# Dataset S1

## Kopp et al.

Dataset S1a. Proxy sites and original studies used in this analysis

Location	Mean Latitude (∘N)	Mean Longitude (∘E)	Median Age Range (CE)	N	References
Western North Atlantic Ocean					
Connecticut, USA	41.3	-71.9	-1174 to 1981	162	ref. 36, 42, 62, 73, 85–87
Florida, USA	30.6	-81.7	-559 to 1999	65	ref. 61
Greenland	65.7	-51.0	1328 to 1950	44	ref. 68
Louisiana, USA	29.9	-91.8	448 to 1807	23	ref. 55
Massachusetts, USA	42.2	-70.8	-1440 to 1963	39	ref. 5, 44, 45, 75, 83
New Jersey, USA	39.3	-74.6	-476 to 2000	151	ref. 36, 41, 43, 58, 60, 72, 74, 82
North Carolina, USA	35.6	-75.9	-1694 to 2000	180	ref. 5, 36, 57, 79
Nova Scotia, Canada	44.7	-63.3	-836 to 1996	78	ref. 47, 77
Eastern North Atlantic Ocean					·
Brittany, France	48.3	-4.3	-872 to 1467	7	ref. 80
Denmark	55.6	-8.3	-808 to 1881	22	ref. 48, 84
Iceland	64.8	-22.4	-141 to 2002	93	ref. 49, 76
Isle of Wight, UK	50.7	-1.4	-517 to 2011	26	ref. 66, 67, 69
Scotland, UK	58.4	-4.8	-198 to 2009	108	ref. 34, 38, 78
South West England, UK	50.3	-3.9	-482 to 1448	11	ref. 51, 53
Spain	43.4	-2.9	-1075 to 2003	52	ref. 46, 63–65
South Atlantic Ocean					
Rio de Janeiro, Brazil	-23.0	-43.5	-1302 to 1388	16	ref. 40, 59, 71
Santa Catarina, Brazil	-28.5	-48.8	-688 to 1834	20	ref. 33
South Africa	-33.7	26.7	-1197 to 2010	41	ref. 35, 37, 39, 70, 81
Mediterranean Sea					
Israel	32.5	34.9	-10 to 1132	65	ref. 7
Pacific Ocean					
Christmas Island, Kiribati	2.0	-157.5	-1050 to 1860	72	ref. 8, 89
Cook Islands	-20.2	-159.8	363 to 1900	12	ref. 56
New Zealand	-46.5	169.7	-299 to 1991	15	ref. 50, 54
Tasmania, Australia	-42.3	147.9	1820 to 2004	28	ref. 52
Indian Ocean					
Seychelles	-4.7	55.5	-646 to 1442	10	ref. 88

Mean latitude, mean longitude and the range of median data point age estimates are shown for the N individual data points from each

Dataset S1b. Tide gauges used in this analysis

MISTERDAM   1237   130   130   120   130	Nama	Latituda (aN)	Langitude (0E)	-	Last Voor	DCMCI ID
KRONSTADT 59.98 29.77 1777 1993 — STOCKHOLM 59.32 18.08 1774 2000 — BREST 48.38 14.49 1807 2013 2013 1 2 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2	Name AMSTERDAM	Latitude (°N) 52.37	Longitude (∘E) 4 90	First Year 1700	Last Year 1925	PSMSL ID
BREST	KRONSTADT	59.98	29.77	1777	1993	_
SWINDUISCIE 53.92 14.23 1811 1999 2 SHEERNESS 51.45 0.74 1833 2006 3 SHEERNESS 51.45 0.74 1833 2006 3 SUSTAINABLE STATES 51.45 0.74 1833 2006 3 SUSTAINABLE STATES 51.45 0.74 1833 2006 3 SUSTAINABLE STATES 51.45 0.74 1835 2013 8 SAN FRANCISCO 37.81 1.22.47 1855 2013 10 SAN FRANCISCO 37.81 1.22.47 1855 2013 12 LIVERPOOL 51.40 -3.00 1858 1953 15 VIESTAINABLE STATE	STOCKHOLM	59.32	18.08	1774		_
SHEERNESS 51.45 0.74 1833 2006 3 CUXHAVEN 2 53.87 8.72 1843 2010 7 WISMAR 2 53.90 11.46 1849 2012 8 MASSLUGSCO 31.90 11.46 1849 2012 8 MASSLUGISCO 31.90 12.247 WARNEMUNDE 2 54.17 12.210 1856 2013 10 WARNEMUNDE 2 54.17 12.210 1856 2013 12 LIVERPOOL 53.40 -3.00 1858 1963 15 LIVERPOOL 53.40 -3.00 1858 1963 15 LIVERPOOL 53.40 -3.00 1858 1963 15 LIVERPOOL 54.4 3.60 1862 2013 20 ABERDEEN IN 57.15 -2.08 1862 2013 20 ABERDEEN HOLLAND 51.96 4.12 1866 2013 22 LIVERPOOL 53.40 -3.00 1858 1963 15 LIVERPOOL 54.4 3.60 1862 2013 22 LIVERPOOL 55.40 51.94 1865 2013 22 LIVERPOOL 55.40 51.94 1865 2013 22 SHEMEN 55.95 51.95 5	SWINOLISCIE	48.38 53.02	-4.49 1 <i>1</i> 23	180 <i>1</i> 1811		
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STAWANGER   58.97   5.73   1919   2012   47	HARLINGEN	53.18	5.41	1865	2013	25
BERGEN         60.40         5.32         1916         2012         58           NORTH SHIELDS         55.01         -1.44         1896         2013         95           FERNANDINA BEACH         30.67         -81.47         1898         2013         112           TROIS-RIVIERES         46.33         -72.55         1925         2013         126           PHILADEL PHIA         39.93         -75.14         1901         2013         136           DUNEDIN II         -45.88         170.51         1900         2013         136           BALTIMORE         39.27         -76.58         1903         2013         148           GAIVESTON II         29.31         -94.79         1909         2013         161           ATLANTIC CITY         39.95         -74.42         1912         2013         180           PORTLAND         43.66         -70.25         1912         2013         183           NEWYN         50.10         -55.44         1916         2013         202           CHARLESTON I         32.78         -79.92         1922         2013         234           BOSTON         42.35         -71.05         1921         2013		52.40 58 97	4.55 5.73	1072		32 47
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FERNANDINA BEACH TROIS RIVIERES 46.33 -72.55 1925 2013 126 PHILADELPHIA 39.93 -75.14 1901 2013 135 DUNEDIN II 45.88 170.51 1900 2013 136 BALTIMORE 39.27 -76.58 1903 2013 148 GALVESTON II 29.31 39.35 -74.47 1909 2013 161 ATLANTIC CITY 39.35 -74.42 1912 2013 180 PORTLAND 43.66 -70.25 1912 2013 183 NEWLYN 50.10 55.54 1916 2013 202 CHARLESTON I 32.78 -79.92 1922 2013 224 CHARLESTON I 42.35 -71.05 1921 2013 235 WEST-TERSCHELLING 53.36 5.22 1921 2013 235 WEST-TERSCHELLING 53.36 5.22 1921 2013 236 PENSACOLA 30.40 -87.21 1924 2011 246 PORT SAID 55.84 1929 2013 235 WEST-TERSCHELLING 53.36 5.22 1921 2013 236 PENSACOLA 30.40 -87.21 1924 2011 246 PORT SAID 55.84 1929 2013 235 WEST-TORSCHELLING 53.36 5.22 1921 2013 236 PENSACOLA 30.40 -87.21 1924 2011 246 PORT SAID 31.25 32.30 1923 1946 253 SEWELLS POINT 36.95 -76.33 1928 2013 299 ANNAPOLIS 38.98 -76.48 1929 2013 311 PORTSMOUTH 50.80 -1.11 1962 2012 350 NEWPORT 41.51 -71.33 1931 2013 356 NEWOODS HOLE 41.52 -70.67 1933 2013 366 WOODS HOLE 41.52 -70.67 1933 2013 366 WOODS HOLE 41.52 -70.67 1933 2013 396 NEW LONDON 41.36 -72.09 1939 2013 395 NULMINGTON 34.23 -77.95 1936 2013 395 NULMINGTON 42.9 EUGENE EISLAND 1944 2010 469 SANTANDERI 43.46 -3.79 1944 2010 409  SANTANDERI 43.46 -3.79 1944 2010 409  SANTANDERI 43.46 -3.79 1940 1974 440 1974 440 1974 440 1974 440 1974 440 1974 440 1974 1995 2013 1936 201	NORTH SHIELDS	55.01	-1.44	1896		95
TROIS-RIVIERES 46.33 -72.55 1925 2013 126 PHILADELPHIA 39.93 -75.14 1901 2013 135 DUNEDIN II -45.88 170.51 1900 2013 136 BALTIMORE 39.27 -76.58 1903 2013 148 GALVESTON II 29.31 -94.79 1909 2013 161 ATLANTIC CITY 39.35 -74.42 1912 2013 180 PORTLAND 43.66 -70.25 1912 2013 183 PORTLAND 43.66 -70.25 1912 2013 183 PORTLAND 43.66 -70.25 1912 2013 234 PORTLAND 43.66 19.25 19.22 2013 236 PORTLAND 43.66 19.25 19.22 2013 235 PORTLAND 43.66 19.25 19.22 2013 236 PORTLAND 43.66 19.25 19.25 23.30 19.23 19.46 25.3 PORTLAND 43.66 19.25 23.30 19.23 19.46 25.3 PORTLAND 43.66 19.25 23.30 19.23 19.46 25.3 PORTLAND 43.65 19.25 23.30 19.23 19.46 25.3 PORTLAND 43.65 19.25 20.30 19.23 19.46 25.3 PORTLAND 43.55 20.13 31.1 PORTLAND 43.55 20.13 3.55 PORTLAND 43.55 20.1	HALIFAX			1896		
PHILADELPHIA   39.93   -75.14   1901   2013   135   DUNEDIN   II   45.88   170.51   1900   2013   136   BALTIMORE   39.27   -76.58   1903   2013   148   GALVESTON   II   29.31   -94.79   1909   2013   161   ATLANTIC CITY   39.35   -74.42   1912   2013   180   PORTLAND   43.66   -70.25   1912   2013   183   NEWLYN   50.10   -5.54   1916   2013   202   204		30.07 46 33	-81.47 -72.55	1090 1025		
DUNEDIN II         -45.88         170.51         1900         2013         136           BALTIMORE         39.27         -76.58         1903         2013         148           GALVESTON II         29.31         -94.79         1909         2013         161           ATLANTIC CITY         39.35         -74.42         1912         2013         180           PORTLAND         43.66         -70.25         1912         2013         183           NEWLYN         50.10         -5.54         1916         2013         232           CHARLESTON I         32.78         -79.92         1922         2013         234           BOSTON         42.35         -71.05         1921         2013         235           WEST-TERSCHELLING         53.36         5.22         1921         2013         236           PORT SAID         31.25         32.30         1923         1946         253           SEWELLS POINT         36.95         -76.33         1928         2013         299           ANNAPOLIS         38.89         -76.48         1929         2013         311           PORTSMOUTH         50.80         -1.11         1962         2012		39.93	-75.14	1901		135
GALVESTON II 29.31 -94.79 1909 2013 161 ATLANTIC CITY 39.35 -74.42 1912 2013 183 NEWLYN 50.10 -5.54 1916 2013 202 CHARLESTON I 32.78 -79.92 1922 2013 224 BOSTON 42.35 -71.05 1921 2013 225 WEST-TERSCHELLING 53.36 5.22 1921 2013 235 WEST-TERSCHELLING 53.36 5.22 1921 2013 236 PENSACOLA 30.40 -87.21 1924 2011 246 PORT SAID 31.25 32.30 1923 1946 253 SEWELLS POINT 36.95 -76.33 1928 2013 299 ANNAPOLIS 38.98 -76.48 1929 2013 311 PORTSMOUTH 50.80 -1.11 1962 2012 350 NEWPORT 41.51 -71.33 1931 2013 351 WASHINGTON DC 38.87 -77.02 1931 2013 360 SANDY HOOK 40.47 -74.01 1933 2013 360 SANDY HOOK 40.47 -74.01 1933 2013 366 WOODS HOLE 41.52 -70.67 1933 2013 366 WOODS HOLE 41.52 -70.67 1933 2013 367 FORT PULASKI 32.03 -80.90 1935 2013 395 WILMINGTON 34.23 -77.95 1936 2013 395 WILMINGTON 41.36 -72.09 1939 2013 429 EUGENE ISLAND 29.37 -91.39 1940 1974 440 ST JEAN DE LUZ 43.40 -1.68 1943 2010 469 SANTANDER I 43.46 -3.79 1944 2010 469 SANTANDER I 43.46 -3.79 1944 2012 485 REYLJAVIK 64.15 -21.94 1957 2013 638 CANANEIA -25.02 -47.93 1955 2001 920 SIMONS BAY -34.19 18.44 1958 2013 982 ILHA FISCAL -22.90 -43.17 1965 2013 1032 BRIDGEPORT 57.90 1965 2013 1153 BRIDGEPORT 41.17 1.966 2013 1153 BRIDGEPORT 41.17 1.966 2013 1153 BRIDGEPORT 41.17 1.966 1966 2013 1153 BRIDGEPORT 41.17 1.966 20	DUNEDIN II	-45.88	170.51	1900		136
ATLANTIC CITY 39.35 PORTLAND 43.66 -70.25 1912 2013 180 PORTLAND PORTLAND 50.10 -5.54 1916 2013 202 CHARLESTON I 32.78 -79.92 1922 2013 224 BOSTON 42.35 -71.05 1921 2013 2235 WEST-TERSCHELLING 53.36 5.22 1921 2013 236 PENSACOLA 30.40 -87.21 1924 2011 246 PORT SAID SEWELLS POINT 36.95 -76.33 1928 2013 299 ANNAPOLIS 38.98 -76.48 1929 2013 311 PORTSMOUTH 50.80 -1.11 1962 2012 350 NEWPORT 41.51 -71.33 1931 2013 351 WASHINGTON DC 38.87 -77.02 1931 2013 350 SANDY HOOK 40.47 -74.01 1933 2013 366 WOODS HOLE 41.52 -70.67 -74.01 1933 2013 367 FORT PULASKI 32.03 -80.90 1935 2013 396 NEW LONDON 41.36 -77.95 1936 2013 396 NEW LONDON 41.36 -77.99 1939 2013 396 NEW LONDON 41.36 -77.99 1939 1940 1974 440 SATJANDER I 43.46 -3.79 1944 2012 485 REYKLANUK 64.15 -21.94		39.27				148
PORTLAND  43.66  -70.25  1912  2013  183  NEWLYN  50.10  -5.54  1916  2013  202  CHARLESTON I  32.78  -79.92  1922  2013  234  BOSTON  42.35  -71.05  1921  2013  235  WEST-TERSCHELLING  53.36  5.22  1921  2013  235  WEST-TERSCHELLING  53.36  5.22  1921  2013  236  PENSACOLA  30.40  -87.21  1924  2011  246  PORT SAID  31.25  32.30  1923  1946  253  SEWELLS POINT  36.95  -76.33  1928  2013  299  ANNAPOLIS  38.98  -76.48  1929  2013  311  PORTSMOUTH  50.80  -1.11  1962  2012  350  NEWPORT  41.51  -71.33  1931  2013  351  NEWPORT  41.51  -71.33  1931  2013  350  NEWPORT  41.51  -71.33  1931  2013  366  WOODS HOLE  41.52  -70.67  1933  2013  367  FORT PULASKI  32.03  -80.90  1935  2013  396  NEW LONDON  41.36  -72.09  1939  2013  396  NEW LONDON  41.36  -72.09  1939  2013  409  EUGENE ISLAND  29.37  -91.39  1944  2012  485  REYKJAWIK  64.15  -21.94  1957  2013  388  CANANEIA  -25.02  -47.93  1955  2013  1968  MALINI HEAD  55.37  -4.19  1966  2013  109  109  109  109  109  109  109		29.31 30.35		1909 1912		
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BOSTON         42.35         -71.05         1921         2013         235           WEST-TERSCHELLING         53.36         5.22         1921         2013         236           PENSACOLA         30.40         -87.21         1924         2011         246           PORT SAID         31.25         32.30         1923         1946         253           SEWELLS POINT         36.95         -76.33         1928         2013         311           PORTSMOUTH         50.80         -1.11         1962         2012         350           NEWPORT         41.51         -71.33         1931         2013         351           WASHINGTON DC         38.87         -77.02         1931         2013         366           WOODS HOLE         41.52         -70.67         1933         2013         366           WOODS HOLE         41.52         -70.67         1933         2013         395           WILMINGTON         34.23         -77.95         1936         2013         395           WILMINGTON         34.23         -77.95         1936         2013         396           NEW LONDON         41.36         -72.09         1939         2013		50.10		1916	2013	202
WEST-TERSCHELLING         53.36         5.22         1921         2013         236           PENSACOLA         30.40         -87.21         1924         2011         246           PORT SAID         31.25         32.30         1923         1946         253           SEWELLS POINT         36.95         -76.33         1928         2013         299           ANNAPOLIS         38.98         -76.48         1929         2013         311           PORTSMOUTH         50.80         -1.11         1962         2012         350           NEWPORT         41.51         -71.33         1931         2013         351           WASHINGTON DC         38.87         -77.02         1931         2013         360           SANDY HOOK         40.47         -74.01         1933         2013         366           WOODS HOLE         41.52         -70.67         1933         2013         366           WOLMINGTON         34.23         -77.95         1936         2013         395           WILMINGTON         34.23         -77.95         1936         2013         396           NEW LONDON         41.36         -72.09         1939         2013		32.78		1922		
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PORT SAID  31.25  SEWELLS POINT  36.95  -76.33  1928  2013  299  ANNAPOLIS  38.98  -76.48  1929  2013  311  PORTSMOUTH  50.80  -1.11  1962  2012  350  NEWPORT  41.51  -71.33  1931  2013  351  WASHINGTON DC  38.87  -77.02  1931  2013  360  SANDY HOOK  40.47  -74.01  1933  2013  366  WOODS HOLE  41.52  -70.67  1933  2013  367  FORT PULASKI  32.03  -80.90  1935  2013  395  NEW LONDON  41.36  -72.09  1939  2013  396  NEW LONDON  41.36  -72.09  1939  2013  429  EUGENE ISLAND  29.37  -91.39  1940  1974  440  SANTANDER I  43.46  -3.79  1944  2012  485  REYKJAVIK  64.15  -21.94  -21.94  PORT ELIZABETH  -33.95  203  820  MALIN HEAD  55.37  -7.33  1959  2001  916  KNYSNA  -34.05  22.90  43.17  1965  2013  1965  2013  982  ILHA FISCAL  -22.90  43.17  -41.91  1965  2013  1966  2013  982  ILHA FISCAL  -22.90  -43.17  1965  2013  1966  2013  1966  2013  982  ILHA FISCAL  -22.90  -43.17  1965  2013  1966  2013  1966  2013  1966  2013  1966  2013  1966  2013  982  ILHA FISCAL  -22.90  -43.17  -73.18  1965  2013  1032  BRIDGEPORT  41.17  -73.18  1965  2013  1153  SPRING BAY  -42.55  147.93  1992  2013  1453  CHRISTMAS ISLAND II  1,98  -157.48  1974  2001  1453	PENSACOLA	30.40	-87.21	1924		246
ANNAPOLIS ANNAPOLIS ANNAPOLIS PORTSMOUTH 50.80 1.11 1962 2012 350 NEWPORT 41.51 -71.33 1931 2013 351 WASHINGTON DC 38.87 -77.02 1931 2013 350 SANDY HOOK 40.47 -74.01 1933 2013 366 WOODS HOLE 41.52 -70.67 1933 2013 367 FORT PULASKI 32.03 -80.90 1935 2013 395 WILMINGTON 34.23 -77.95 1936 2013 395 NEW LONDON 41.36 -72.09 1939 2013 429 EUGENE ISLAND 29.37 -91.39 1940 5T JEAN DE LUZ 43.40 -1.68 1943 2010 469 SANTANDER I 43.46 -3.79 1944 2012 485 REYKJAVIK 64.15 -21.94 CANANEIA -25.02 -47.93 1955 2004 726 PORT ELIZABETH -33.95 25.63 1980 2010 820 SIMONS BAY -34.19 18.44 1958 2013 950 MALIN HEAD 55.37 -7.33 1959 2001 916 KNYSNA -34.05 23.05 1961 2013 982 ILHA FISCAL -22.90 -43.17 1965 2013 1032 BRIDGEPORT 41.17 -73.18 1965 2013 1153 SPRING BAY -42.55 147.93 1992 2013 1153 SPRING BAY -21.20 -159.77 1978 2001 1371 1453		31.25		1923		
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NEWPORT 41.51 -71.33 1931 2013 351 WASHINGTON DC 38.87 -77.02 1931 2013 360 SANDY HOOK 40.47 -74.01 1933 2013 366 WOODS HOLE 41.52 -70.67 1933 2013 367 FORT PULASKI 32.03 -80.90 1935 2013 395 WILMINGTON 34.23 -77.95 1936 2013 395 NEW LONDON 41.36 -72.09 1939 2013 429 EUGENE ISLAND 29.37 -91.39 1940 1974 440 ST JEAN DE LUZ 43.40 -1.68 1943 2010 469 SANTANDER I 43.46 -3.79 1944 2012 485 REYKJAVIK 64.15 -21.94 1957 2013 638 CANANEIA -25.02 -47.93 1955 2004 72.6 PORT ELIZABETH -33.95 25.63 1980 2010 820 SIMONS BAY -34.19 18.44 1958 2013 82.6 MALIN HEAD 55.37 -7.33 1959 2001 91.6 KNYSNA -34.05 23.05 1961 2013 982 ILHA FISCAL -22.90 -43.17 1965 2013 982 ILHA FISCAL -22.90 -43.17 1965 2013 1032 BRIDGEPORT 41.17 -73.18 1965 2013 1032 CAPE MAY 38.97 -74.96 1966 2013 1153 SPRING BAY -42.55 147.93 1992 2013 1216 CHRISTMAS ISLAND II 1.98 -157.48 1974 2010 1371 CAPARNEI L98	PORTSMOUTH	50.80			2013	
SANDY HOOK       40.47       -74.01       1933       2013       366         WOODS HOLE       41.52       -70.67       1933       2013       367         FORT PULASKI       32.03       -80.90       1935       2013       395         WILMINGTON       34.23       -77.95       1936       2013       396         NEW LONDON       41.36       -72.09       1939       2013       429         EUGENE ISLAND       29.37       -91.39       1940       1974       440         ST JEAN DE LUZ       43.40       -1.68       1943       2010       469         SANTANDER I       43.46       -3.79       1944       2012       485         REYKJAWIK       64.15       -21.94       1957       2013       638         CANANEIA       -25.02       -47.93       1957       2013       638         CANANEIA       -33.95       25.63       1980       2010       820         SIMONS BAY       -34.19       18.44       1958       2013       826         MALIN HEAD       55.37       -7.33       1959       2001       916         KNYSNA       -34.05       23.05       1961       2013	NEWPORT	41.51	-71.33	1931	2013	351
WOODS HOLE         41.52         -70.67         1933         2013         367           FORT PULASKI         32.03         -80.90         1935         2013         395           WILMINGTON         34.23         -77.95         1936         2013         396           NEW LONDON         41.36         -72.09         1939         2013         429           EUGENE ISLAND         29.37         -91.39         1940         1974         440           ST JEAN DE LUZ         43.40         -1.68         1943         2010         469           SANTANDER I         43.46         -3.79         1944         2012         485           REYKJAVIK         64.15         -21.94         1957         2013         638           CANANEIA         -25.02         -47.93         1955         2004         726           PORT ELIZABETH         -33.95         25.63         1980         2010         820           SIMONS BAY         -34.19         18.44         1958         2013         826           MALIN HEAD         55.37         -7.33         1959         2001         916           KNYSNA         -34.05         23.05         1961         2013				1931		360
FORT PULASKI 32.03 -80.90 1935 2013 395 WILMINGTON 34.23 -77.95 1936 2013 396 NEW LONDON 41.36 -72.09 1939 2013 429 EUGENE ISLAND 29.37 -91.39 1940 1974 440 ST JEAN DE LUZ 43.40 -1.68 1943 2010 469 SANTANDER I 43.46 -3.79 1944 2012 485 REYKJAVIK 64.15 -21.94 1957 2013 638 CANANEIA -25.02 -47.93 1955 2004 726 PORT ELIZABETH -33.95 25.63 1980 2010 820 SIMONS BAY -34.19 18.44 1958 2013 826 MALIN HEAD 55.37 -7.33 1959 2001 916 KNYSNA -34.05 23.05 1961 2013 982 ILHA FISCAL -22.90 -43.17 1965 2013 1032 BRIDGEPORT 41.17 -73.18 1965 2013 1032 BRIDGEPORT 41.17 -73.18 1965 2013 1068 WICK 58.44 -3.09 1965 2012 1109 ULLAPOOL 57.90 -5.16 1983 2013 1112 CAPE MAY 38.97 -74.96 1966 2013 1153 SPRING BAY -42.55 147.93 1992 2013 1216 CHRISTMAS ISLAND II 1.98 -157.48 1974 2010 1371 RAROTONGA -21.20 -159.77 1978 2001 1453						
WILMINGTON       34.23       -77.95       1936       2013       396         NEW LONDON       41.36       -72.09       1939       2013       429         EUGENE ISLAND       29.37       -91.39       1940       1974       440         ST JEAN DE LUZ       43.40       -1.68       1943       2010       469         SANTANDER I       43.46       -3.79       1944       2012       485         REYKJAVIK       64.15       -21.94       1957       2013       638         CANANEIA       -25.02       -47.93       1955       2004       726         PORT ELIZABETH       -33.95       25.63       1980       2010       820         SIMONS BAY       -34.19       18.44       1958       2013       826         MALIN HEAD       55.37       -7.33       1959       2001       916         KNYSNA       -34.05       23.05       1961       2013       982         ILHA FISCAL       -22.90       -43.17       1962       2013       1032         BRIDGEPORT       41.17       -73.18       1965       2013       1068         WICK       58.44       -3.09       1965       2012	FORT PULASKI	32.03				
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ST JEAN DE LUZ       43.40       -1.68       1943       2010       469         SANTANDER I       43.46       -3.79       1944       2012       485         REYKJAVIK       64.15       -21.94       1957       2013       638         CANANEIA       -25.02       -47.93       1955       2004       726         PORT ELIZABETH       -33.95       25.63       1980       2010       820         SIMONS BAY       -34.19       18.44       1958       2013       826         MALIN HEAD       55.37       -7.33       1959       2001       916         KNYSNA       -34.05       23.05       1961       2013       950         DEVONPORT       50.37       -4.19       1962       2013       982         ILHA FISCAL       -22.90       -43.17       1965       2013       1032         BRIDGEPORT       41.17       -73.18       1965       2013       1068         WICK       58.44       -3.09       1965       2012       1109         ULLAPOOL       57.90       -5.16       1983       2013       1112         CAPE MAY       38.97       -74.96       1966       2013       115	NEW LONDON		-72.09 01.30	1939		429
SANTANDER I       43.46       -3.79       1944       2012       485         REYKJAVIK       64.15       -21.94       1957       2013       638         CANANEIA       -25.02       -47.93       1955       2004       726         PORT ELIZABETH       -33.95       25.63       1980       2010       820         SIMONS BAY       -34.19       18.44       1958       2013       826         MALIN HEAD       55.37       -7.33       1959       2001       916         KNYSNA       -34.05       23.05       1961       2013       950         DEVONPORT       50.37       -4.19       1962       2013       982         ILHA FISCAL       -22.90       -43.17       1965       2013       1032         BRIDGEPORT       41.17       -73.18       1965       2013       1068         WICK       58.44       -3.09       1965       2012       1109         ULLAPOOL       57.90       -5.16       1983       2013       1112         CAPE MAY       38.97       -74.96       1966       2013       1153         SPRING BAY       -42.55       147.93       1992       2013       1216						
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PORT ELIZABETH -33.95	REYKJAVIK					
SIMONS BAY       -34.19       18.44       1958       2013       826         MALIN HEAD       55.37       -7.33       1959       2001       916         KNYSNA       -34.05       23.05       1961       2013       950         DEVONPORT       50.37       -4.19       1962       2013       982         ILHA FISCAL       -22.90       -43.17       1965       2013       1032         BRIDGEPORT       41.17       -73.18       1965       2013       1068         WICK       58.44       -3.09       1965       2012       1109         ULLAPOOL       57.90       -5.16       1983       2013       1112         CAPE MAY       38.97       -74.96       1966       2013       1153         SPRING BAY       -42.55       147.93       1992       2013       1216         CHRISTMAS ISLAND II       1.98       -157.48       1974       2010       1371         RAROTONGA       -21.20       -159.77       1978       2001       1453	CANANEIA	-25.02		1955	2004	726
MALIN HEAD       55.37       -7.33       1959       2001       916         KNYSNA       -34.05       23.05       1961       2013       950         DEVONPORT       50.37       -4.19       1962       2013       982         ILHA FISCAL       -22.90       -43.17       1965       2013       1032         BRIDGEPORT       41.17       -73.18       1965       2013       1068         WICK       58.44       -3.09       1965       2012       1109         ULLAPOOL       57.90       -5.16       1983       2013       1112         CAPE MAY       38.97       -74.96       1966       2013       1153         SPRING BAY       -42.55       147.93       1992       2013       1216         CHRISTMAS ISLAND II       1.98       -157.48       1974       2010       1371         RAROTONGA       -21.20       -159.77       1978       2001       1453	SIMONS RAY	-33.93 -34 10				020 826
KNYSNA     -34.05     23.05     1961     2013     950       DEVONPORT     50.37     -4.19     1962     2013     982       ILHA FISCAL     -22.90     -43.17     1965     2013     1032       BRIDGEPORT     41.17     -73.18     1965     2013     1068       WICK     58.44     -3.09     1965     2012     1109       ULLAPOOL     57.90     -5.16     1983     2013     1112       CAPE MAY     38.97     -74.96     1966     2013     1153       SPRING BAY     -42.55     147.93     1992     2013     1216       CHRISTMAS ISLAND II     1.98     -157.48     1974     2010     1371       RAROTONGA     -21.20     -159.77     1978     2001     1453	MALIN HEAD	55.37	-7.33	1959	2001	916
ILHA FISCAL     -22.90     -43.17     1965     2013     1032       BRIDGEPORT     41.17     -73.18     1965     2013     1068       WICK     58.44     -3.09     1965     2012     1109       ULLAPOOL     57.90     -5.16     1983     2013     1112       CAPE MAY     38.97     -74.96     1966     2013     1153       SPRING BAY     -42.55     147.93     1992     2013     1216       CHRISTMAS ISLAND II     1.98     -157.48     1974     2010     1371       RAROTONGA     -21.20     -159.77     1978     2001     1453			23.05	1961	2013	
BRIDGEPORT     41.17     -73.18     1965     2013     1068       WICK     58.44     -3.09     1965     2012     1109       ULLAPOOL     57.90     -5.16     1983     2013     1112       CAPE MAY     38.97     -74.96     1966     2013     1153       SPRING BAY     -42.55     147.93     1992     2013     1216       CHRISTMAS ISLAND II     1.98     -157.48     1974     2010     1371       RAROTONGA     -21.20     -159.77     1978     2001     1453						
WICK     58.44     -3.09     1965     2012     1109       ULLAPOOL     57.90     -5.16     1983     2013     1112       CAPE MAY     38.97     -74.96     1966     2013     1153       SPRING BAY     -42.55     147.93     1992     2013     1216       CHRISTMAS ISLAND II     1.98     -157.48     1974     2010     1371       RAROTONGA     -21.20     -159.77     1978     2001     1453				1965		
ULLAPOOL     57.90     -5.16     1983     2013     1112       CAPE MAY     38.97     -74.96     1966     2013     1153       SPRING BAY     -42.55     147.93     1992     2013     1216       CHRISTMAS ISLAND II     1.98     -157.48     1974     2010     1371       RAROTONGA     -21.20     -159.77     1978     2001     1453	WICK	58.44	-3.09	1965		1109
SPRING BAY     -42.55     147.93     1992     2013     1216       CHRISTMAS ISLAND II     1.98     -157.48     1974     2010     1371       RAROTONGA     -21.20     -159.77     1978     2001     1453		57.90	-5.16	1983	2013	
CHRISTMAS ISLAND II 1.98 -157.48 1974 2010 1371 RAROTONGA -21.20 -159.77 1978 2001 1453				1966		1153
RAROTONGA -21.20 -159.77 1978 2001 1453				1992		1371
	RAROTONGA	-21.20	-159.77	1978	2001	1453
	DUCK PIER OUTSIDE		-75.75	1985	2013	1636

#### Dataset S1c. Hyperparameters under different modeling assumptions

Model	log likelihood	$\sigma_g$	$ au_{q}$	$\sigma_l$	$\lambda_l$	$\sigma_m$	$ au_m$	$\lambda_m$	$\sigma_w$	$\sigma_0$	$\sigma_{g0}$	
		(mm)	(yr)	(mm/yr)	(°)	(mm)	(yr)	(°)	(mm)	(mm)	(mm)	
$\overline{ML_{2,1}}$	-12260	57.3	100.0	1.1	5.5	50.9		6.4	20.9	18.1	121.1	-
$ML_{2,2}$	-12257	772.3	2004.9	0.9	2.7	57.0	100.0	9.0	20.9	16.6	0.2	
$ML_{1,1}$	-12266	53.7	100.0	1.1	5.7			7.0	20.8	18.2	118.5	
NC	-12255	396.9	692.3	0.9	1.9	57.7	100.0	7.4	20.8	0.4	235.9	
Gr	-12259	165.8	311.7	1.1	4.9	53.1	100.0	7.1	21.0	18.1	121.2	

#### Dataset S1d. Prior estimates of rates of GSL change under different modeling assumptions (mm/yr)

	$ML_{2,1}$	$ML_{2,2}$	$ML_{1,1}$	NC	Gr
0-300	$0.00 \pm 0.48$	$0.00 \pm 1.03$	$0.00 \pm 0.45$	$0.00 \pm 1.50$	$0.00 \pm 1.04$
300-700	$0.00 \pm 0.40$	$0.00 \pm 0.75$	$0.00 \pm 0.38$	$0.00 \pm 1.24$	$0.00 \pm 0.91$
700-1000	$0.00 \pm 0.53$	$0.00 \pm 0.70$	$0.00 \pm 0.50$	$0.00 \pm 1.37$	$0.00 \pm 1.09$
1000-1400	$0.00 \pm 0.40$	$0.00 \pm 0.75$	$0.00 \pm 0.38$	$0.00 \pm 1.24$	$0.00 \pm 0.91$
1400-1800	$0.00 \pm 0.38$	$0.00 \pm 1.03$	$0.00 \pm 0.36$	$0.00 \pm 1.41$	$0.00 \pm 0.92$
1800-1900	$0.00 \pm 1.11$	$0.00 \pm 1.26$	$0.00 \pm 1.04$	$0.00 \pm 1.81$	$0.00 \pm 1.48$
1860-1900	$0.00 \pm 1.56$	$0.00 \pm 1.29$	$0.00 \pm 1.46$	$0.00 \pm 1.89$	$0.00 \pm 1.65$
1900-2000	$0.00 \pm 1.16$	$0.00 \pm 1.28$	$0.00 \pm 1.08$	$0.00 \pm 1.78$	$0.00 \pm 1.47$
Amplitude (cm)	±10 (8-15)	$\pm 17 (8-37)$	±11 (8–14)	$\pm 27 (14-48)$	$\pm 20 (12-33)$

 $Errors \ are \ \pm 2\sigma. \ Amplitude \ row \ indicates \ the \ median \ (5th-95th \ percentile) \ prior \ estimate \ of \ the \ amplitude \ of \ variability \ over \ 0-1900 \ CE.$ 

#### Dataset S1e. Posterior estimates of rates of GSL change under different modeling assumptions (mm/yr)

	$ML_{2,1}$	$ML_{2,2}$	$ML_{1,1}$	NC	Gr
0-300	$0.13 \pm 0.25 \text{ (0.87)}$	$0.18 \pm 0.21 \ (0.96)$	$0.14 \pm 0.25 \ (0.88)$	$0.17 \pm 0.26 \ (0.91)$	$0.17 \pm 0.25 \ (0.92)$
300-700	$0.08 \pm 0.20 \ (0.79)$	$0.04 \pm 0.18 \ (0.68)$	$0.07 \pm 0.20 \ (0.78)$	$0.05 \pm 0.21 \ (0.68)$	$0.06 \pm 0.21 \ (0.71)$
700-1000	$-0.03 \pm 0.26 $ (0.40)	$-0.02 \pm 0.22$ (0.44)	$-0.03 \pm 0.26$ (0.42)	$0.02 \pm 0.28 \ (0.56)$	$-0.02 \pm 0.27 \ (0.45)$
1000-1400	$-0.23 \pm 0.19 \ (0.01)$	$-0.17 \pm 0.17 \ (0.02)$	$-0.23 \pm 0.19 \ (0.01)$	$-0.25 \pm 0.20$ (0.01)	$-0.24 \pm 0.20 \ (0.01)$
1400-1800	$0.01 \pm 0.16 \ (0.55)$	$-0.02 \pm 0.14 \ (0.38)$	$0.00 \pm 0.17$ (0.53)	$0.01 \pm 0.17  (0.55)$	$0.01 \pm 0.17 \ (0.58)$
1800-1900	$-0.03 \pm 0.38  (0.45)$	$0.40 \pm 0.28$ (1.00)	$-0.05 \pm 0.39$ (0.40)	$0.23 \pm 0.38 \ (0.89)$	$0.09 \pm 0.39 \ (0.69)$
1860-1900	$0.41 \pm 0.54 \ (0.94)$	$0.69 \pm 0.32 \ (1.00)$	$0.40 \pm 0.56 \ (0.93)$	$0.60 \pm 0.48 \ (0.99)$	$0.50 \pm 0.51 \ (0.98)$
1900-2000	$1.38 \pm 0.15 \ (1.00)$	$1.35 \pm 0.13 \ (1.00)$	$1.37 \pm 0.15 \ (1.00)$	$1.40 \pm 0.14 \ (1.00)$	$1.39 \pm 0.14 \ (1.00)$
Amplitude	±8 (7-11)	±6 (4-8)	±9 (7-11)	±8 (6-10)	±8 (6-11)
(0-1900; cm)					

Errors are ±2σ. Parenthetical numbers indicate probability greater than 0-1700 CE average rate. Amplitude row indicates the median (5th-95th percentile) estimate of the amplitude of variability over 0–1900 CE.

### Dataset S1f. Rates of GSL change employing different data subsets (mm/yr; prior $ML_{2,1}$ )

						, .	
Subset	0-700	700-1000	1000-1400	1400-1600	1600-1800	1800-1900	1900-2000
+AII+GSL	0.10 ± 0.10**	$-0.03 \pm 0.26$	$-0.23 \pm 0.19$ ***	0.29 ± 0.35**	-0.28 ± 0.31**	$-0.03 \pm 0.38$	1.38 ± 0.15***
$+AII ext{-}GSL$	0.10 ± 0.10**	$-0.04 \pm 0.26$	$-0.23 \pm 0.19$ ***	0.29 ± 0.35**	$-0.25 \pm 0.32$ *	$-0.04 \pm 0.40$	$1.31 \pm 0.33$ ***
+NWAtlantic+GSL	$-0.00 \pm 0.13$	$-0.00 \pm 0.30$	$-0.13 \pm 0.21^{\dagger}$	0.37 ± 0.38**	$-0.21 \pm 0.38^{\dagger}$	$-0.07 \pm 0.53$	1.37 + 0.16***
+NWAtlantic-GSL	$-0.00 \pm 0.13$	$-0.00 \pm 0.30$	$-0.12 \pm 0.21^{\dagger}$	$0.37 \pm 0.38$	$-0.20 \pm 0.39^{\dagger}$	$-0.18 \pm 0.58^{\dagger}$	1.48 + 0.52***
-NWAtlantic+GSL	0.19 ± 0.14***	$0.04 \pm 0.37$	$-0.29 \pm 0.29$ **	$0.02 \pm 0.54$	$-0.34 \pm 0.44$ *	$-0.04 \pm 0.47$	$1.37 \pm 0.16$ ***
-NWAtlantic-GSL	0.18 ± 0.14***	$0.04 \pm 0.37$	$-0.29 \pm 0.29$ **	$0.03 \pm 0.54$	$-0.26 \pm 0.45^{\dagger}$	$0.01\pm0.49$	$1.01 \pm 0.40$ ***
+NEAtlantic + GSL	0.16 ± 0.17**	$0.01 \pm 0.45$	$-0.16 \pm 0.35^{\dagger}$	$-0.04 \pm 0.65$	$-0.48 \pm 0.53$ **	$-0.00 \pm 0.54$	1.35 ± 0.16***
$+NEAtlantic ext{-}GSL$	0.15 ± 0.17**	$-0.01 \pm 0.45$	$-0.17 \pm 0.35^{\dagger}$	$-0.04 \pm 0.65$	$-0.28 \pm 0.54^{\dagger}$	$0.08 \pm 0.57$	$0.51 \pm 0.54$
-NEAtlantic + GSL	$0.06 \pm 0.11^{\dagger}$	$-0.04 \pm 0.27$	-0.18 ± 0.20**	0.31 ± 0.35**	$-0.19 \pm 0.35^{\dagger}$	$-0.17 \pm 0.48^{\dagger}$	1.39 ± 0.16***
-NEAtlantic-GSL	$0.06 \pm 0.11^{\dagger}$	$-0.04 \pm 0.27$	-0.18 ± 0.20**	0.31 ± 0.35**	$-0.20 \pm 0.36^{\dagger}$	$-0.28 \pm 0.51^{\dagger}$	1.56 ± 0.40***
+NAtlantic + GSL	$0.06 \pm 0.12^{\dagger}$	$-0.01 \pm 0.28$	-0.19 ± 0.20**	$0.33 \pm 0.37$	$-0.30 \pm 0.34$ **	$0.04 \pm 0.41$	1.36 ± 0.15***
$+NAtlantic ext{-}GSL$	$0.06 \pm 0.12^{\dagger}$	$-0.01 \pm 0.28$	-0.20 ± 0.20 **	$0.33 \pm 0.37$	$-0.23 \pm 0.34$ *	$0.05 \pm 0.43$	1.18 ± 0.40***
-NAtlantic + GSL	$0.12 \pm 0.15$ *	$0.04 \pm 0.41$	$-0.21 \pm 0.31$ *	$0.02\pm0.56$	$-0.16 \pm 0.53^{\dagger}$	$-0.29 \pm 0.70^{\dagger}$	1.41 ± 0.17***
-NAtlantic-GSL	$0.12 \pm 0.15$ *	$0.04 \pm 0.41$	$-0.21 \pm 0.31$ *	$0.02\pm0.56$	$-0.14 \pm 0.54^{\dagger}$	$-0.30 \pm 0.75^{\dagger}$	1.30 ± 0.55***
+SAmerica + GSL	$0.06 \pm 0.20^{\dagger}$	$-0.07 \pm 0.53$	$0.01 \pm 0.40$	$0.01 \pm 0.70$	$-0.34 \pm 0.71^{\dagger}$	$-0.31 \pm 0.99^{\dagger}$	1.40 ± 0.18***
+SAmerica-GSL	$0.04 \pm 0.20^{\dagger}$	$-0.07 \pm 0.53$	$0.01 \pm 0.40$	$-0.01 \pm 0.70$	$-0.09 \pm 0.75$	$-0.38 \pm 1.07^{\dagger}$	0.67 ± 1.00*
-SAmerica $+$ GSL	0.09 ± 0.11**	$-0.02 \pm 0.26$	$-0.23 \pm 0.19$ ***	0.30 ± 0.35**	$-0.27 \pm 0.31$ **	$-0.01 \pm 0.38$	1.37 ± 0.15***
-SAmerica-GSL	0.09 ± 0.11**	$-0.02 \pm 0.26$	$-0.23 \pm 0.19$ ***	0.30 ± 0.35**	$-0.24 \pm 0.32$ *	$-0.01 \pm 0.40$	1.26 ± 0.34***
+AtlanticMediterranean $+$ GSL	0.10 ± 0.11**	$0.00 \pm 0.27$	$-0.33 \pm 0.21$ ***	0.45 ± 0.37***	$-0.26 \pm 0.34$ *	$0.01 \pm 0.42$	1.35 ± 0.15***
+AtlanticMediterranean-GSL	0.10 ± 0.11**	$0.00 \pm 0.27$	$-0.34 \pm 0.21$ ***	$0.45 \pm 0.37$ ***	$-0.19 \pm 0.34^{\dagger}$	$0.04 \pm 0.44$	1.11 ± 0.39***
-AtlanticMediterranean + GSL	$0.04 \pm 0.17^{\dagger}$	$-0.08 \pm 0.43^{\dagger}$	$0.10 \pm 0.29^{\dagger}$	$-0.16 \pm 0.54^{\dagger}$	$-0.27 \pm 0.53^{\dagger}$	$-0.24 \pm 0.67^{\dagger}$	$1.41 \pm 0.17$
-AtlanticMediterranean-GSL	$0.04 \pm 0.17^{\dagger}$	$-0.07 \pm 0.43^{\dagger}$	$0.10 \pm 0.29^{\dagger}$	$-0.16 \pm 0.54^{\dagger}$	$-0.27 \pm 0.53^{\dagger}$	$-0.38 \pm 0.70^{\dagger}$	1.58 ± 0.54***

†/\*/\*\*\* = 67%/90%/95%/99% probability of sign. '+' indicates a data set consisting only of the sites in the named region, '-' a data set consisting of sites except those in the named region. '+GSL' and '-GSL' represent the inclusion of exclusion of the Kalman smoother GMSL curve of ref. 12.

## Dataset S1g. Rates of RSL change (mm/yr; prior $ML_{2,1}$ )

$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	00-2000 $00-2000$ $00-2000$ $00000$ $000000$ $000000$ $000000$ $000$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$0 \pm 0.61$ *** $0 \pm 0.74$ *** $0 \pm 0.45$ $0 \pm 0.47$ ***
Christmas Island $-0.06 \pm 0.07^{**}$ $0.01 \pm 0.19^{\dagger}$ $-0.10 \pm 0.21$ $-0.15 \pm 0.32^{\dagger}$ $0.04 \pm 0.94$ 1.16	0 ± 0.74*** 0 ± 0.45 3 + 0.47***
Christmas Island $-0.06 \pm 0.07^{**}$ $0.01 \pm 0.19^{\dagger}$ $-0.10 \pm 0.21$ $-0.15 \pm 0.32^{\dagger}$ $0.04 \pm 0.94$ 1.16	$0 \pm 0.45$ $0 \pm 0.47$
Connecticut-Rarn Island $0.01\pm0.29$ $1.09\pm0.29$ $1.09\pm0.29$	3 + 0.47***
0.91 ± 0.22 1.00 ± 0.20 1.09 ± 0.62 2.09	3 ± 0.47***
Connecticut-East River Marsh $0.97 \pm 0.07^{***}$ $1.02 \pm 0.15^{\dagger}$ $0.91 \pm 0.14^{\dagger}$ $1.04 \pm 0.21^{\dagger}$ $1.09 \pm 0.61$ 2.73	***
Connecticut-Indian River $0.91 \pm 0.24^{***}$ $0.96 \pm 0.28^{\dagger}$ $0.84 \pm 0.27^{\dagger}$ $0.97 \pm 0.33^{\dagger}$ $1.08 \pm 0.67^{\dagger}$ 2.71	± 0.52
	$5 \pm 0.87$
Cook Islands-Rarotonga $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	3 ± 0.79
Denmark-Ho Bugt $0.52 \pm 0.12^{***}$ $0.67 \pm 0.24^{*}$ $0.32 \pm 0.23^{**}$ $0.60 \pm 0.37^{\dagger}$ $0.71 \pm 0.89$ 1.43	3 ± 0.78***
	2 ± 0.49***
	$2 \pm 1.05$
	$t \pm 1.09$
Greenland-Sisimiut $0.66\pm0.36$ $0.10\pm1.03$ $1.67$	± 1.05
Iceland-Vioarholmi	3 ± 0.77***
Isle of Wight-Newtown Estuary $0.59 \pm 0.33^{***}$ $0.74 \pm 0.38^{*}$ $0.38 \pm 0.38^{**}$ $0.69 \pm 0.49^{\dagger}$ $0.56 \pm 0.67$ 1.46	3 ± 0.61***
	3 ± 1.03***
Louisiana-Lydia 0.60 ± 0.18 0.49 ± 0.30 0.25 ± 0.96 3.41	± 0.83
Massachusetts-Barnstable $1.16 \pm 0.26^{****}$ $1.22 \pm 0.31^{\dagger}$ $1.07 \pm 0.29^{\dagger}$ $1.24 \pm 0.36^{\dagger}$ $1.23 \pm 0.75$ 2.81	± 0.57***
Massachusetts-Revere $0.62 \pm 0.08^{***}$ $0.69 \pm 0.17^{\dagger}$ $0.53 \pm 0.15^{\dagger}$ $0.71 \pm 0.25^{\dagger}$ $0.69 \pm 0.69$ 2.38	5 ± 0.45
Massachusetts-Wood Island $0.54 \pm 0.09^{***}$ $0.61 \pm 0.19^{\dagger}$ $0.45 \pm 0.13^{\dagger}$ $0.63 \pm 0.24^{\dagger}$ $0.64 \pm 0.69$ 2.23	3 ± 0.47***
New Jersey-Cape May Courthouse $1.54 \pm 0.10^{***}$ $1.64 \pm 0.16^{*}$ $1.49 \pm 0.17^{\dagger}$ $1.49 \pm 0.24^{\dagger}$ $1.78 \pm 0.62^{\dagger}$ $3.87$	± 0.43***
New Jersey-Cheeseguake Marsh $\begin{bmatrix} 1.46 + 0.33^{***} & 1.53 + 0.35^{*} & 1.38 + 0.36^{\dagger} & 1.47 + 0.42 & 1.72 + 0.72^{\dagger} & 3.43^{\dagger} \end{bmatrix}$	· + 0 50***
New Jersey-Leeds Point $\begin{vmatrix} 1.53 + 0.06^{***} & 1.63 + 0.13^{**} & 1.45 + 0.13^{\dagger} & 1.52 + 0.24 & 1.77 + 0.63^{\dagger} & 3.76 \end{vmatrix}$	6 + 0.41***
New Zealand-Blueskin Bay $-0.03 \pm 0.21$ $0.10 \pm 0.29^{\dagger}$ $-0.18 \pm 0.30^{\dagger}$ $-0.07 \pm 0.40$ $0.14 \pm 0.90$ 1.47	± 0.56***
	$3 \pm 0.60$
	$7 \pm 0.57$
North Carolina-Hatteras Island $0.99 \pm 0.60$ $1.21 \pm 0.79$ $3.40$	± 0.76
North Carolina-Sand Point $1.12 \pm 0.04^{***}$ $1.08 \pm 0.10^{\dagger}$ $1.24 \pm 0.09^{***}$ $0.99 \pm 0.16^{*}$ $1.08 \pm 0.50$ $3.33$	3 ± 0.47***
North Carolina-Tump Point $1.06 \pm 0.08^{***}$ $1.05 \pm 0.16$ $1.16 \pm 0.15^{*}$ $0.91 \pm 0.14^{**}$ $1.33 \pm 0.48^{\dagger}$ $3.47$	± 0.41***
North Carolina-Wilmington $0.68 \pm 0.17^{***}$ $0.69 \pm 0.23$ $0.73 \pm 0.22^{\dagger}$ $0.58 \pm 0.30^{\dagger}$ $0.90 \pm 0.73^{\dagger}$ 2.58	± 0.54***
Nova Scotia-Chezzetcook $1.78 \pm 0.13^{***}$ $1.87 \pm 0.24^{\dagger}$ $1.65 \pm 0.23^{\dagger}$ $1.89 \pm 0.22^{\dagger}$ $1.66 \pm 0.53$ $3.14$	± 0.45***
Rio de Janeiro-Arraial do Cabro $-0.79 \pm 0.28^{***}$ $-0.68 \pm 0.35^{\dagger}$ $-0.94 \pm 0.35^{\dagger}$ $-0.80 \pm 0.47$ $-0.90 \pm 1.08$ 0.90	± 0.95***
Rio de Janeiro-Buzios $-0.66 \pm 0.25^{***}$ $-0.54 \pm 0.33^{\dagger}$ $-0.80 \pm 0.33^{\dagger}$ $-0.66 \pm 0.45$ $-0.76 \pm 1.07$ 1.03	± 0.94***
Rio de Janeiro-Frade $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	3 ± 0.94***
Rio de Janeiro-Ilha Grande $ -0.87 \pm 0.47^{****} -0.75 \pm 0.53^{\dagger} -1.02 \pm 0.51^{\dagger} -0.89 \pm 0.60 -1.03 \pm 1.14 0.86                                   $	5 ± 1.00***
Rio de Janeiro-Itaipu-Acu $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	3 ± 0.88***
Rio de Janeiro-Mangaratiba	) + 0.91 <b>***</b>
Rio de Janeiro-Parati-Mirim $-0.85 \pm 0.42^{***}$ $-0.73 \pm 0.47^{\dagger}$ $-1.00 \pm 0.48^{\dagger}$ $-0.87 \pm 0.57$ $-1.02 \pm 1.12$ $0.87 \pm 0.57$	± 0.99***
Rio de Janeiro-Tarituba $-0.91 \pm 0.43^{***}$ $-0.79 \pm 0.48^{\dagger}$ $-1.06 \pm 0.49^{\dagger}$ $-0.93 \pm 0.57$ $-1.08 \pm 1.13$ 0.83	± 1.00***
Santa Catarina-Cape of Santa Marta $\begin{bmatrix} -0.58 \pm 0.24 & *** \end{bmatrix} = \begin{bmatrix} -0.46 \pm 0.32 & -0.74 \pm 0.32 & -0.59 \pm 0.45 & -0.81 \pm 1.10 & 1.00 \end{bmatrix}$	) ± 1.01***
Santa Catarina-Ponta de Itapiruba $-0.49 \pm 0.54$ ** $-0.37 \pm 0.58$ † $-0.65 \pm 0.58$ † $-0.51 \pm 0.66$ $-0.73 \pm 1.20$ 1.10	± 1.10***
	$3 \pm 0.71$
Scotland-Loch Laxford $-0.07 \pm 0.25$ $0.13 \pm 0.36$ $0.03 \pm 0.85$ 1.13	3 ± 0.71
Scotland-Wick $-0.15 \pm 0.12^{***}$ $0.01 \pm 0.24^{**}$ $-0.35 \pm 0.23^{**}$ $-0.14 \pm 0.36$ $-0.22 \pm 0.83$ $0.88$	± 0.67***
Seychelles-Barbarons $0.44 \pm 0.15^{***}$ $0.54 \pm 0.26^{\dagger}$ $0.30 \pm 0.26^{\dagger}$ $0.44 \pm 0.41$ $0.41 \pm 1.11$ 1.81	± 1.05***
South Africa-Groenvlei $0.03 \pm 0.36$ $0.36 \pm 0.47$ $0.10 \pm 1.04$ $1.48$	$3 \pm 0.85$
South Africa-Kariega Estuary $0.42 \pm 0.28$ $0.79 \pm 0.37$ $0.49 \pm 1.01$ 1.76	5 ± 0.89
South Africa-Langebaan $-0.02 \pm 0.16$ $0.12 \pm 0.27$ * $-0.25 \pm 0.25$ *** $0.08 \pm 0.40$ † $-0.11 \pm 1.05$ 1.31	± 0.89***
South West England-Thurlestone $0.95 \pm 0.16^{***}$ $1.10 \pm 0.29^{*}$ $0.73 \pm 0.23^{**}$ $1.04 \pm 0.37^{\dagger}$ $0.93 \pm 0.70$ $1.78$	3 + 0.60***
Spain-Muskiz Estuary $0.92 \pm 0.51^{***}$ $1.02 \pm 0.55^{\dagger}$ $0.75 \pm 0.55^{*}$ $1.00 \pm 0.63^{\dagger}$ $0.90 \pm 0.98$ $1.83$	· + 0.78***
Spain-Urdaibai Estuary $0.52 \pm 0.41^{***}$ $0.61 \pm 0.44^{\dagger}$ $0.34 \pm 0.44^{*}$ $0.60 \pm 0.57^{\dagger}$ $0.51 \pm 0.82$ 1.45	5 ± 0.70***
	3 ± 0.76

 $\dagger/*/***=67\%/90\%/95\%/99\%$  probability of sign (for 0–1700 CE) or of being distinct from the 0–1700 CE rate. Rates not shown when there are no observations within 0.5 degrees of a site. Probabilities not shown where no observations within 0.5 degrees of a site predate 0 CE.

Dataset S1h. Probability observed GSL rise since 1900 CE exceeded counterfactual projection

		enario 1 ted against:	Scenario 2 calibrated against:		
Year	Mann et al. (ref. 1)	Marcott et al. (ref. 2)	Mann et al. (ref. 1)	Marcott et al. (ref. 2)	
1910 1920 1930 1940	0.34	0.20	0.00	0.00	
1920	0.70	0.33	0.01	0.01	
1930	0.70 0.96	0.54	0.15	0.14	
1940	1.00	0.75	0.68	0.64	
1950	1.00	0.88		0.95	
1960	1.00	0.93	0.96 0.99	0.99	
1950 1960 1970	1.00	0.95	1.00	1.00	
1980	1.00	0.97	1.00	1.00	
1990	1.00	0.98	1.00	1.00	
1990 2000	1.00	1.00	1.00	1.00	

Dataset S1i. Semi-empirical projections of 21st century sea-level rise with different calibrations (cm)

	50	17–83	5–95	50	17–83	5–95	50	17-83	5–95
		Summary			Mann et al. (re	ef. 1)	Ma		ef. 2)
RCP 2.6	38	28-51	24-61	38	29–50	25–59	38	28–51	24–61
RCP 4.5	51	39–69	33–85	51	39–66	34–81	52	39–69	33–85
RCP 8.5	76	59-105	52-131	75	59–99	52–121	78	60-105	52-131

Values with respect to year 2000 baseline. Results across the three temperature calibration sets show median of medians, minimum of 5th percentiles, and maximum of

Dataset S1j. Prior and posterior distributions  $P(\Psi)$  for the parameters  $\Psi$ 

Parameter	Prior	Mann et al. (ref. 1)	Marcott et al. (ref. 2)
$\overline{a}$	U(0,20)  mm/yr/K	4.0 (3.2, 5.4)	4.7 (3.4, 7.0)
c(500  CE)	U(-10, 10)  mm/yr	0.22 (0.10, 0.42)	0.05 (0.02, 0.08)
c(2000  CE)	U(-2,2)  mm/yr	$0.14 \ (0.05, 0.29)$	$0.03 \ (0.01, 0.06)$
$T_0(-2000 \text{ CE})$	$\langle T(-2000 \text{ to } -1800 \text{ CE}) \rangle + U(-0.6, 0.6)$	0.25 (-0.19, 0.89)	0.03 (-0.42, 0.60)
$T_0(500 \text{ CE})$	$\mathcal{N}(\langle T(500 - 700 \text{ CE}) \rangle, (0.2 \text{ K})^2)$	0.17 (0.11, 0.23)	-0.09 (-0.17, -0.01)
$T_0(2000 \text{ CE})$		-0.05 (-0.12, 0.07)	0.04 (-0.10, 0.16)
au	$\log U(30, 3000) \text{ yrs}$	174 (87, 366)	102 (64, 203)
$ au_c$	$\log U(1000, 20000)$ yrs	4175 (1140, 17670)	3392 (1124, 16155)

 $\mathcal{N}(\mu, \sigma^2)$  denotes a normal distribution around  $\mu$  with the standard deviation  $\sigma$ .  $U(x_1, x_2)$  is a uniform distribution between  $x_1$  and  $x_2$ . Ranges shown for posteriors are 5th–95th percentiles. Temperatures are relative to the 1850–2000 CE average.