Supplementary Material:

Using Global Tide Gauge Data to Validate and Improve the Representation of Extreme Sea Levels in Flood Impact Studies

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Readme_Supplementary_Material This file.

Supplementary Material Figures

SM1. All stations in the GESLA-2 data set. See Woodworth et al. (2017) for detailed information on GESLA-2.

SM2. Difference between Gumbel scale parameters obtained from $H1$ and $H100$ extreme values in the D-C data set, and those obtained from $H10$ and $H1000$ values. The vertical banding is due to the H values being provided in units of cm.

SM3. Differences between the increases in the frequency of flooding (D-C minus GESLA-2) shown in Figure 10 (a) and (b).

SM4. Ranking of the 59 cities in terms of annual average losses under 2005 conditions when using GESLA-2 or D-C return level estimates.

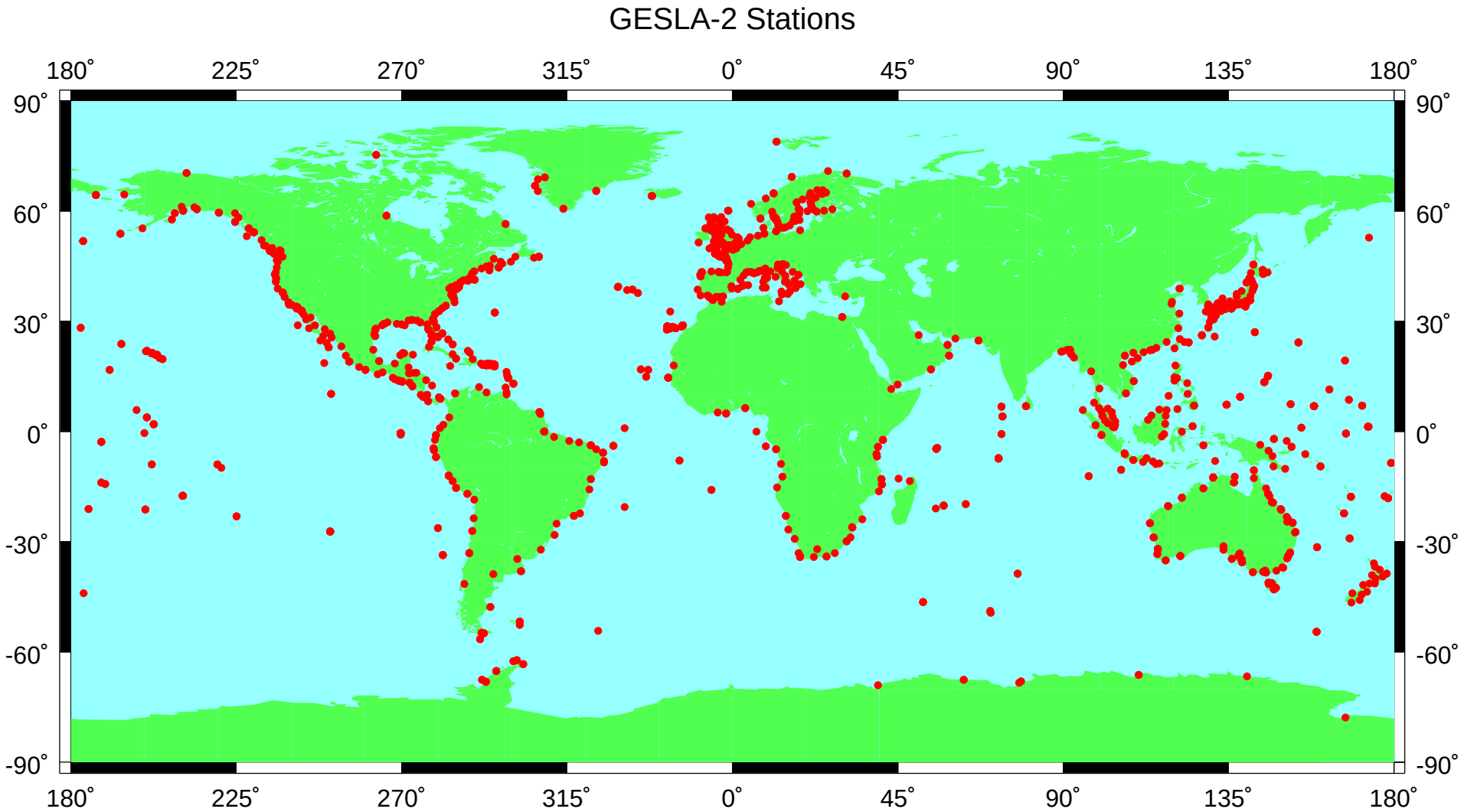
Supplementary Material: Extreme Level Parameters

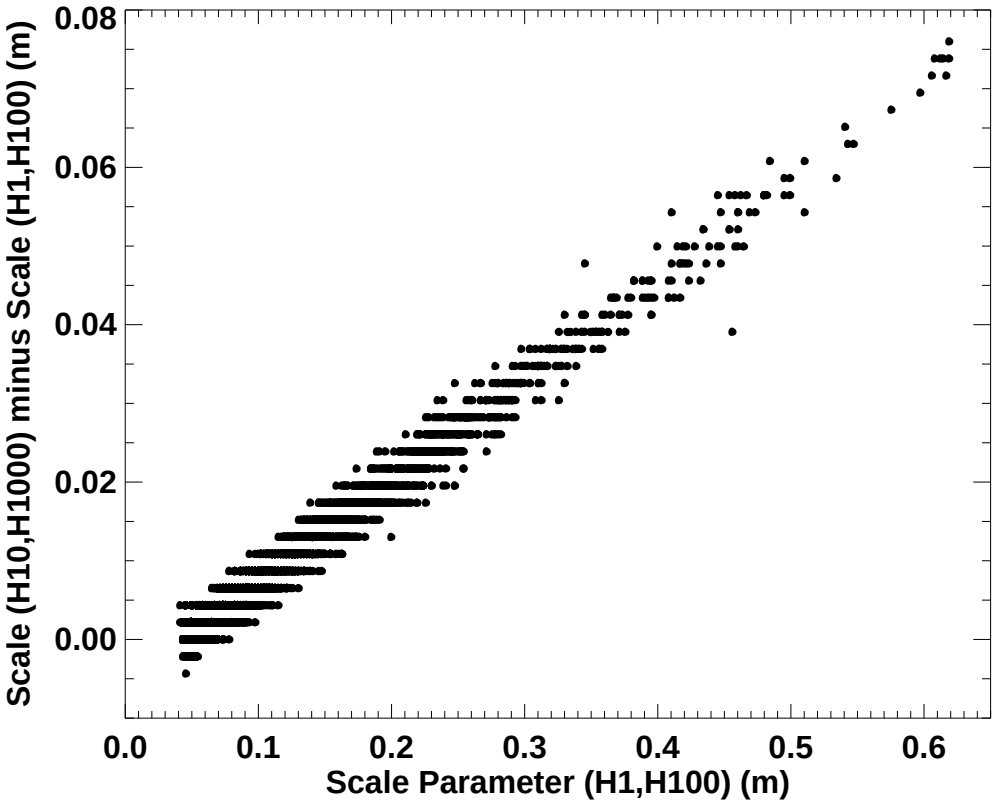
The file 'gesla2_public+private' contains extreme level parameters using the first method described in the text. It consists of:

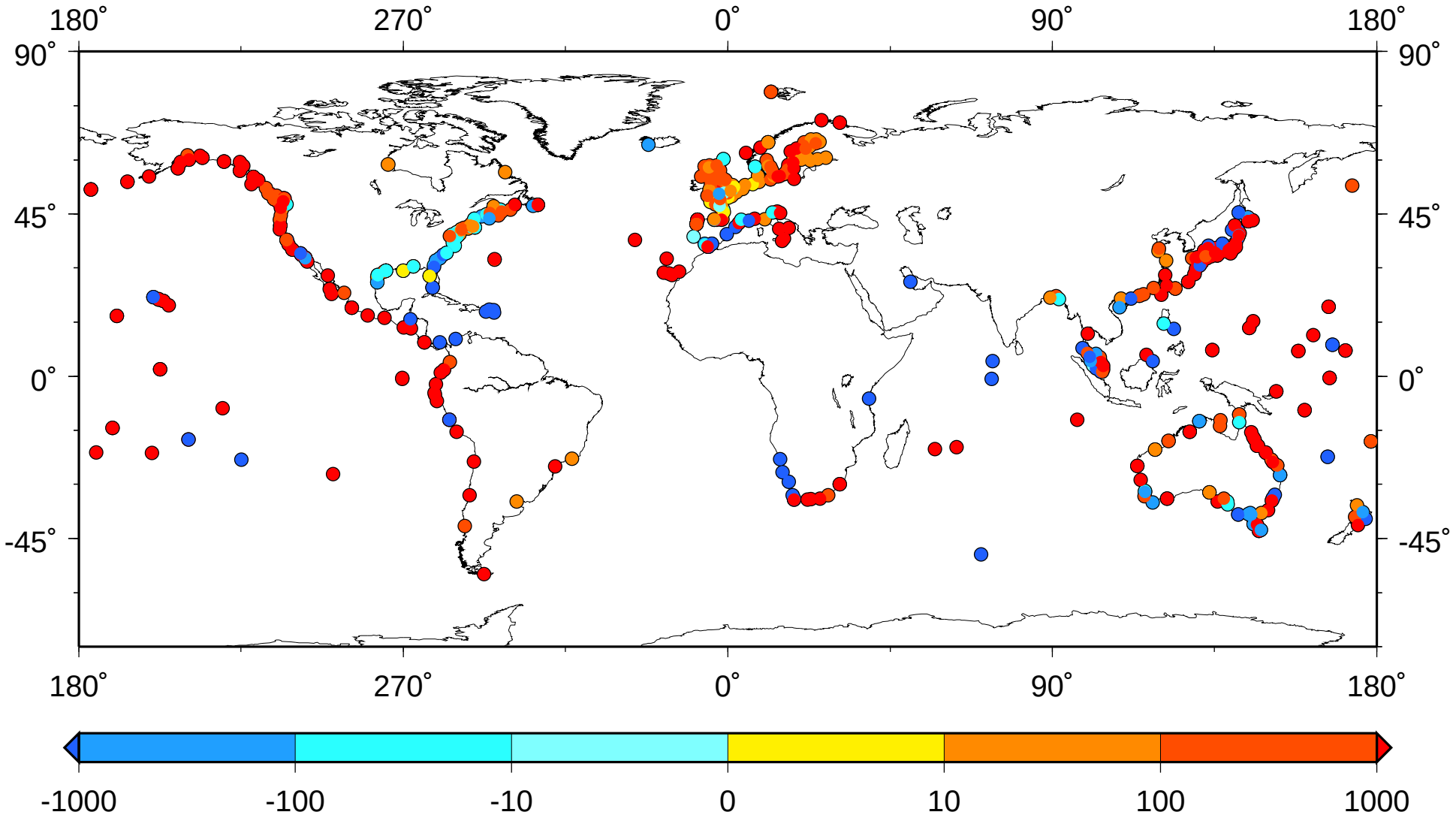
COLUMN 1 longitude (degrees)
COLUMN 2 latitude (degrees)
COLUMN 3 probability of at least one level in either tail (sets rejection limit)
COLUMN 4 rejection limit in standard deviations
COLUMN 5 number of years in original data
COLUMN 6 number of years in truncated data
COLUMN 7 Gumbel location parameter (metres)
COLUMN 8 uncertainty (S.D.) in Gumbel location parameter (metres)
COLUMN 9 Gumbel scale parameter (metres)
COLUMN 10 uncertainty (S.D.) in Gumbel scale parameter (metres)
COLUMN 11 GESLA-2 filename

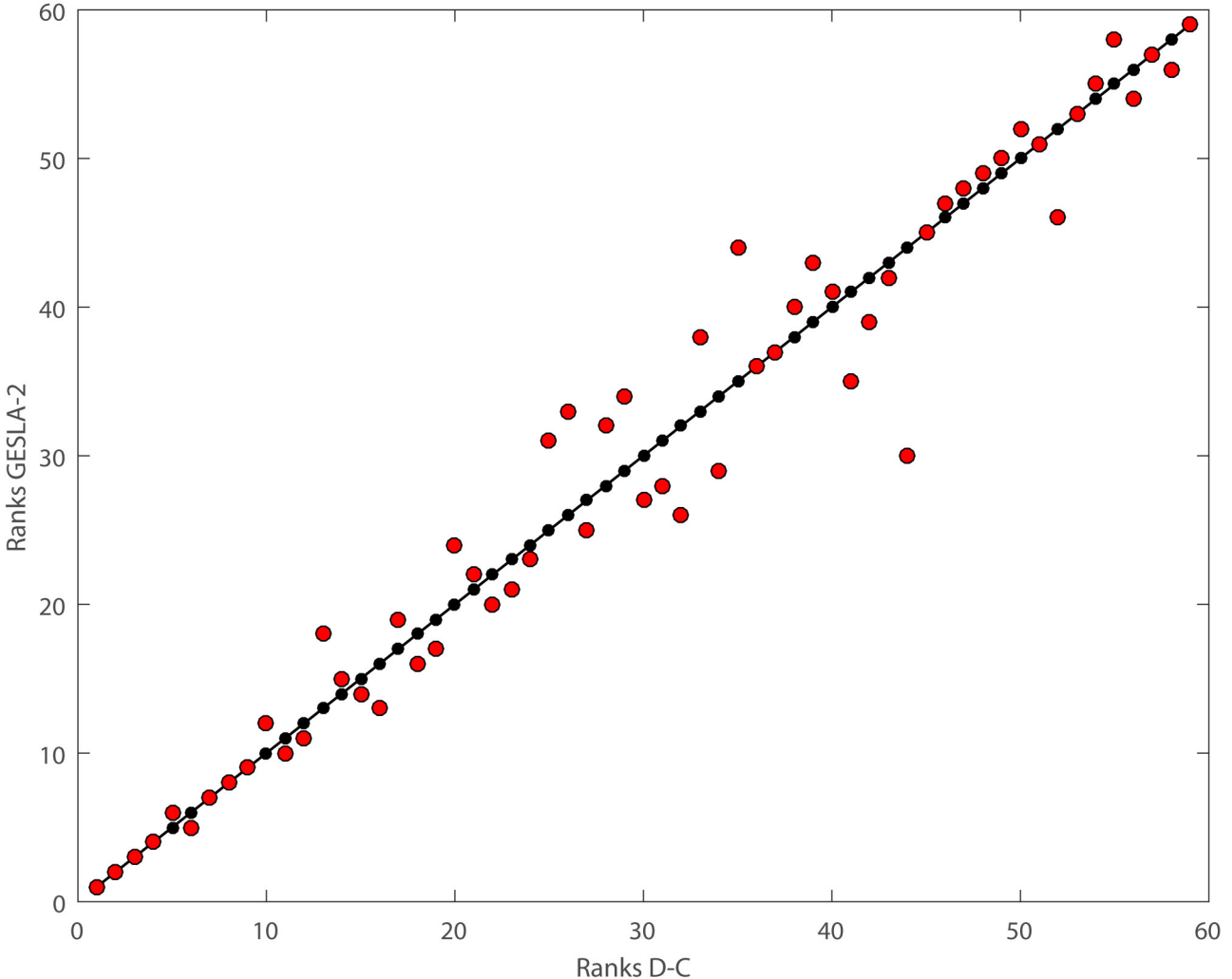
There are 1236 entries with one entry corresponding to a record in the GESLA-2 data set (there are fewer than the 1355 in GESLA-2 overall as some duplication in Australian records was removed and records which yielded less than 2 annual maxima were not included). The record has the name given in column 11. The first 1188 entries come from the 'public' section of GESLA-2 (see Woodworth et al., 2016) and the remainder from the 'private' section.

Column 3 is a parameter used to determine column 4 which is the half-range of the limits used for the rejection of annual maxima (in terms of standard deviations of the estimated uncertainty in the Gumbel-derived return levels). Columns 7-10 provide the resulting Gumbel parameters. In the analysis described in the text, there was a requirement for at least 20 years of the truncated data (column 6) and, in addition, a requirement for column 6 to be at least 85% of column 5.


GESLA-2 Stations
180°
225°
270°
315°
0°
45°
90°
135°
180°
90°
60°
30°
0°
-30°
-60°
-90°


Scale (H10,H1000) minus Scale (H1,H100) (m)
0.08
0.06
0.04
0.02
0.00
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Scale Parameter (H1,H100) (m)


180°
270°
0°
90°
180°
90°
45°
0°
-45°
-1000
-100
-10
0
10
100
1000


Ranks GESLA-2
Ranks D-C
0
10
20
30
40
50
60