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The imprints of contemporary mass redistribution on local sea level and vertical land motion observations

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Text S1: Long tide gauges and GNSS stations

We use a different set of long tide-gauge records than *Thompson et al.* (2016, T16). The list of tide gauges and accompanying GNSS stations used in our analysis can be found in Table S1. For the tide gauges that are different from T16, we discuss the reasons below:

San Diego Instead of the using tide gauge San Diego (Quarantine Station, 158), we use station La Jolla (Scripps Pier, 256). We chose the latter station because of the availability of two nearby permanent GNSS stations with long records, while for the original station, GNSS records with sufficient length are substantially farther away. The drawback is that the new station does not have data for the first 25 years.

Buenos Aires We merged the Buenos Aires (157) and Palermo (832) tide gauges to form one single method by removing the mean sea level over the overlapping period, instead of solely using Buenos Aires. As a result, the tide gauge record stretches over 1905-2000 instead of 1905-1981.

Brest We used Brest (1) instead of Newlyn (202). There is a permanent GNSS station close to Newlyn (NEWL), however, this tide-gauge station shows a large subsidence signal, which results in a 20th-century sea-level trend of 0.3 mm/yr using the full model, which seems to be anomalously low. For Brest, 2 GNSS stations with long records are nearby who both show very small VLM trends.

Auckland For Auckland, we combine two tide-gauge records, similar as for Buenos Aires.

Sydney We replaced the Fremantle tide gauge from T16 with Sydney, because for Fremantle, no nearby GNSS station is available, and because *Featherstone et al.* (2015) have noticed substantial differences between land motion at the tide-gauge location and at GNSS sites further away. For Sydney, two tide gauges have a long record over the whole 20th century, and a long GNSS record is available, which is located 10 km from the tide gauge locations.

Balboa and Cristobal These stations are included in T16, but excluded here. For Cristobal, the ACP1 GNSS station shows a large uplift signal, which results in an anomalously high 20th-century sea-level trend. However, this GNSS record contains a lot of gaps, which results in a large uncertainty for this station. For Balboa, the same situation occurs with GNSS station IGN1, which also results in an unrealistically large 20th-century sea-level trend. Unfortunately, no long tide-gauge records are located nearby. which could replace these stations.

Table S1: Overview of the tide gauges and GNSS stations used in Figure 12. The PSMSL id refers to the station number as used by PSMSL. The time span denotes the first and last years of the time series used in the analysis, and number of years shows the number of annual-mean sea-level estimates are available over the analysis period. The last column denotes whether the tide gauge data used here is the same as in T16.

	PSMSL id	GNSS stations	Time span	Record length	Same as T16
Honolulu	155	HLNC	1905-2000	96	yes
San Francisco	10	UCSF, MHDL, TIBB	1901-2000	100	yes
San Diego	256	SIO3, SIO5	1925-2000	70	no
Buenos Aires	157, 832	IGM1, LPGS	1905-2000	95	no
Key West	188	FLKW	1913-2000	87	yes
Pensacola	246	PCLA	1924-2000	76	yes
New York	12	NYBP	1901-2000	98	yes
Cascais	52	CASC	1901-1993	82	yes
Brest	1	BRST, GUIP	1901-2000	91	no
Marseille	61	MARS, PRIE, AXPV	1901-2000	92	yes
Trieste	154	TRIE, KOPE	1901-2000	94	yes
Auckland	150, 217	AUKT, AUCK	1904-1998	92	no
Sydney	65, 196	SYDN	1901-1999	99	no

References

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