**Perspectives on Compound Flooding in Chinese Estuary Regions**

We use the MRL plot for determining threshold value for the POT model (Davison & Smith, 1990). It consists in picking the value of u which represents the level where all the higher threshold-based sample mean excesses are consistent with a straight line (Scarrott & MacDonald, 2012). The MRL plot is based on the determination of deviation from mean in the surge. It is obvious that the extreme value analysis methods, such as the POT model, deal with standard deviation (errors of residuals) from the mean. Accordingly, the MRL plot can be employed in the POT analysis to determine a true threshold value.

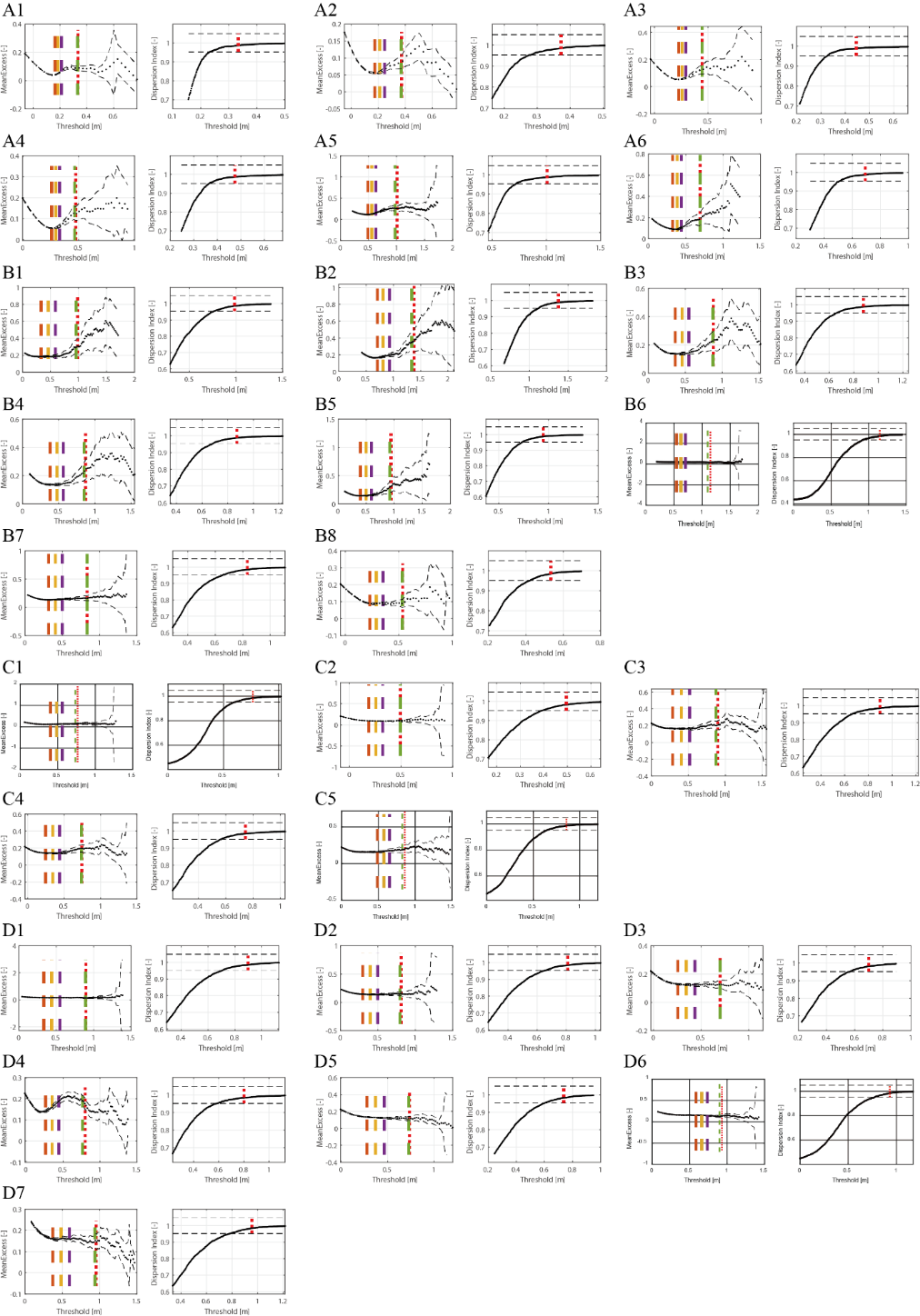


Fig. S1. MRL and DI plot for each catchment (26 catchments).

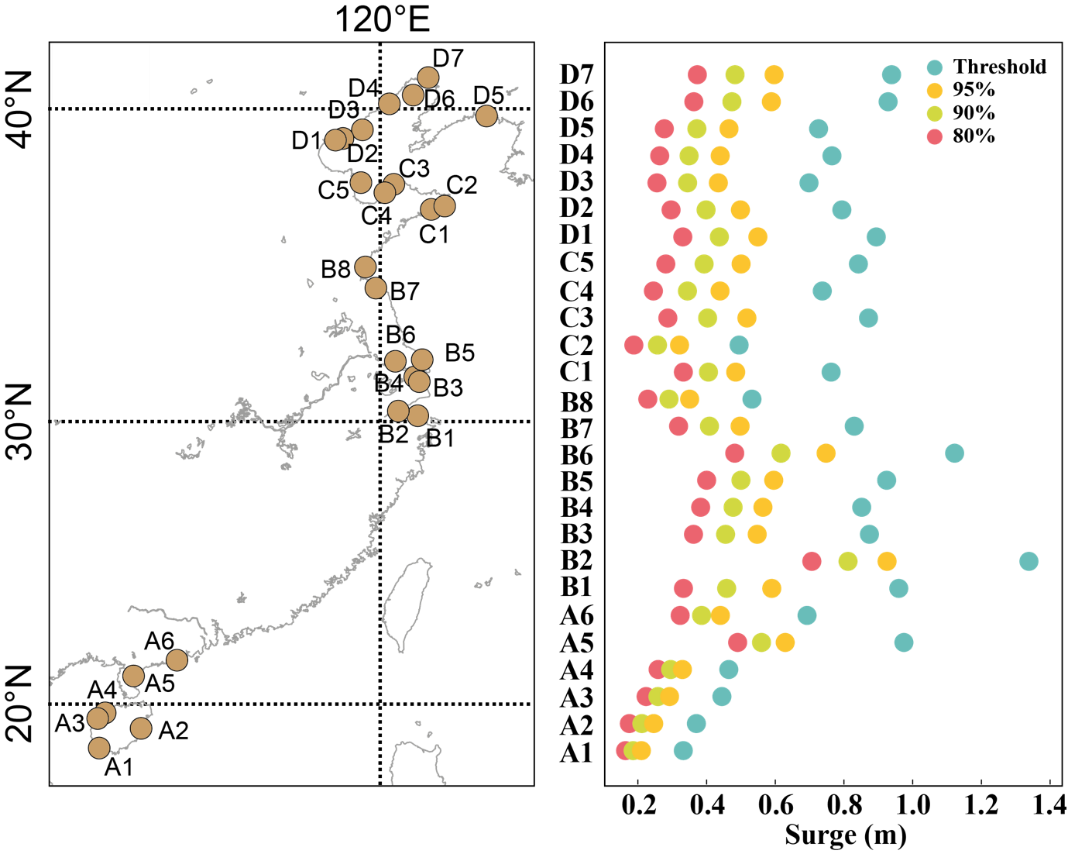


Fig. S2. Surge threshold for each catchment.

We select extreme storm surge events and the corresponding rainfall the same day of the surge. The number of days between the occurrence of a storm surge event, and the maximum rainfall that result in the highest value of the upper tail dependence coefficient, is referred to hereafter as the “time lag”. To implicitly account for the rainfall travel time to the catchment outlet, range from 1 to 7 days accumulated rainfall were also estimated and the correlation between such accumulated rainfall and peak storm surge was then estimated.

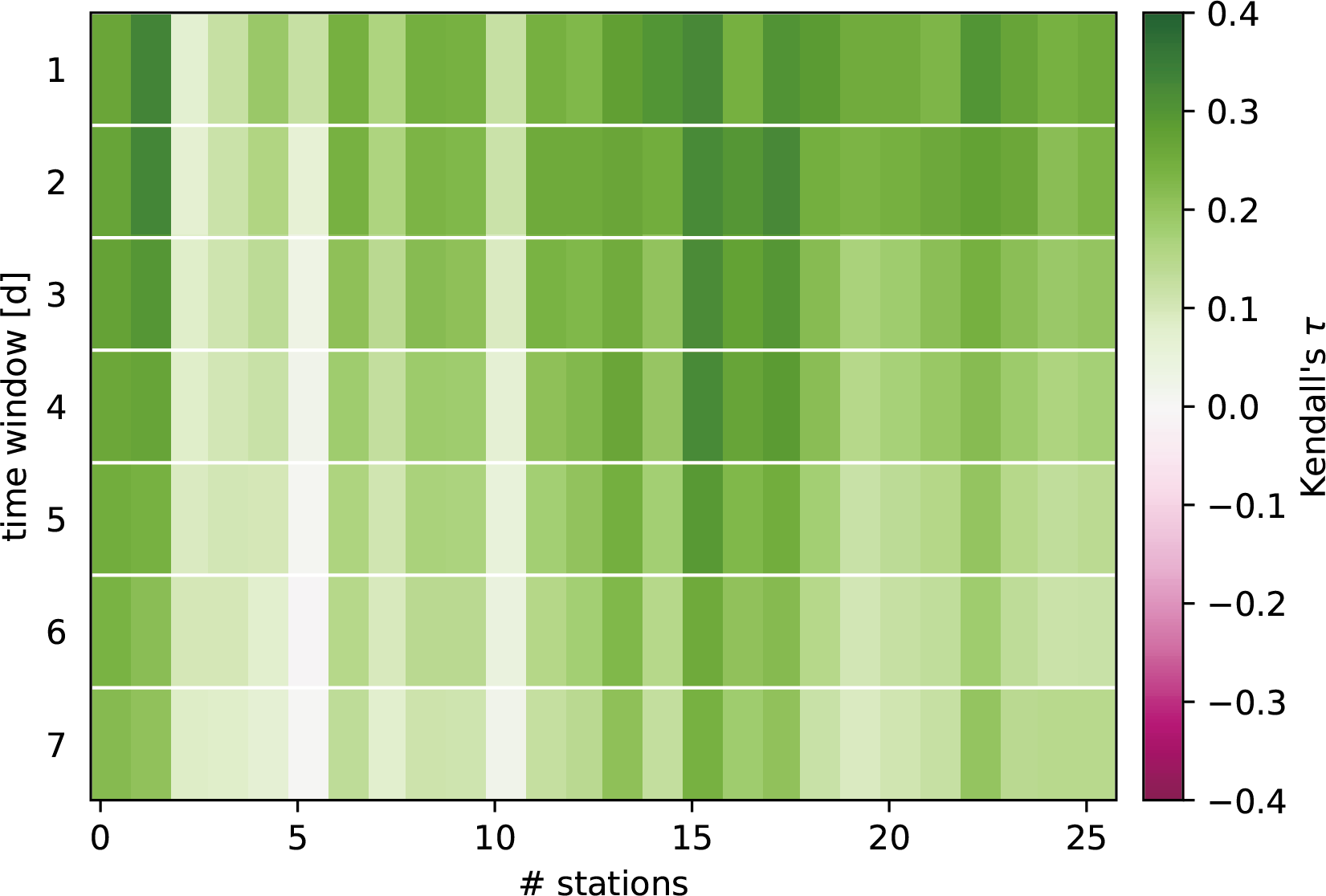


Fig. S3. Time lag for each catchment (from south to north)

## S.2. Supplementary Results

Table S1. Location and information of each catchment.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Surge station | Latitude | Longitude | Typhoon number | Non-typhoon number | Threshold *u* (m) | Altitude (m) | slope |
| A1 | 18.41 | 108.95 | 34 | 12 | 0.334 | 74.74 | 1.12 |
| A2 | 19.14 | 110.59 | 46 | 10 | 0.372 | 106.95 | 1.88 |
| A3 | 19.50 | 108.89 | 30 | 10 | 0.445 | 2.94 | 0.02 |
| A4 | 19.71 | 109.18 | 36 | 13 | 0.474 | 292.41 | 2.76 |
| A5 | 21.06 | 110.30 | 42 | 6 | 1.004 | 21.36 | 0.19 |
| A6 | 21.64 | 112.00 | 37 | 7 | 0.693 | 15.42 | 0.06 |
| B1 | 30.23 | 121.43 | 36 | 19 | 0.982 | 10.05 | 0.04 |
| B2 | 30.39 | 120.67 | 30 | 17 | 1.374 | 14.18 | 0.06 |
| B3 | 31.38 | 121.49 | 33 | 10 | 0.877 | 54.41 | 0.69 |
| B4 | 31.53 | 121.31 | 35 | 15 | 0.871 | 134.68 | 1.61 |
| B5 | 32.05 | 120.55 | 32 | 16 | 0.945 | 71.59 | 0.82 |
| B6 | 32.10 | 121.61 | 30 | 29 | 1.140 | 30.32 | 0.53 |
| B7 | 34.45 | 119.79 | 27 | 25 | 0.832 | 48.17 | 1.04 |
| B8 | 36.95 | 121.96 | 27 | 28 | 0.534 | 3.79 | 0.11 |
| C1 | 37.13 | 119.38 | 24 | 34 | 0.762 | 4.5 | 0.02 |
| C2 | 37.05 | 122.49 | 20 | 39 | 0.495 | 4.98 | 0.02 |
| C3 | 37.47 | 120.14 | 16 | 39 | 0.899 | 3.36 | 0.01 |
| C4 | 37.73 | 120.49 | 16 | 36 | 0.744 | 4.84 | 0.04 |
| C5 | 37.78 | 119.20 | 18 | 34 | 0.854 | 6.68 | 0.02 |
| D1 | 39.08 | 118.21 | 20 | 35 | 0.897 | 47.19 | 0.84 |
| D2 | 39.14 | 118.50 | 19 | 42 | 0.811 | 76.22 | 1.66 |
| D3 | 39.40 | 119.26 | 21 | 36 | 0.698 | 34.37 | 0.34 |
| D4 | 39.81 | 124.13 | 25 | 36 | 0.798 | 344.77 | 3.81 |
| D5 | 40.18 | 120.32 | 21 | 41 | 0.736 | 134.39 | 1.47 |
| D6 | 40.44 | 121.25 | 18 | 37 | 0.930 | 81.42 | 0.56 |
| D7 | 40.96 | 121.84 | 21 | 42 | 0.954 | 65.63 | 0.49 |