

Supplement of

Accounting for shelf-width in selecting altimetry observations for estimating coastal sea level changes improves its agreement with tide gauges

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S1. Evaluating high frequency data (hourly)

We used hourly tide gauge (TG) data from the University of Hawaii Sea Level Center (UHSLC), applying preprocessing steps that included tide removal, Dynamic Atmospheric Correction (DAC), and vertical land motion (VLM) correction. Tides were estimated from FES2022b tidal model. To ensure consistency with altimetry, we applied DAC correction from AVISO to the TG SLA using the value at the nearest ocean grid point to the TG station. The DAC correction (available at 6-hourly) was linearly interpolated to hourly resolution. VLM rates from nearby GPS stations were obtained from the Nevada Geodetic Laboratory (NGL) and applied as corrections. Here, we show the analysis conducted at the Brisbane TG station only.

For the comparison, we first identified the nearest altimetry point with at least 80% completeness in the sea level anomaly (SLA) time series for 1994–2021, and then we selected the tide gauge observation closest in time to the satellite overpass containing that altimetry observation point. Note that XTRACK product used in this analysis is the X-TRACK SLA L2P v2.1 from AVISO. We then validated XTRACK-derived altimetry SLA against TG SLA. Fig. S1 illustrates this comparison. Using statistical metrics, we obtained a correlation of 0.49 and an RMSE of 100.45 mm.

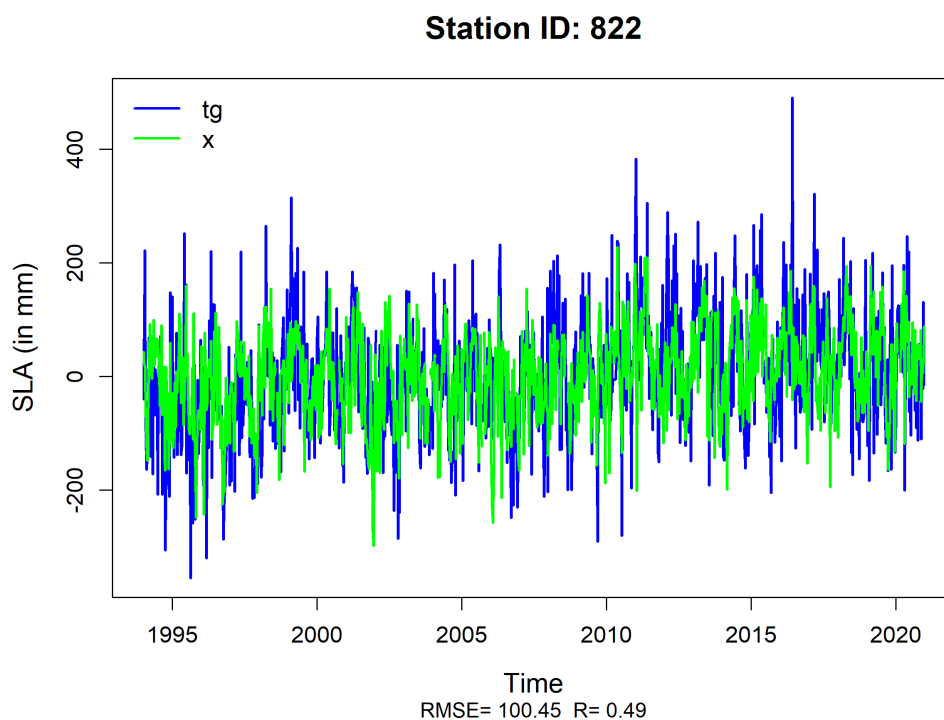


Figure S1 Comparison of high-frequency SLA (hourly) at Brisbane. The figure shows the hourly time series of SLA from tide gauge (TG) data at Brisbane (from UHSLC) and from XTRACK. The TG data is corrected for

23 DAC, tides, and VLM, and is compared with the nearest altimeter pass observation. The blue line represents TG
 24 data, and the green line represents XTRACK data.

25 **Table S1** List of stations on minor islands.

Station ID	Station Name	Latitude	Longitude
155	HONOLULU	21.30667	-157.867
1842	NUKU'ALOFA B	-21.1368	-175.181
1843	RAROTONGA B	-21.2048	-159.785
300	HILO, HAWAII ISLAND	19.73	-155.055
521	KAHULUI HARBOR, MAUI ISLAND	20.895	-156.477
523	MIDWAY ISLAND	28.21167	-177.36
756	NAWILIWILI BAY, KAUAI ISLAND	21.95333	-159.355
823	MOKUOLOE ISLAND	21.43167	-157.79
1001	SAN JUAN	18.45833	-66.115
1803	TENERIFE	28.47722	-16.2411
1673	PORT LOUIS II	-20.15	57.5
983	COCOS ISLAND (HOME IS.)	-12.1167	96.89442
1804	BETIO	1.365056	172.933
1805	LAUTOKA	-17.6049	177.4383
1839	FUNAFUTI B	-8.50247	179.1952
1841	PORT VILA B	-17.7553	168.3077
1844	NAURU-B	-0.52942	166.9101
1151	NAHA	26.21333	127.6653
1671	ISHIGAKI II	24.33222	124.1636
1745	XI SHA	16.83333	112.3333
1391	CHICHIJIMA	27.08333	142.1833
1490	ULLEUNG	37.49139	130.9136

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28 **Table S2** Coastal sea level trend with uncertainty at 248 stations for the period 1994 to 2023 from tide gauges
 29 and altimetry (DSR).

Station ID	Station Name	Latitude	Longitude	TG trend	DSR trend
1	BREST	48.38285	-4.494838	2.15±0.43	3.18±0.35
10	SAN FRANCISCO	37.806667	-122.465	2.14±0.6	2.06±0.43
1001	SAN JUAN	18.458333	-66.115	2.58±0.44	3.74±0.42
1026	ONISAKI	34.903889	136.823611	5.37±0.79	7.35±0.82
1027	OSHOHO II	43.209444	140.858056	3.33±0.35	3.38±0.31
1031	GERALDTON	-28.77597	114.601889	3.44±0.84	2.89±0.81
1034	TAI PO KAU, TOLO HARBOUR	22.4425	114.183889	2.48±0.79	3.29±0.57
1036	AMRUM (WITTDUEN)	54.616667	8.383333	0±1.57	3.82±0.91
1037	BORKUM (FISCHERBALJE)	53.5575	6.747778	2.09±1.2	3.83±0.96
1066	JEJU	33.5275	126.543056	3.78±0.45	3.52±0.45
1067	ANCHORAGE	61.238333	-149.89	2.81±0.68	1.23±0.59
1068	BRIDGEPORT	41.173333	-73.181667	3.81±0.62	3.78±0.44
1069	VICTOR HARBOUR	-35.56248	138.635403	2.33±0.66	2.18±0.6
1070	SELDOVIA	59.44	-151.72	0.83±0.65	1.33±0.57
1071	PORT HARDY	50.716667	-127.48333	2.39±0.6	1.56±0.56
1089	MAISAKA	34.681944	137.608889	5.06±0.84	6.41±1.09
1090	URAGAMI	33.558333	135.896389	8.81±0.77	4.62±0.86
1095	SAIGO	36.201389	133.331111	2.91±0.47	3.22±0.48
1098	SUMOTO	34.340556	134.906667	3.4±0.72	1.1±0.6
1099	OSAKA	34.658056	135.432778	5.3±0.7	0±0.66
11	WARNEMUNDE 2	54.169722	12.103333	2.55±1	3.91±0.86
1100	NAGASAKI	32.735	129.866111	3.71±0.55	3.33±0.42
1101	FUKUE	32.696111	128.849444	2.53±0.51	3.4±0.43
1102	OURA	32.976667	130.220556	0±0.57	3.28±0.45
1103	WAKKANAI	45.407778	141.685278	4.83±0.36	3.41±0.35
1104	ABASHIRI	44.019444	144.285833	3.77±0.39	3.15±0.3
1111	NANTUCKET ISLAND	41.285	-70.096667	4.26±0.45	3.76±0.4
1113	HELGEROA	58.995212	9.856379	3.94±0.65	4.27±0.66
1114	ESPERANCE	-33.87089	121.895361	3.18±0.59	2.18±0.53
1115	CARNARVON	-24.89869	113.651028	3.21±0.92	3.1±0.84
1116	WYNDHAM	-15.45328	128.101028	3.04±1.05	3.42±0.82
1146	OWASE	34.076389	136.207222	6.64±0.78	4.29±0.7
1148	TAJIRI	35.593611	134.315833	2.3±0.51	3.26±0.53
1150	SHIRAHAMA	33.683611	135.375278	3.64±0.74	4±0.64
1151	NAHA	26.213333	127.665278	3.46±0.68	3.55±0.69
1152	PATRICIA BAY	48.65	-123.45	2.46±0.57	1.71±0.63
1153	CAPE MAY	38.968333	-74.96	4.1±0.64	3.24±0.57
1154	BUNDABERG, BURNETT HEADS	-24.76667	152.383333	4.56±0.58	3.22±0.5
1155	YEOSU	34.747222	127.765556	2.64±0.5	3.49±0.45

1158	YARMOUTH	43.833333	-66.133333	4.43±0.49	3.79±0.45
1159	BROOME	-18.00083	122.218639	3.8±0.73	3.31±0.73
1193	APALACHICOLA	29.726667	-84.981667	4.74±0.68	5.34±0.51
1196	SOUTH BEACH	44.625	-124.04167	2.27±0.7	1.8±0.51
12	NEW YORK (THE BATTERY)	40.7	-74.013333	3.62±0.68	3.69±0.55
1211	SPIKARNA	62.363333	17.531111	4.89±1.48	5.02±1.47
1212	UWAJIMA II	33.227222	132.551111	3.18±0.59	2.16±0.51
1216	SPRING BAY	-42.54586	147.932722	2.48±0.33	2.15±0.31
1241	RORVIK	64.859456	11.230107	3.65±0.67	3.97±0.54
1242	BAMFIELD	48.85	-125.13333	2.39±0.64	1.7±0.63
1246	HAY POINT	-21.28333	149.3	3.48±0.6	2.99±0.42
1247	PORT TUDY	47.644274	-3.445852	1.29±0.45	3.23±0.32
1265	AKUNE	32.0175	130.190833	2.24±0.56	3.41±0.48
1269	CHARLESTON II	43.345	-124.32167	1.38±0.63	1.89±0.52
127	SEATTLE	47.601667	-122.33833	1.52±0.6	1.7±0.69
1294	LE CONQUET	48.359402	-4.78083	2.37±0.42	3.22±0.35
1295	CAMBRIDGE II	38.573333	-76.068333	3.23±0.61	3.24±0.54
1299	NORTH SYDNEY	46.216667	-60.25	3.9±0.43	4.15±0.26
13	TRAVEMUNDE	53.958056	10.872222	3.37±0.95	3.74±0.86
1320	KURE I	33.333611	133.243333	3.83±0.75	2.59±0.55
1322	SEPT-ILES	50.2	-66.4	1.83±0.6	4.21±0.44
1324	POHANG	36.047222	129.383889	4.14±0.48	3.68±0.46
1325	PORT TOWNSEND	48.111667	-122.75667	1.27±0.6	1.68±0.65
134	KUSHIMOTO	33.475833	135.773333	3.3±0.68	4.62±0.86
1347	ROSCOFF	48.718399	-3.96586	1.25±0.41	3.15±0.36
1349	LOWER ESCUMINAC	47.083333	-64.883333	4.6±0.43	3.63±0.92
1366	TSIM BEI TSUI	22.487222	114.014167	3.47±0.9	3.35±0.54
1368	GOODS ISLAND	-10.56167	142.151667	3.26±1.09	4.2±1.06
1386	KUCHINOTSU	32.605278	130.195278	2.13±0.55	3.34±0.43
1387	MAIZURU II	35.476667	135.386944	3.02±0.46	4.26±0.48
1390	MUROTOMISAKI	33.266389	134.164444	7.01±0.75	2.81±0.83
1394	POINT REYES	37.995	-122.97667	1.83±0.56	2.04±0.46
14	HELSINKI	60.153633	24.956217	4.08±1.65	4.96±1.63
1442	HANASAKI II	43.278056	145.567778	1.02±0.45	3.12±0.33
1445	GADEOKDO	35.024722	128.810833	3.02±0.51	3.32±0.46
1446	TONGYEONG	34.8275	128.434722	2.66±0.47	3.36±0.46
148	BALTIMORE	39.266667	-76.578333	3.63±0.7	3.23±0.58
1488	NAGOYA II	35.091389	136.880833	6.11±0.8	4.11±0.68
1492	CAPE FERGUSON	-19.27733	147.058444	4.19±0.56	3.02±0.48
1493	MOOLOOLABA 2	-26.68333	153.133333	2.72±0.47	2.54±0.41
1527	GUNSAN (OUTER PORT)	35.975556	126.563333	4.19±0.49	3.7±0.51
154	TRIESTE	45.647361	13.758472	1.93±0.56	2.52±0.55
1547	PORTLAND	-38.34344	141.613167	2.38±0.46	1.38±0.44
155	HONOLULU	21.306667	-157.86667	1.98±0.56	2.23±0.52

1551	ROOMPOT BUITEN	51.619722	3.681944	2.7±0.77	3.43±0.71
1568	WANDO	34.315278	126.759722	3.43±0.52	3.53±0.45
1585	HAMADA II	34.897222	132.066111	4.23±0.48	3.33±0.48
1597	RIMOUSKI	48.483333	-68.516667	3.9±0.6	4.06±0.7
161	GALVESTON II, PIER 21, TX	29.31	-94.793333	5.6±0.9	4.9±0.64
1627	SEOGWIPO	33.24	126.561667	2.44±0.46	3.51±0.45
1628	WIDO	35.618056	126.301944	3.76±0.46	3.72±0.51
1629	MOURILYAN HARBOUR	-17.58333	146.083333	3.07±0.58	3.22±0.42
1633	CHERRY POINT	48.863333	-122.75667	0±0.57	1.65±0.7
166	VICTORIA	48.416667	-123.36667	2.49±0.56	1.69±0.65
1673	PORT LOUIS II	-20.15	57.5	4.61±0.69	4.19±0.63
1674	QUARRY BAY	22.291111	114.213333	1.36±0.75	3.33±0.55
1675	BORYEONG	36.406389	126.486111	4.1±0.48	3.77±0.51
1699	ANHEUNG	36.673611	126.132222	2.23±0.49	3.8±0.51
1704	GOLD COAST SEAWAY 2	-27.95	153.416667	5.55±0.55	2.44±0.52
172	MANTYLUOTO	61.594383	21.463433	5.25±1.58	5.01±1.48
1745	XI SHA	16.833333	112.333333	4.49±0.86	4.42±0.66
1748	TRONDHEIM 2	63.436484	10.391669	3.72±0.66	3.61±0.63
175	VANCOUVER	49.283333	-123.11667	2.46±0.6	1.67±0.68
1759	VIKER	59.036046	10.949769	3.37±0.84	4.4±0.75
1760	ROSSLYN BAY	-23.16103	150.790167	4±0.5	2.88±0.32
1764	L'ESTARTIT	42.053832	3.206448	1.92±0.38	2.81±0.34
1789	TAKAMATSU II	34.351389	134.056944	2.95±0.69	1.43±0.49
179	SMOGEN	58.353611	11.217778	3.64±0.79	4.26±0.62
1790	KOBE II	34.682222	135.190278	6.61±0.85	0±0.64
1794	WORKINGTON	54.650722	-3.567167	0±0.76	3.52±0.48
1799	WINTER HARBOUR	50.516667	-128.03333	2.14±0.7	1.64±0.57
1803	TENERIFE	28.477217	-16.241117	2.64±0.3	3.32±0.23
1804	BETIO	1.365056	172.933	3.26±0.72	4.18±0.65
1805	LAUTOKA	-17.60492	177.43825	3.66±0.57	4.12±0.56
1806	BILBAO	43.35153	-3.04513	2.59±0.35	2.93±0.36
1807	SANTANDER III	43.4613	-3.79076	1.58±0.35	2.72±0.37
1809	BONANZA	36.80221	-6.33813	2.09±0.48	3.16±0.28
1810	MALAGA II	36.71184	-4.41709	1±0.44	2.77±0.35
1811	BARCELONA	41.34177	2.1657	4.37±0.38	2.72±0.31
1813	VALENCIA	39.44203	-0.31128	3.26±0.41	2.53±0.35
183	PORTLAND (MAINE)	43.656667	-70.246667	4.05±0.53	3.85±0.48
1836	LORNE	-38.54719	143.988833	0±0.5	1.63±0.47
1839	FUNAFUTI B	-8.502472	179.195167	3.16±0.73	4.39±0.77
1844	NAURU-B	-0.529417	166.910056	4.99±0.88	4.39±0.64
1858	VIRGINIA KEY, FL	25.73	-80.161667	5.45±0.63	4.73±0.43
189	PORT HEDLAND	-20.31758	118.574417	2.49±0.81	3.27±0.74
1898	VIGO II	42.24314	-8.726	2.01±0.5	3.24±0.28
194	PIETARSAARI / JAKOBSTAD	63.708567	22.689583	5.08±1.64	5.02±1.55

196	SYDNEY, FORT DENISON 2	-33.85467	151.225778	2.54±0.44	2.86±0.51
20	VLISSINGEN	51.442222	3.596111	3.01±0.77	3.42±0.7
203	FURUOGRUND	64.915833	21.230556	4.87±1.66	5.14±1.59
2072	PORT ALMA	-23.58333	150.866667	3.4±0.54	2.98±0.3
2074	BOWEN II	-20.01667	148.25	3.64±0.51	2.98±0.45
2101	KALIX	65.696944	23.096111	5.07±1.74	5.02±1.72
2103	FORSMARK	60.408611	18.210833	4.8±1.47	4.87±1.45
2105	VISBY	57.639167	18.284444	4.61±1.38	4.58±1.42
2106	OSKARSHAMN	57.275	16.478056	4.48±1.34	4.49±1.37
2107	SIMRISHAMN	55.5575	14.357778	3.81±1.21	4.11±1.01
2108	SKANOR	55.416667	12.829444	4.11±1.08	4.11±0.91
2109	BARSEBACK	55.756389	12.903333	4.12±0.99	4.15±0.85
2110	VIKEN	56.142222	12.579167	3.99±0.95	4.15±0.8
2111	RINGHALS	57.249722	12.1125	3.92±0.89	4.54±0.71
2112	STENUNGSUND	58.093333	11.8325	4.09±0.91	4.31±0.7
2113	KUNGSVIK	58.996667	11.127222	4.33±0.86	4.4±0.75
2127	PORT ANGELES, WASHINGTON	48.125	-123.44	1.89±0.64	1.66±0.65
216	PORT PIRIE	-33.17764	138.01165	4.66±0.66	2±0.73
22	HOEK VAN HOLLAND	51.9775	4.12	2.05±0.84	3.47±0.73
224	LEWES (BREAKWATER HARBOR)	38.781667	-75.12	4.06±0.7	3.23±0.55
225	KETCHIKAN	55.331667	-131.625	0.67±0.59	1.48±0.51
229	KEMI	65.673367	24.51525	4.35±1.74	4.99±1.73
2295	BEAUFORT, NORTH CAROLINA	34.72	-76.67	4±0.65	5.81±0.7
23	DEN HELDER	52.964444	4.745	2.49±0.99	3.76±0.76
230	PORT LINCOLN	-34.7159	135.870011	1.09±0.61	2.02±0.59
2310	BRUNSWICK HEADS	-28.53681	153.552111	2.29±0.6	2.33±0.51
2324	LEWISSETTA, VIRGINIA	37.995	-76.465	5.19±0.72	3.23±0.58
234	CHARLESTON I	32.781667	-79.925	5.03±0.82	5.15±0.72
236	WEST-TERSCHELLING	53.363056	5.22	4.16±1.05	3.78±0.8
239	TURKU / ABO	60.428283	22.100533	3.98±1.58	4.93±1.49
24	DELFIJL	53.326389	6.933056	0±1.28	3.82±0.96
240	RAAHE / BRAHESTAD	64.666333	24.40705	4.69±1.69	4.98±1.66
249	FOGLO / DEGERBY	60.031883	20.384817	4.14±1.51	4.86±1.47
25	HARLINGEN	53.175556	5.409444	3.56±1.28	3.78±0.81
256	LA JOLLA (SCRIPPS PIER)	32.866667	-117.25667	1.03±0.51	2.3±0.47
265	ASTORIA (TONGUE POINT)	46.206667	-123.76833	1.13±0.86	1.74±0.49
285	KASKINEN / KASKO	62.34395	21.214833	4.74±1.58	5.01±1.48
299	SEWELLS POINT, HAMPTON ROADS	36.946667	-76.33	4.7±0.78	4.39±0.46
300	HILO, HAWAII ISLAND	19.73	-155.055	2.14±0.6	2.23±0.55
302	TREGDE	58.006377	7.554759	3.87±0.45	3.99±0.7
310	YAMBA	-29.42971	153.361875	2.56±0.69	2.44±0.51
313	HEIMSJOEN	63.425224	9.101504	5.07±0.67	3.92±0.52
315	HAMINA	60.562767	27.1792	4.6±1.79	5.35±1.72

32	IJMUIDEN	52.462222	4.554722	0±0.93	3.62±0.73
33	OSCARSBORG	59.678073	10.604861	3.81±0.94	4.05±0.54
330	KLAGSHAMN	55.522222	12.893611	2.52±1.07	4.13±0.88
332	EASTPORT	44.903333	-66.981667	4.12±0.41	3.77±0.45
351	NEWPORT	41.505	-71.326667	4.15±0.49	3.76±0.41
353	BAKAR	45.305	14.54	0±0.6	2.54±0.53
366	SANDY HOOK	40.466667	-74.008333	4.67±0.66	3.69±0.55
367	WOODS HOLE (OCEAN. INST.)	41.523333	-70.671667	4.12±0.49	3.77±0.41
376	RAUMA / RAUMO	61.133533	21.425817	4.07±1.56	4.98±1.49
377	SANTA MONICA (MUNICIPAL PIER)	34.008333	-118.5	2.57±0.51	2.15±0.45
384	FRIDAY HARBOR (OCEAN. LABS.)	48.546667	-123.01	1.65±0.57	1.69±0.64
385	NEAH BAY	48.366667	-124.61167	1.09±0.71	1.6±1.1
393	ST. JOHN'S, NFLD.	47.566667	-52.716667	1.84±0.65	3.94±0.3
395	FORT PULASKI	32.033333	-80.901667	5.9±0.87	5.09±0.77
396	WILMINGTON	34.226667	-77.953333	4.57±0.91	5.69±0.7
397	SASSNITZ	54.510833	13.643056	3.43±1.16	4.03±0.96
407	UCHIURA	35.017222	138.890278	7.13±0.69	5.83±0.72
413	OOSTENDE	51.233333	2.916667	2.48±0.72	3.3±0.6
427	CHARLOTTETOWN	46.233333	-63.116667	3.71±0.54	3.94±0.33
429	NEW LONDON	41.36	-72.09	4.01±0.57	3.71±0.43
437	ALAMEDA (NAVAL AIR STATION)	37.771667	-122.29833	1.38±0.65	2.06±0.44
448	PORT ADELAIDE (OUTER HARBOR)	-34.77976	138.480728	2.49±0.67	2.11±0.6
453	LE HAVRE	49.4819	0.106	2.18±0.47	3.04±0.45
457	ST. NAZAIRE	47.27	-2.2	1.75±0.59	3.25±0.32
467	CHERBOURG	49.651299	-1.63563	1.87±0.41	3.09±0.44
47	STAVANGER	58.974339	5.730121	3.15±0.51	3.9±0.4
486	MALOY	61.933776	5.11331	4.48±0.63	3.92±0.44
489	NIEUWPOORT	51.15	2.733333	1.09±0.7	3.28±0.59
497	PORT ISABEL	26.06	-97.215	4.57±0.73	4.7±0.6
508	PORT SAN LUIS	35.176667	-120.76	3.14±0.5	2.01±0.46
509	ALESUND	62.469414	6.151946	3.7±0.66	3.83±0.46
518	KUSHIRO	42.975556	144.371389	4.2±0.37	3.01±0.34
520	ST. PETERSBURG	27.76	-82.626667	5.04±0.46	5.38±0.47
521	KAHULUI HARBOR, MAUI ISLAND	20.895	-156.47667	1.59±0.54	2.08±0.52
523	MIDWAY ISLAND	28.211667	-177.36	3.62±0.64	2.88±0.42
526	GRAND ISLE	29.263333	-89.956667	5.78±0.65	5.51±0.81
562	BODO	67.28829	14.390813	6.38±0.65	4.01±0.64
564	MACKAY	-21.1	149.233333	3.24±0.58	2.98±0.46
571	TALCAHUANO	-36.68333	-73.1	-9.49±0.66	2.12±0.38
58	BERGEN	60.398046	5.320487	3.5±0.52	3.96±0.45
62	OSLO	59.908559	10.73451	3.84±0.96	4.03±0.54
636	KIPTOPEKE BEACH	37.165	-75.988333	3.44±0.68	4.32±0.5

637	TOWNSVILLE I	-19.25	146.833333	3.49±0.57	3±0.58
682	KRISTIANSUND	63.113859	7.734352	3.4±0.65	3.95±0.5
69	OLANDS NORRA UDDE	57.366111	17.097222	4.2±1.39	4.52±1.39
7	CUXHAVEN 2	53.866667	8.716667	2.69±1.56	3.74±0.99
70	KUNGSHOLMSFORT	56.105278	15.589444	4.43±1.28	4.36±1.22
701	KAINAN	34.144167	135.191389	3.57±0.73	3.65±0.52
723	DALIAN	38.866667	121.683333	5.22±0.61	3.86±0.53
754	LOWESTOFT	52.473111	1.750111	2.82±0.75	3.53±0.66
756	NAWILIWILI BAY, KAUAI ISLAND	21.953333	-159.355	2.55±0.57	2.22±0.45
78	STOCKHOLM	59.324167	18.081667	4.49±1.42	4.75±1.44
79	OULU / ULEABORG	65.040317	25.418233	4.7±1.73	5.02±1.72
8	WISMAR 2	53.898889	11.458056	3.19±0.97	3.77±0.89
809	KOMATSUSHIMA	34.009167	134.587778	3.84±0.74	2.66±0.5
811	SAKAI	35.547778	133.243056	3.34±0.49	3.25±0.45
812	UNO	34.488611	133.949444	4.79±0.71	3.76±0.73
813	HAKODATE I	41.781667	140.724722	1.68±0.37	3.29±0.31
814	ABURATSU	31.576944	131.409444	2.18±0.62	3.06±0.5
815	TOSA SHIMIZU	32.779167	132.958889	2.62±0.64	2.28±0.71
816	WAKAYAMA	34.221667	135.145556	3.22±0.75	2.64±0.54
817	TAN-NOWA	34.338889	135.178056	3.67±0.73	1.53±0.58
823	MOKUOLOE ISLAND	21.431667	-157.79	2.31±0.57	2.2±0.51
824	PETROPAVLOVSK-KAMCHATSKY	52.983333	158.65	2.5±0.58	2.13±0.44
833	EDEN	-37.07366	149.907739	1.49±0.5	2.67±0.42
834	BUNBURY	-33.32344	115.659972	2.67±0.77	2.68±0.81
835	KARUMBA	-17.5	140.833333	3.75±1.24	3.85±1.06
88	RATAN	63.986111	20.895	5.15±1.61	4.98±1.54
9	MAASSLUIS	51.9175	4.249722	2.08±0.87	3.47±0.73
933	ZHAPO	21.583333	111.816667	2.56±0.77	3.51±0.58
934	KANMEN	28.083333	121.283333	5.14±0.79	3.24±0.45
935	DARWIN	-12.47178	130.845861	4.11±0.79	4.06±0.76
953	CAIRNS	-16.91667	145.783333	1.33±0.56	3.25±0.43
954	MOKPO	34.779722	126.375556	4.11±0.55	3.57±0.47
955	BUSAN	35.096111	129.035556	2.89±0.46	3.27±0.47
956	INCHEON	37.451944	126.592222	3.24±0.51	3.8±0.51
984	BELLA BELLA	52.166667	-128.13333	2.58±0.61	1.35±0.59
996	PORT TARANAKI	-39.05618	174.03439	3.06±0.7	4.26±0.4

30

31 **Table S3.** Coastal sea level trend with uncertainty at 45 stations for the period 1994 to 2023 from tide gauges
32 linked to ellipsoid and altimetry (DSR).

Station ID	Station Name	Latitude	Longitude	TG trend	DSR trend
1	BREST	48.38285	-4.494838	3.12±0.44	3.18±0.35
1026	ONISAKI	34.903889	136.823611	7.12±0.79	7.35±0.82

1027	OSHO RO II	43.209444	140.858056	4.18±0.35	3.38±0.31
1037	BORKUM (FISCHERBALJE)	53.5575	6.747778	2.7±1.18	3.83±0.96
11	WARNEMUNDE 2	54.169722	12.103333	3.25±0.98	3.91±0.86
1100	NAGASAKI	32.735	129.866111	3.81±0.55	3.33±0.42
1103	WAKKANAI	45.407778	141.685278	4.29±0.36	3.41±0.35
1104	ABASHIRI	44.019444	144.285833	4.69±0.39	3.15±0.3
1148	TAJIRI	35.593611	134.315833	3.48±0.51	3.26±0.53
1151	NAHA	26.213333	127.665278	3.43±0.68	3.55±0.69
1158	YARMOUTH	43.833333	-66.133333	5.27±0.49	3.79±0.45
1216	SPRING BAY	-42.545861	147.932722	1.62±0.33	2.15±0.31
1265	AKUNE	32.0175	130.190833	2.16±0.56	3.41±0.48
1320	KURE I	33.333611	133.243333	1.35±0.75	2.59±0.55
134	KUSHIMOTO	33.475833	135.773333	4.6±0.68	4.62±0.86
1347	ROSCOFF	48.718399	-3.96586	1.93±0.41	3.15±0.36
1492	CAPE FERGUSON	-19.277333	147.058444	3.83±0.56	3.02±0.48
1547	PORTLAND	-38.343444	141.613167	1.21±0.46	1.38±0.44
1585	HAMADA II	34.897222	132.066111	3.52±0.48	3.33±0.48
1597	RIMOUSKI	48.483333	-68.516667	3.69±0.61	4.06±0.7
161	GALVESTON II, PIER 21, TX	29.31	-94.793333	5.32±0.9	4.9±0.64
166	VICTORIA	48.416667	-123.36667	2.06±0.6	1.69±0.65
1674	QUARRY BAY	22.291111	114.213333	1.78±0.76	3.33±0.55
1799	WINTER HARBOUR	50.516667	-128.03333	2.07±0.7	1.64±0.57
1803	TENERIFE	28.477217	-16.241117	3.34±0.3	3.32±0.23
1804	BETIO	1.365056	172.933	4.05±0.72	4.18±0.65
1805	LAUTOKA	-17.604917	177.43825	3.24±0.57	4.12±0.56
1807	SANTANDER III	43.4613	-3.79076	2.21±0.35	2.72±0.37
1810	MALAGA II	36.71184	-4.41709	1.83±0.44	2.77±0.35
1811	BARCELONA	41.34177	2.1657	4.31±0.38	2.72±0.31
1813	VALENCIA	39.44203	-0.31128	2.52±0.41	2.53±0.35
1839	FUNAFUTI B	-8.502472	179.195167	3.85±0.73	4.39±0.77
1844	NAURU-B	-0.529417	166.910056	3.83±0.88	4.39±0.64
1858	VIRGINIA KEY, FL	25.73	-80.161667	5.13±0.63	4.73±0.43
351	NEWPORT	41.505	-71.326667	4.75±0.49	3.76±0.41
393	ST. JOHN'S, NFLD.	47.566667	-52.716667	2.99±0.67	3.94±0.3
397	SASSNITZ	54.510833	13.643056	3.4±1.15	4.03±0.96
457	ST. NAZAIRE	47.27	-2.2	2.1±0.6	3.25±0.32
518	KUSHIRO	42.975556	144.371389	5.11±0.37	3.01±0.34
7	CUXHAVEN 2	53.866667	8.716667	3.01±1.53	3.74±0.99
701	KAINAN	34.144167	135.191389	3.61±0.73	3.65±0.52
813	HAKODATE I	41.781667	140.724722	1.54±0.37	3.29±0.31
814	ABURATSU	31.576944	131.409444	3.98±0.62	3.06±0.5
816	WAKAYAMA	34.221667	135.145556	4.47±0.75	2.64±0.54
935	DARWIN	-12.471778	130.845861	4.59±0.79	4.06±0.76