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SUPPLEMENTARY INFORMATION

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Increasing risk of compound flooding from storm surge and rainfall for major US cities

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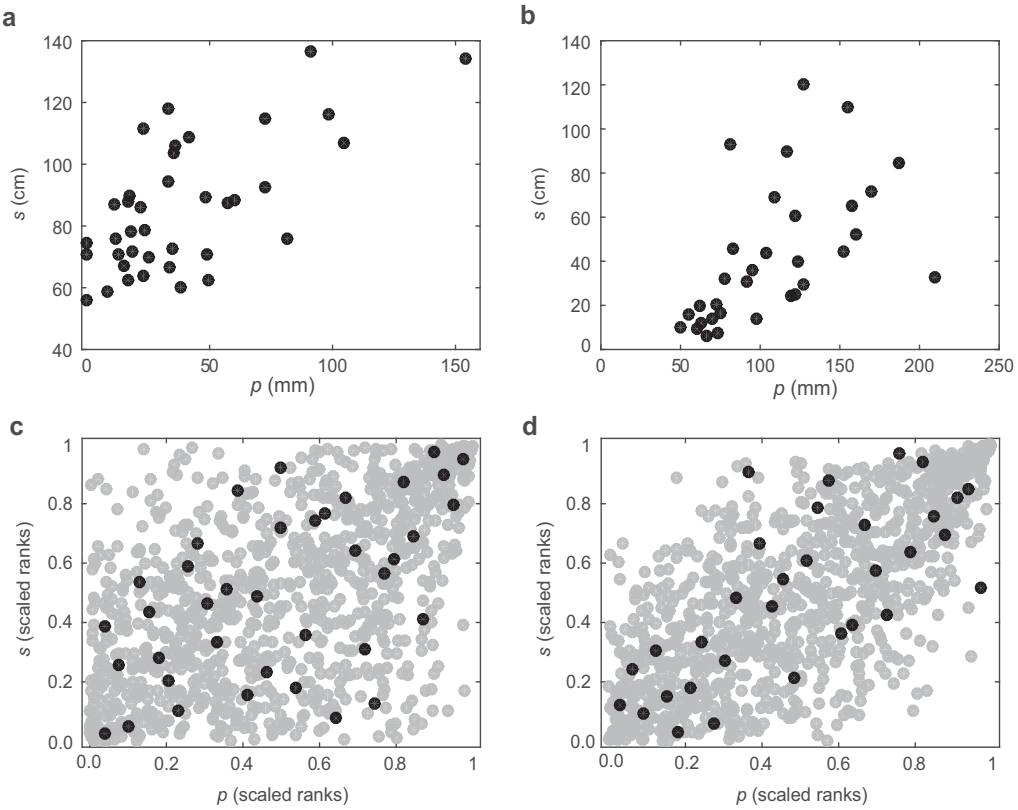
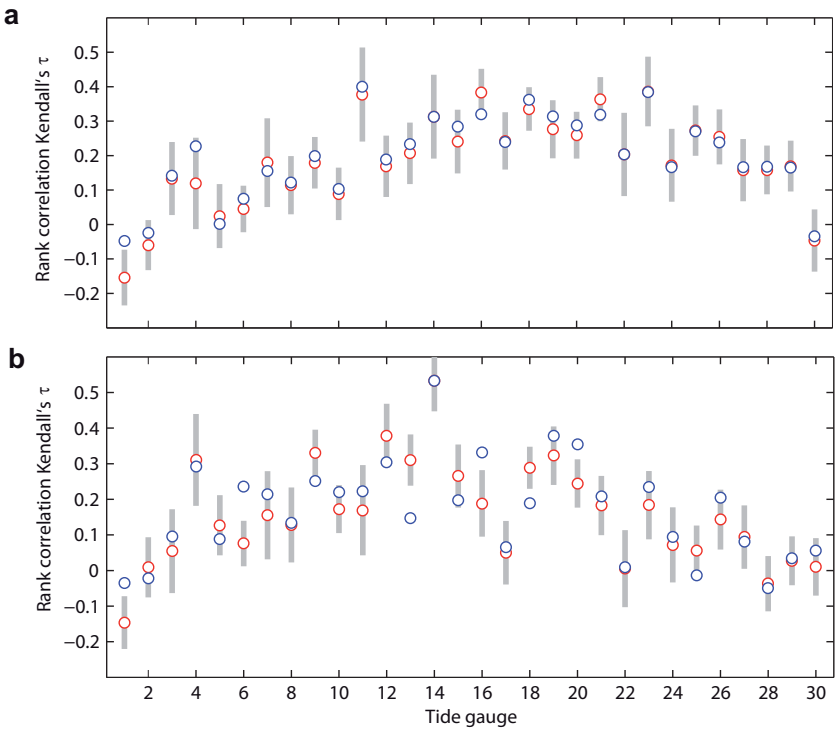


Supplementary Figure 1 | a–b, Observed data pairs of storm surge (*s*) and precipitation (*p*) in real units. **c–d**, Comparison of simulated (grey; 1000 events) and observed pairs of ranks. Results are shown for Chesapeake Bay in Case I (**a, c**) and Grand Isle in Case II (**b, d**); the Gumbel copula was used for the simulations (see Figs. 1b–c).



Supplementary Figure 2 | Case I (**a**) and Case II (**b**) τ values for the 30 TGs when precipitation stations are selected in a 25 km radius (red) and a 50 km radius (blue); grey bars are bootstrapped standard errors associated with the values derived with the 25 km radius.

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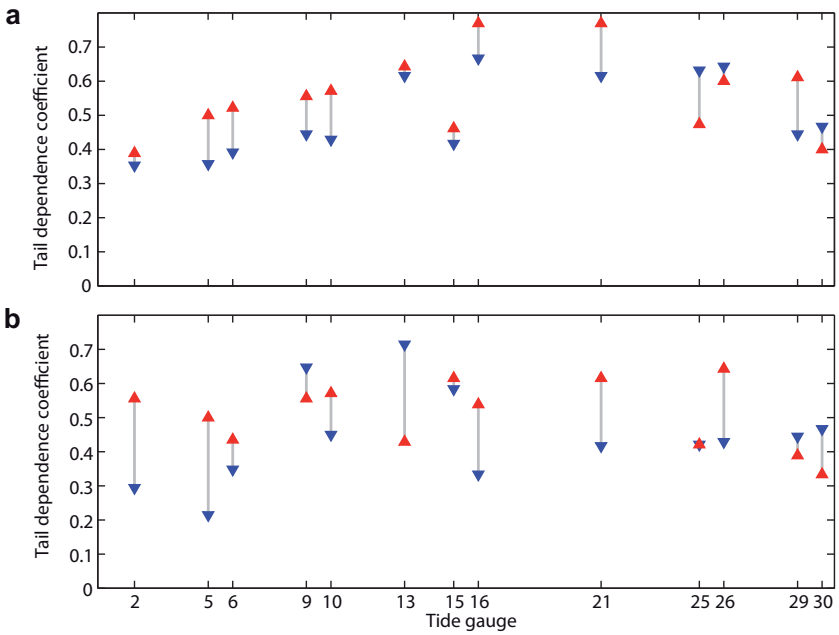
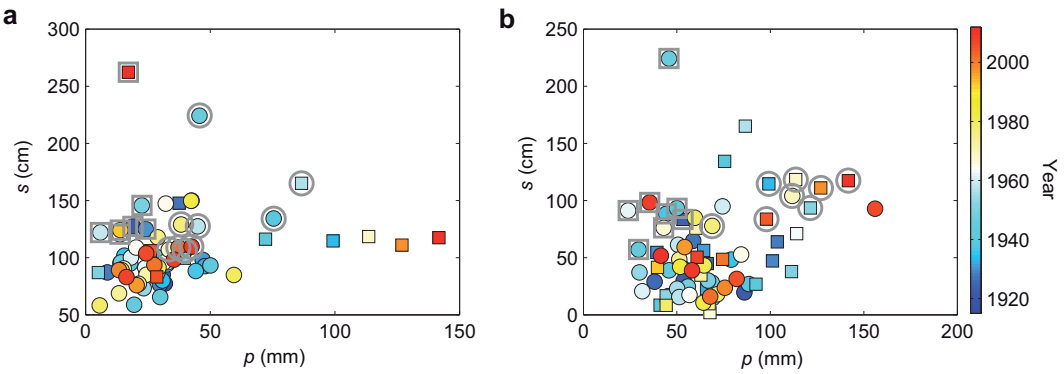
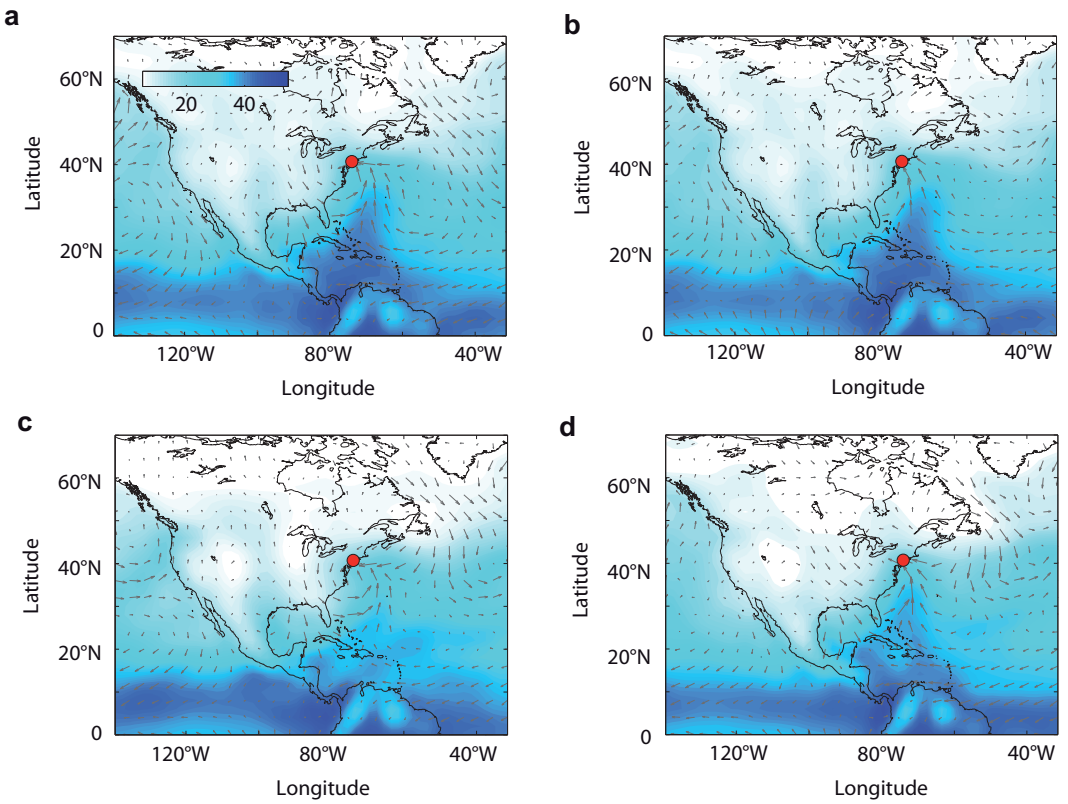


Supplementary Figure 3 | TDCs for a threshold of 0.6 derived from the first (blue) and second (red) halves of Case I (**a**) and Case II (**b**) data sets at sites with at least 55 overlapping years of data (covering at least 65 years) and at least one significant positive trend in Fig. 2g.



Supplementary Figure 4 | Scatter plots of storm surge (*s*) and precipitation (*p*) for NYC in real units; frames highlight the selected compound and non-compound events in the same way as in Figs. 3a–b for Case I (**a**) and Case II (**b**).



Supplementary Figure 5 | Composite plots of PWC (unit is kg m^{-1}) and wind for events with high storm surge and high precipitation (**a–b**; derived from events with circle frames in Figs. 3a–b) and high storm surge and low precipitation (**c–d**; derived from events with square frames in Figs. 3a–b); the NYC TG location is indicated by the red dot. Case I (**a, c**), Case II (**b, d**).

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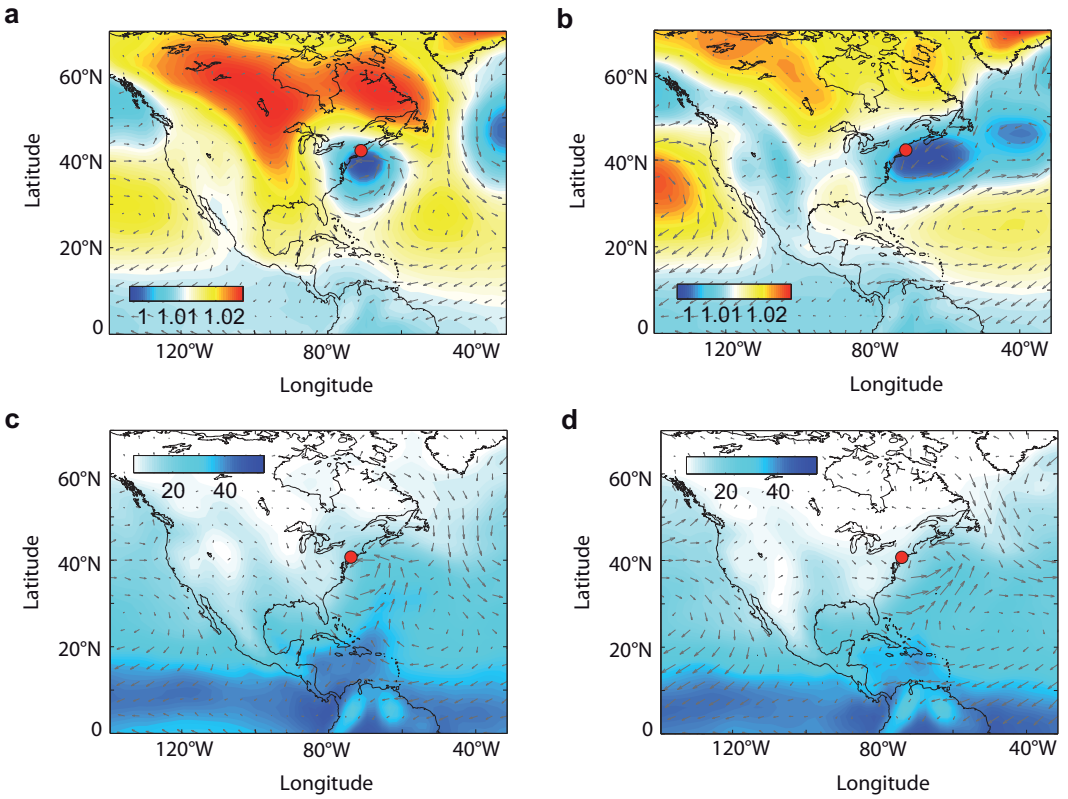

Supplementary Figure 6 | Composite plots of SLP (unit is Pa · 10^5) (**a–b**) and PWC (unit is kg m^{-1}) (**c–d**) for events with high storm surge and high precipitation (**a, c**) and high storm surge and low precipitation (**b, d**); the Boston TG location is indicated by the red dot.