

1 **Supplementary Material for:**

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3 **Ocean mass, sterodynamic effects and vertical land motion largely explain US coast**
4 **relative sea level rise**

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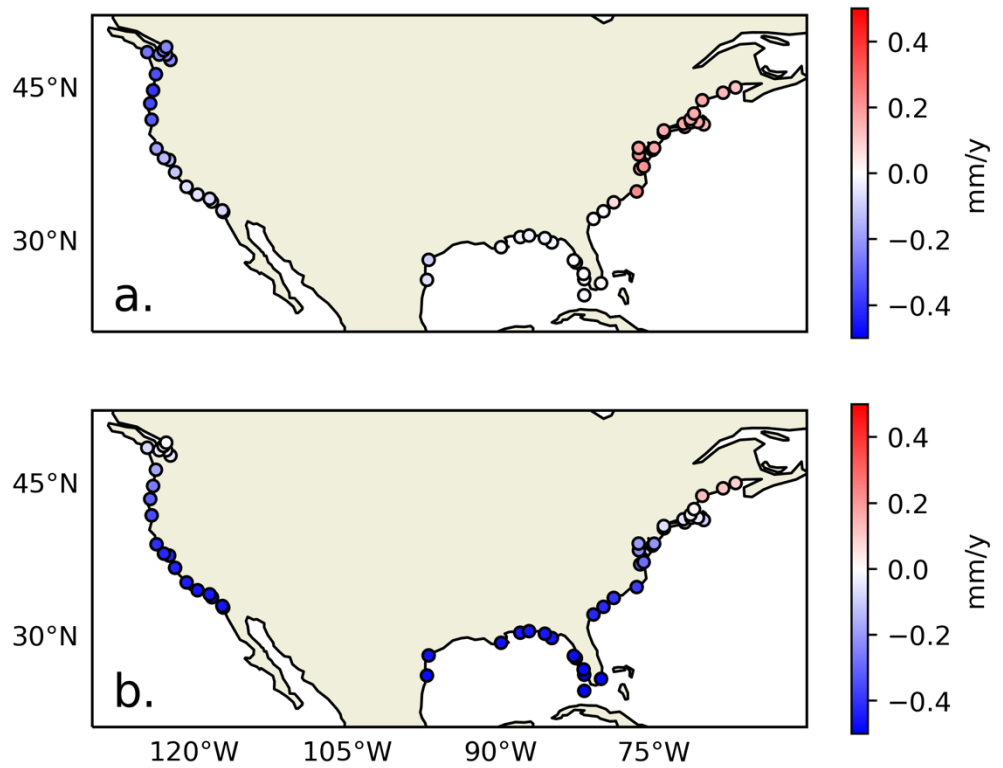
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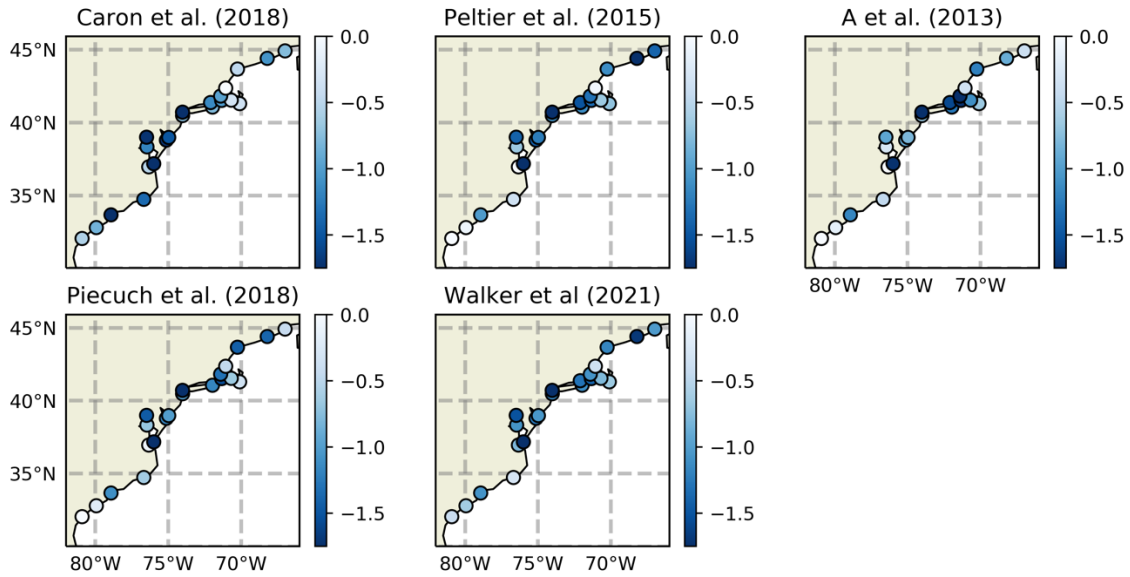
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27 **Figure S1.** (a) Trends associated with the inverted barometer effect from 1993 to 2018 and (b)
28 trends associated with the GIA effect on sea surface height over the same period.
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Figure S2. Comparison of GIA estimates on the residuals along the Atlantic Coast. Mapped RSL budget residuals (mm/y) using five different GIA estimates on the U.S. Atlantic coast. Trend reconstructions used here do not include “other VLM.”

Table S1. List of all tide-gauge and GPS stations used in this study.

Station Name	PSMSL ID	GPS Stations
Northwest		
Sewells Point	299	CHR1-CHR2, DRV5-DRV6, KPVA, LNG1, SPVA, VAB4, VAHP
Kiptopeke Beach	636	CHR1-CHR2, COVX, KPVA, LNG1, LOYW, SPVA, VACC
Solomon's Island	412	CMB1, HNPT, MDCF, MDLT, MDNM, MDSI-SOL1, VAKI, VATA
Lewes	224	CHL1-CHL2, DELS, DEMI, NJCM
Cape May	1153	CHL1-CHL2, DEDT, DELS, NJBN-NJBR, NJCM, OCCC
Annapolis	311	ANP5-ANP6, BAL5, LAYF, USNA
Sandy Hook	366	NJDY, NJNT, NYJM, PLRI, SHK5-SHK6
New York	12	NYBK, NYBP, NYBR, NYPR
Montauk	519	CTGR, CTGU, CTWF, MNP1-MNP2, MOR5-MOR6, NYRH
Nantucket Island	1111	CHT1-CHT2, IMTS, MAF1, MNP1-MNP2, NPRI
New London	429	CTGI, CTGR, CTWF, PMTS, WTFD
Newport	351	IMTS, MAD4, MAF1, MNP1-MNP2, NPRI, URIL
Woods Hole	367	ACU2, ACU5-ACU6, AMTS, IMTS, MAD4, MAF1, MNP1-MNP2, NPRI
Providence	430	CTGI, CTPU, LIN2, MAD4, RIKT, RIRU
Boston	235	FMTS, MABR, MAHV, MAMI, MARR, MAWB, MAWO, MAWN
Portland (Maine)	183	MEEL, MEYA, PTL1
Bar Harbor	525	BARH, BRU5-BRU8, MATU, MEMA, MTGN, TSKT
Eastport	332	DGBY, EPRT, GEO2, MEMA, MTGN
Southeast		
Port Isabel	497	AMBI, ARP7-ARP8, DEV1, DWI1, PROX, TAM1, TXBV, TXKN, TXLN
Rockport	538	ARP7-ARP8, TXPO, TXPV, TXRP, TXS2-TXSI
Grand Isle	526	BVHS, LABR, COCD, LACC, LMCN, DEV1, GRIS, LAGM
Dauphin Island	1156	AL90, ALDI, ALWB, MOB5-MOB6, MSGB
Pensacola	246	ALFO, DSTN, EDDV, FLJO, MOB5-MOB6, PCLA
Panama City	1641	DSTN, FLJO, PNCY, PNMA
Apalachicola	1193	FLCB, FLCK, FLIB, FLJO, MRKB
Clearwater Beach	1638	FLCK, FLD7, FLE1, FLIB, MCD5-MCD6, MRKB
St. Petersburg	520	EKY1-EKY2, FLAI, FLIB, GSPS, MCD5-MCD6, STP3
Ft. Myers	1106	CRLT-PNTA, FLSI, FMYR, LBLI
Naples	1107	CHIN, FLSI, KYW5-KYW6, NAPL
Key West	188	CHIN, CNC0, FLKW, FLSI, KYW5-KYW6, NAPL
Fort Pulaski	395	CRNR, FLFB, GABK, GASA, GASK, GASA, SAVA, SCBT, SVEB, SCJR
Virginia Key	1858	AOML, MIA3-MIA4, SA20, PLC5-PLC6, FLF1-FLF2, FLIU, FLMB, FLPK, NAS0, ZMA1
Charleston I	234	CHA1, CSB1, SCCC, SCFJ, SCHA
Springmaid Pier	1444	KNS5-KNS6, NCSL, NCSO, SCGN, SCHG, SCHY
Beaufort	2295	FMCI, FMC2, NCBE, NCCI, NCNP, NCNT
West		

San Diego	158	AERO-CASD, OBRC, P475, PL01, PL05-PL06
La Jolla	256	CAOS, CBADMDMAR, DSME, LBRF, OBRC, SCIP, SIO3, SPW2, SIO5
Los Angeles	245	CAPE, ELLY, LBC2, LBCH, VTIS
Santa Monica	377	CASM, FCTF-UCLP, PVE3-PVEP, SPK1, VIMT, WRHS
Santa Barbara	2126	ANAI, CASM-UCSB, CRUN1, CSST, P548, PSSB, RCA2
Port San Luis	508	DAPK, DCAN, NIPO, P513, P524, SHP5
Monterey	1352	CAMT, P171, O172, P231
San Francisco	10	CADY, CCSF, MHDL, PBL1-PBL2, UCSF
Point Reyes	1394	RAB, P193, PTRB, T3RP, TRCP
Arena Cove	2125	FARB, P059, P182, P184, P186, P188, P189, PTRB
Crescent City	378	CACC, PTSG, P316, P786
Charleston II	1269	CABL,LFLO,ORFL,ONAB,P061,P364,P365,P732,REED
South Beach	1196	NEWP-P367, ORNW, ORSB, P374, P375
Astoria	265	CATH,P408,FTS5,FTS6,SEAS,TPW2
Seattle	127	ELSR,KTBW,SEAT,SMAI,SSHO,UFDA,V081,V096,V102
Port Townshend	1325	BLYN,CAMI,CHCM,COUP,P437,SEQM,SQIM
Port Angeles	2127	AL2H, ALBH, BCES, PNCL, PTAA, SEQM
Neah Bay	385	BAMF,MKAH,NEAH,PTRF
Friday Harbor	384	BCNS, PGC5, FRID, WAFH, WAFR ,P439, SAC4, SC02
Cherry Point	1633	BCDT,BCTS,LNG2,P439,P440,WAFD

41 **Table S2. Summary of tide gauge information and trend contributions (mm/y) for each tide**
 42 **gauge, as shown in Figs. 4, 6, and 7.**
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ID	Name	Lat	Lon	SD	CMR	GIA	Other VLM	Sum	TG Trend	Residual
Northeast										
299	Sewells Point	36.95	283.67	2.5	1.74	1.88	-0.96	5.16	5.61	0.45
636	Kiptopeke Beach	37.17	284.01	2.52	1.74	1.97	-1.22	5	3.52	-1.49
412	Solomon's Island	38.32	283.55	2.81	1.74	1.78	0.57	6.9	5.14	-1.76
224	Lewes	38.78	284.88	2.73	1.72	1.83	-0.33	5.95	4.55	-1.4
1153	Cape May	38.97	285.04	2.74	1.72	1.91	-0.79	5.59	4.87	-0.72
311	Annapolis	38.98	283.52	2.89	1.72	1.67	0.38	6.66	4.55	-2.11
366	Sandy Hook	40.47	285.99	2.68	1.68	1.24	0.48	6.08	4.85	-1.23
12	New York	40.7	285.99	2.68	1.68	0.89	0.41	5.66	3.27	-2.39
519	Montauk	41.05	288.04	2.62	1.67	0.81	0.34	5.44	4.32	-1.12
1111	Nantucket Island	41.28	289.9	2.63	1.68	1.11	-0.46	4.96	5.06	0.1
429	New London	41.36	287.91	2.57	1.67	0.73	0	4.97	3.82	-1.14
351	Newport	41.5	288.67	2.54	1.67	0.52	0.2	4.93	3.7	-1.23
367	Woods Hole	41.52	289.33	2.53	1.68	0.63	0.85	5.69	4.52	-1.17
430	Providence	41.81	288.6	2.5	1.67	0.52	-0.11	4.59	3.72	-0.87
235	Boston	42.35	288.95	2.45	1.65	0.14	0.24	4.48	4.54	0.06
183	Portland	43.66	289.75	2.46	1.63	-0.52	0.11	3.69	3.11	-0.58
525	Bar Harbor	44.39	291.8	2.5	1.61	0.04	0.4	4.56	3.08	-1.48
332	Eastport	44.9	293.02	2.54	1.61	0.45	-0.07	4.53	3.83	-0.7
Southeast										
497	Port Isabel	26.06	262.79	2.75	1.85	0.46	0.76	5.83	4.98	-0.85
538	Rockport	28.02	262.95	2.79	1.81	0.53	1.74	6.87	8.62	1.75
526	Grand Isle	29.26	270.04	2.89	1.83	1.06	5.65	11.43	8.54	-2.89
1156	Dauphin Island	30.25	271.92	2.83	1.82	1.08	0.36	6.08	5.3	-0.78
246	Pensacola	30.4	272.79	2.8	1.82	1.09	0.26	5.97	5.54	-0.43
1641	Panama City	30.15	274.33	2.73	1.84	1.05	0.28	5.9	5.08	-0.82

1193	Apalachicola	29.73	275.02	2.71	1.84	0.99	-0.14	5.41	4.44	-0.97
1638	Clearwater Beach	27.98	277.17	2.55	1.85	0.75	0.47	5.61	7	1.38
520	St. Petersburg	27.76	277.37	2.52	1.85	0.75	-0.51	4.61	4.84	0.24
1106	Fort Myers	26.65	278.13	2.38	1.87	0.61	0.41	5.27	5.25	-0.02
1107	Naples	26.13	278.19	2.26	1.88	0.57	0.7	5.41	4.56	-0.85
188	Key West	24.56	278.19	1.76	1.88	0.45	0.81	4.91	4.6	-0.31
395	Fort Pulaski	32.03	279.1	2.1	1.82	1.19	-1.13	3.98	4.54	0.56
1858	Virginia Key	25.73	279.84	1.93	1.88	0.45	0.25	4.51	4.8	0.29
234	Charleston	32.78	280.08	2.08	1.81	1.36	-0.31	4.95	4.42	-0.54
1444	Springmaid Pier	33.66	281.08	2.06	1.8	1.52	0.96	6.34	3.4	-2.94
2295	Beaufort	34.72	283.33	2.07	1.79	1.78	0.57	6.21	4.28	-1.94
West										
158	San Diego	32.713	242.827	0.38	1.89	0.59	1.32	4.18	3.85	-0.33
256	La Jolla	32.867	242.743	0.39	1.86	0.59	0.5	3.34	2.48	-0.86
245	Los Angeles	33.72	241.728	0.35	1.88	0.64	-0.86	2.01	1.98	-0.02
377	Santa Monica	34.008	241.5	0.36	1.88	0.66	-1.55	1.35	2.38	1.03
2126	Santa Barbara	34.408	240.315	0.3	1.84	0.72	-0.95	1.9	1.06	-0.85
508	Port San Luis	35.177	239.24	0.22	1.87	0.75	-1.56	1.27	1.8	0.53
1352	Monterey	36.605	238.113	0.12	1.87	0.78	-0.46	2.32	2.19	-0.13
10	San Francisco	37.807	237.535	0.14	1.84	0.82	-0.37	2.43	1.79	-0.64
1394	Point Reyes	37.995	237.023	0.17	1.84	0.87	0.11	2.98	2.47	-0.4
2125	Arena Cove	38.913	236.293	0.23	1.88	0.97	-0.4	2.68	1.59	-1.09
378	Crescent City	41.745	235.818	0.28	1.89	1.17	-3.56	-0.22	-1.55	-1.33
1269	Charleston	43.345	235.678	0.31	1.87	1.24	-1.37	2.05	0.91	-1.13
1196	South Beach	44.625	235.958	0.28	1.85	1.11	-1.24	2	2.22	0.22
265	Astoria	46.207	236.232	0.25	1.8	0.48	-0.75	1.78	0.94	-0.84
127	Seattle	47.602	237.662	0.23	1.7	-0.84	2.13	3.22	2.38	-0.84
1325	Port Townsend	48.112	237.243	0.23	1.7	-1.12	1.99	2.79	2	-0.79
2127	Port Angeles	48.125	236.56	0.21	1.7	-0.99	0.66	1.57	0.48	-1.09
385	Neah Bay	48.367	235.388	0.18	1.72	-0.43	-1.8	-0.34	-1.66	-1.32

384	Friday Harbor	48.547	236.99	0.22	1.7	-1.37	1.39	1.94	2.1	0.16
1633	Cherry Point	48.863	237.243	0.23	1.7	-1.5	1.53	1.96	0.53	-1.44

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