo	not considered	not considered	not considered	NCLE1
Antenna thrust model	not considered	not considered	not considered	ANTBK
Higher order Ionospheric effects	2nd and 3rd order (CODE GIM)	2nd order (JPL IONEX)	2nd order (GMAP IGRF13)	2nd order (IGS IONEX)
A-priori troposphere model (hydrostatic & wet)	VMF3	VMF1	VMF1	VMF1
ZTD parametrization	piece wise linear (1h)	5min sampling random walk process with process noise of $5 \times 10^{-8}\,\mathrm{km\,s}^{-0.5}$	piece wise linear (1h)	piece wise linear (2h)
Ground/satellite antenna phase center variations (PCV)	igs14.atx	igs14.atx	igs14.atx	igs14.atx
Azimuth correction for ground antenna misalignment from true north	yes	not considered	not considered	not considered

S 2.2 Combination of the AC coordinate time series

In addition to the approach outlined in Sec. 3.2.3, alternative combination approaches have been tested. We investigated four approaches to combine the coordinate time series. Each approach works on a site by site basis. Approach (a) calculates the unweighted mean for each day for each coordinate component over all four AC solutions (or less, if less solutions are available), (b) as implemented and applied for the final data set, (c) Geometric median and (d) calculates the weighted mean for each day for each coordinate component over all four PC solutions as in (b), but with weights based on the daily variances that are scaled for each site: $\sigma^2_{scaled,AC}(t) = \sigma^2_{AC}(t)/mean_{t_0..t_n}(\sigma^2_{AC})$ (normalized variances).

Table S3. Assessment of the residual RMS for the combined time series based on different combination approaches: (a) unweighted mean, (b) weighted mean with weights based on daily variances. Variances are scaled so the mean variance equals the variance of the residual time series of a PC, (c) geometric median, (d) weighted mean with weights based on daily variances. Daily variances are scaled in the way that the mean variances equals unity (equal for each PC). Option (b) is used for the data set presented in this study. The mean RMS and median RMS are calculated over all sites of the presented data set.

combination method	mean RMS [mm]						median RMS [mm]					
	permanent/mixed			episodic			permanent/mixed			episodic		
	north	east	up	north	east	up	north	east	up	north	east	up
(a)	2.47	2.59	5.37	2.89	2.97	7.44	1.80	1.73	4.71	2.24	2.11	5.37
(b)	2.45	2.58	5.30	2.86	2.88	7.28	1.80	1.72	4.67	2.25	2.09	5.23
(c)	2.51	2.62	5.49	2.93	3.03	7.48	1.85	1.76	4.86	2.26	2.19	5.50
(d)	2.49	2.59	5.42	2.89	2.95	7.49	1.86	1.73	4.75	2.24	2.09	5.38

S 3 NGL vs GR time series: examples time series for corrected antenna heights

Figure S1 displays the time series of antenna heights and the vertical coordinate component for a selection of sites showing differences in the antenna heights between the GR and NGL data set. The site A368 shows differences in the antenna height for a whole period of measurements in 2004. The error in the antenna height can not be determined from the trajectory of the NGL time series and is, therefore, dangerous (does not constitute an outlier) and could lead to the determination of false uplift rates. The site BEAN shows singular days with offsets in the antenna heights that lead to isolated outliers in the up time series. A similar effect can be observed for MAW1. The antenna and the receiver were changed on 2019-1-11 for the site RMBO, which included a change in the antenna height from $0.000\,\mathrm{m}$ to $0.3048\,\mathrm{m}$, leading to a step in the GR time series. The information on the change in antenna height seems to be recorded incorrectly in the RINEX header, leading to the displayed outlier. Even after the correction of the antenna height, an offset between the NGL and GR time series remains.

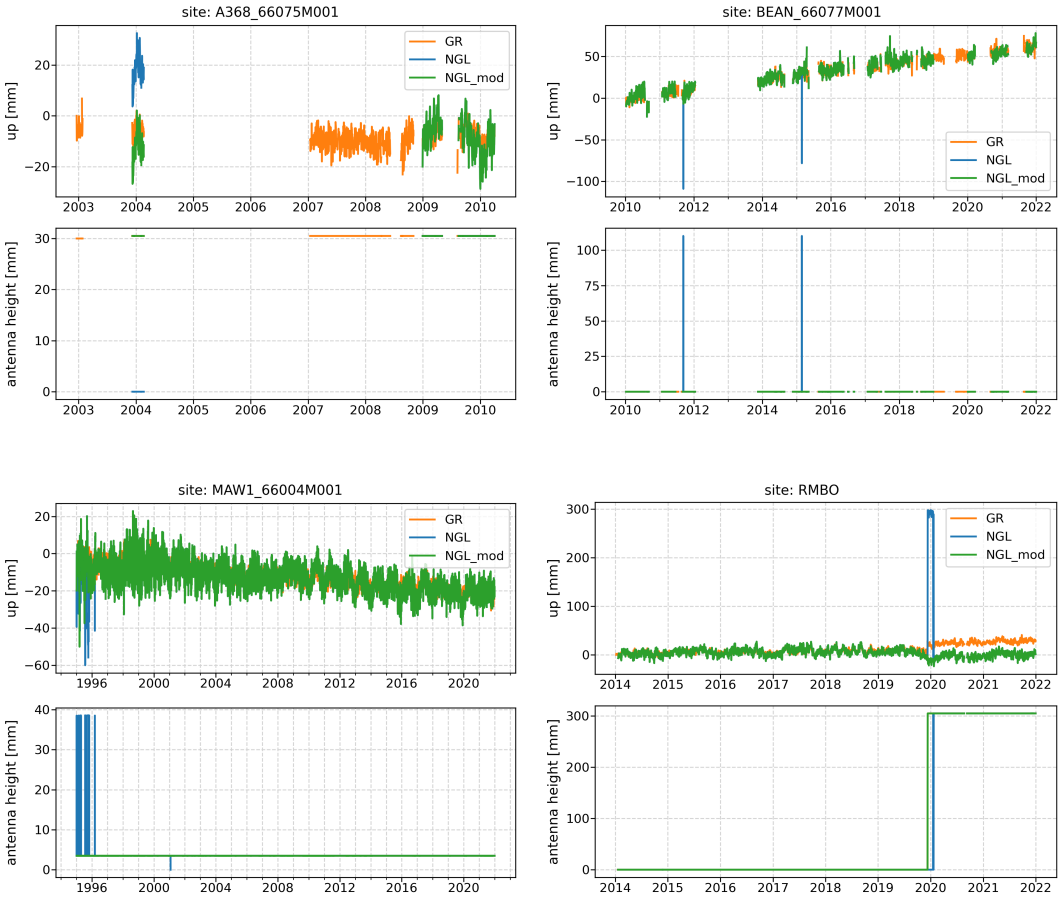

Figure S1. Time series of the vertical coordinate component from the GR (orange), NGL (blue) and NGL_mod with corrected antenna heights according to the GR meta data (green), together with the time series of antenna heights. The sites are selected to demonstrate the effect of false antenna height information on the coordinate trajectory, leading to errors in estimated rates (A368), single outliers (MAW1 and BEAN), or clustered outliers (RMBO).

S 4 Zenith Total Delay (ZTD)

Zenith troposphere delays are estimated together with the daily station coordinates by each AC (see chapter 3.1). The individual troposphere time series are provided as site-wise time series with one hour resolution for OSU, UTAS and TUD and with a two hour resolution for the NEWC solution.

Tab. S2 provides an overview over the processing setups for the ZTD estimation (a-priori models and parametrization). The resulting ZTD estimates are expressed as piece-wise linear functions (see S2 for an example time series for site DUPT). Since coordinate solutions are processed on a daily basis, two estimates at the day boundary exist. Therefore, the estimated ZTD values are averaged at the day boundary. Large outliers, exceeding five times the RMS of the de-trended time series, are removed.

To compare the ZTD results from the individual ACs we investigate for each AC pair:

- the correlation coefficients (Pearson),
- RMS over the differenced ZTD time series.

We derive correlations coefficients and the RMS over the differenced time series of ZTD for each combination of AC solutions for a selection of 29 stable cGPS sites (see Sec. 3 for an overview of the selected sites) and the complete data set. The resulting mean correlations and RMS values are summarized in table S4. For the sub-selection of sites, the correlation coefficients vary between 0.88 and 1.00 (Fig. S4). The results of OSU-NEWC can be considered nearly identical, reaching an average correlation coefficient of 1.00 for the selected sites and 0.99 over the whole data set, while TUD-UTAS show an average correlation coefficient of 0.99 for the selected sites and 0.97 over the whole data set. The other AC combinations show an average correlation coefficient of 0.93 for the selected sites and between 0.91 and 0.92 for the whole data set. All AC solutions are generally in good agreement, but with better agreement between the processings of NEWC-OSU and TUD-UTAS.

The same conclusion can be drawn when analyzing the RMS over the differenced time series. Smallest mean RMS are reached for the combinations NEWC-OSU and TUD-UTAS reaching $1.5\,\mathrm{mm}$ and $3.3\,\mathrm{mm}$ for the selection of stable sites, respectively (Fig. S5).

Table S4. Mean correlation coefficients and mean RMS over differenced time series over pairs of ZTD time series based on a sub-selection of 29 stable sites (see Chapter 3) and the whole data set.

AC combinations	mean correlation coefficient		mean RMS over differenced time series [mm]	
	selected sites	complete data set	selected sites	complete data set
OSU-TUD	0.93	0.92	10.3	9.3
OSU-UTAS	0.93	0.91	10.4	9.2
OSU-NEWC	1.00	0.99	1.5	2.0
NEWC-TUD	0.93	0.92	10.2	9.2
NEWC-UTAS	0.93	0.92	10.2	9.1
TUD-UTAS	0.99	0.97	3.3	4.0

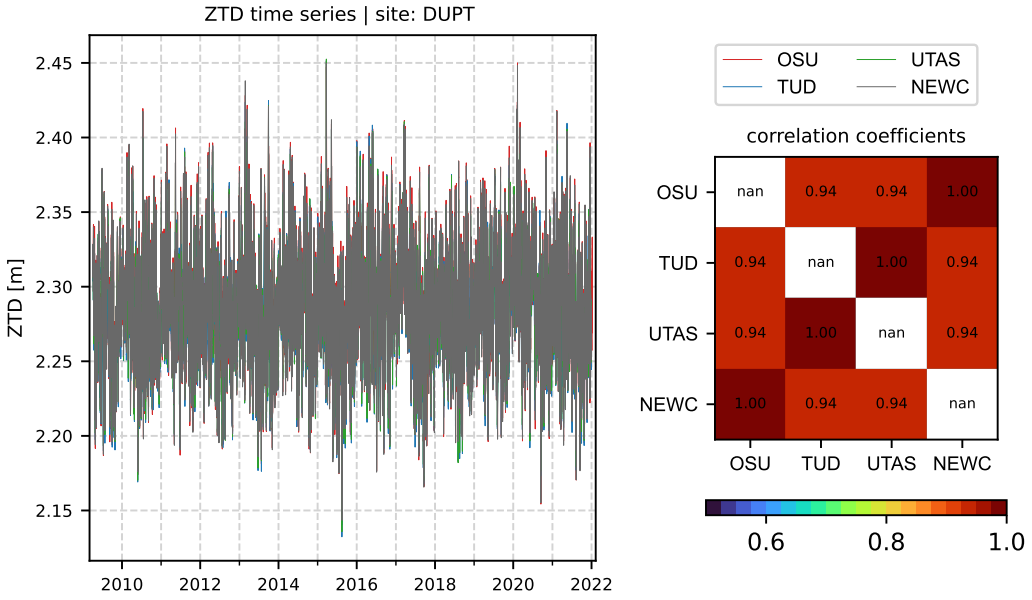

Figure S2. Time series of ZTD estimates form the four processing centers for the site DUPT (Duthiers Point) and their pair wise correlation coefficients.

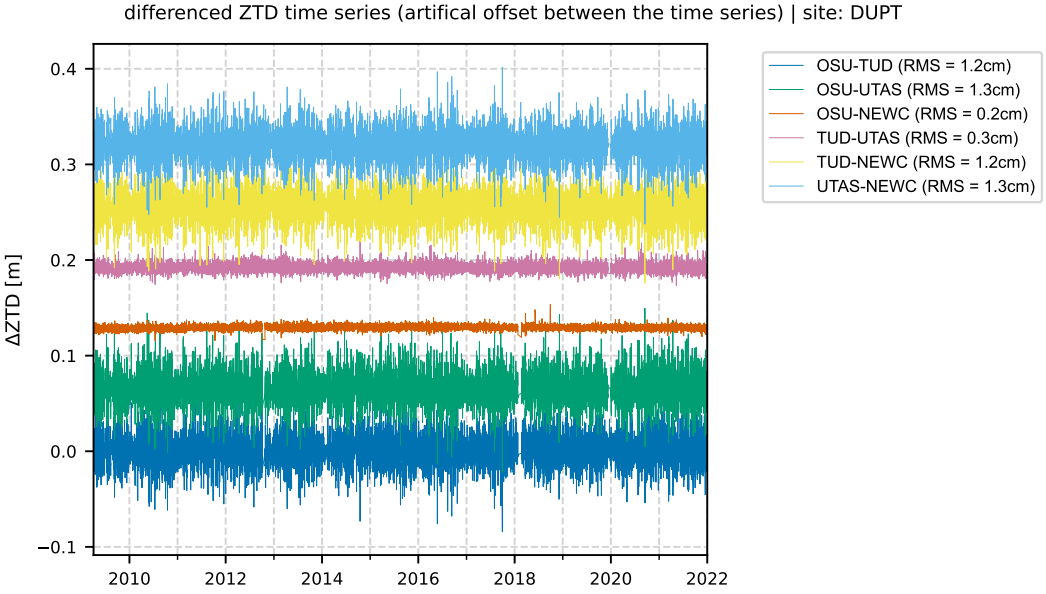

Figure S3. Time series of the differences of the ZTD time series for each AC pair for the site DUPT (Duthiers Point) (an artificial offset between the time series is introduced). RMS over the time series of differences is given on the right site.

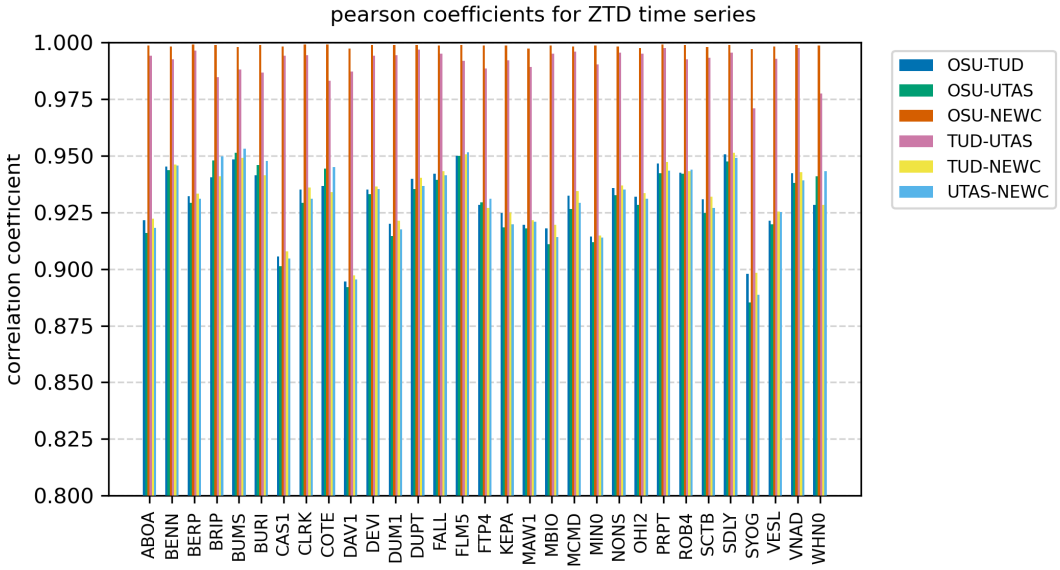

Figure S4. Correlation coefficients between the ZTD time series for pairs of AC solutions. Highest correlations can be found for the NEWC-OSU and TUD-UTAS correlations.

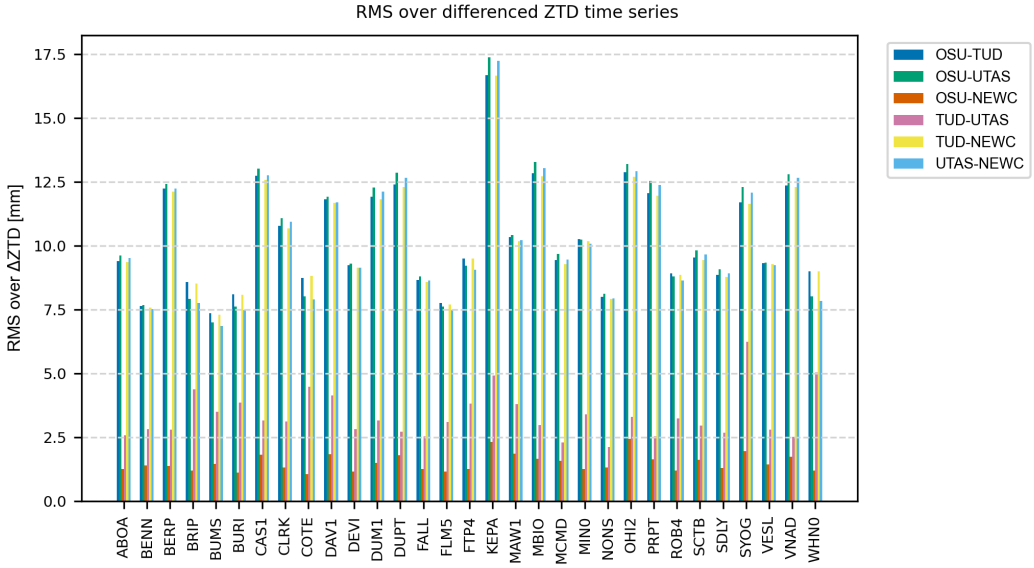

Figure S5. RMS over the differences ZTD time series between the AC solutions.

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