Supplementary material for:
Quantifying cascading uncertainty in compound flood modeling with linked process-based and machine learning models

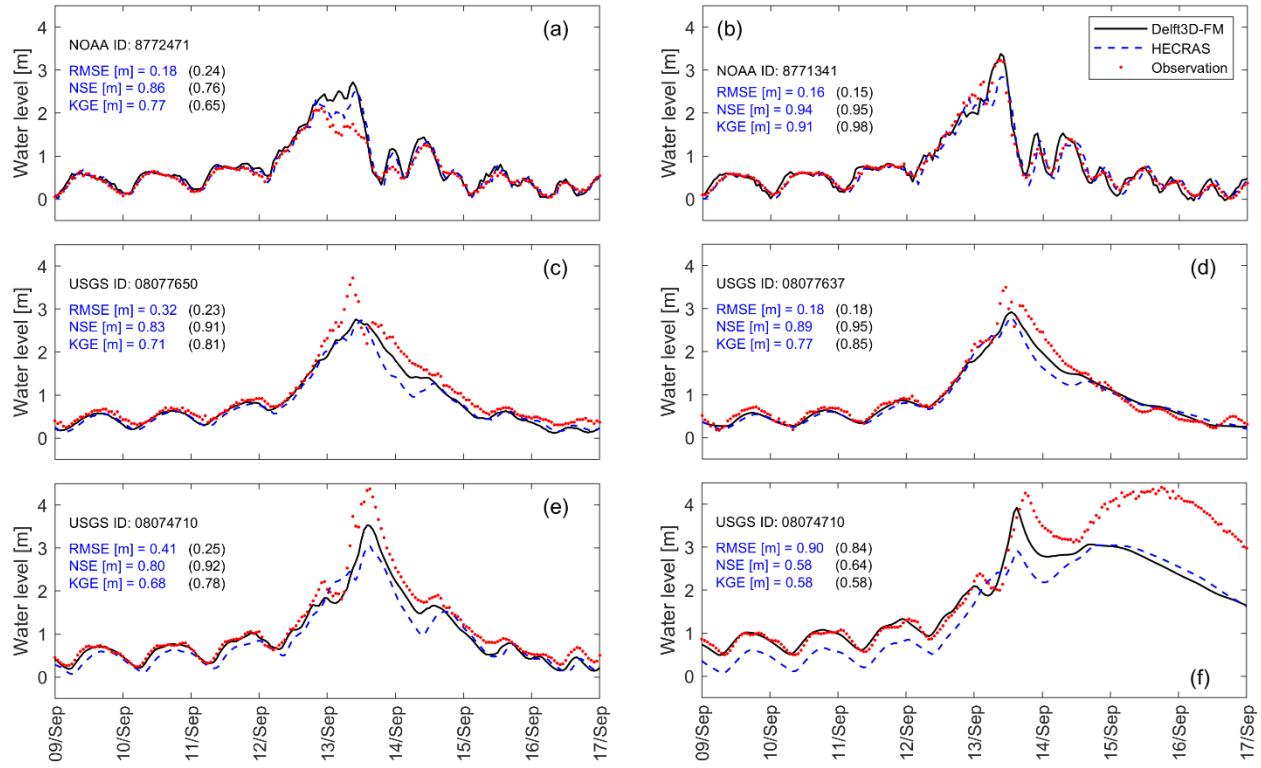



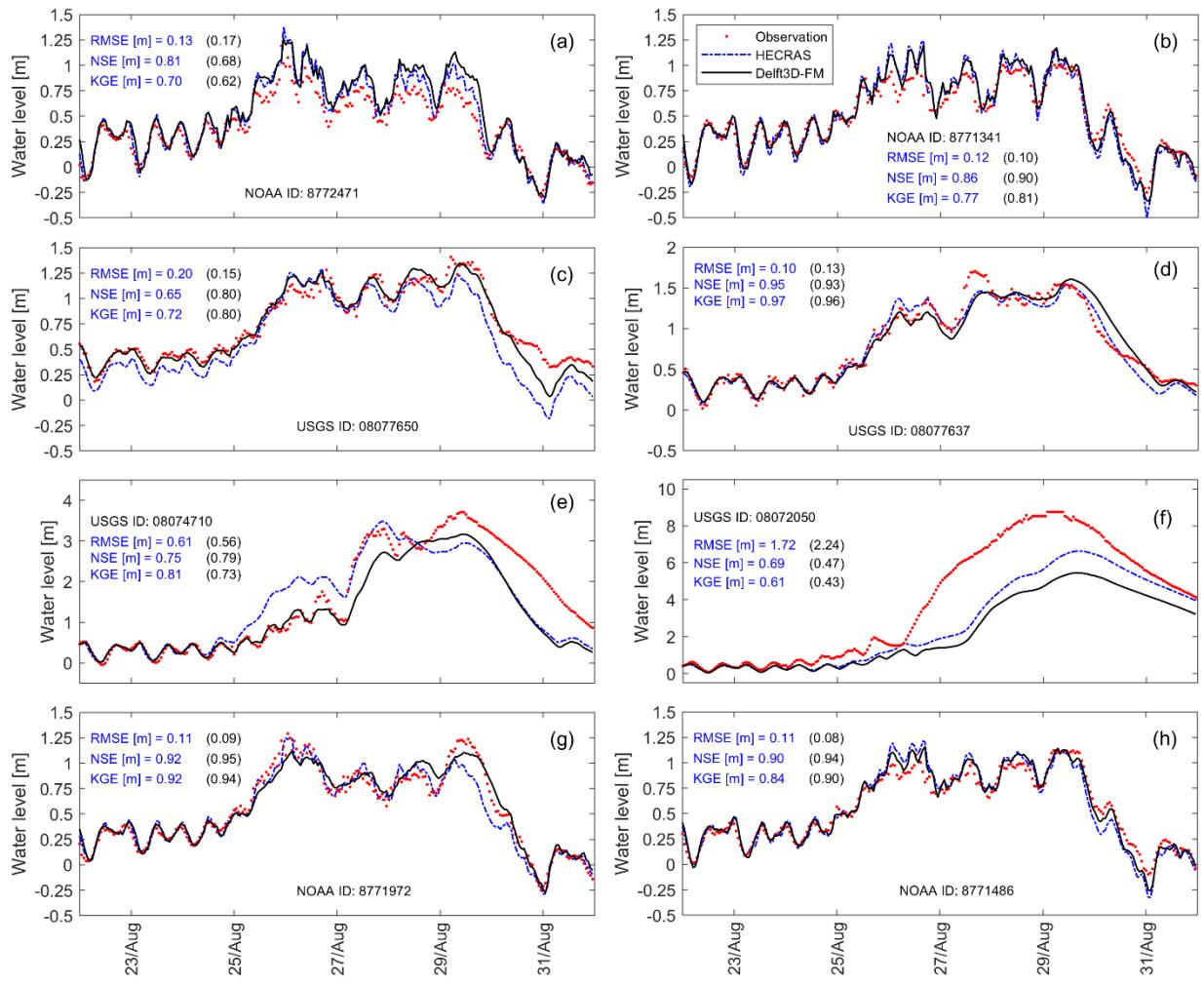
Figure S1. Model calibration for Hurricane Ike at selected tide-gauge stations in Galveston Bay. Model performance is evaluated in terms of RMSE, NSE, and KGE. Color code indicate score metrics for Delft3D-FM (black and in parentheses) and 2D HEC-RAS (blue).

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Figure S2. Model calibration for Hurricane Harvey at selected tide-gauge stations in Galveston Bay. Model performance is evaluated in terms of RMSE, NSE, and KGE. Color code indicate score metrics for Delft3D-FM (black and in parentheses) and 2D HEC-RAS (blue).

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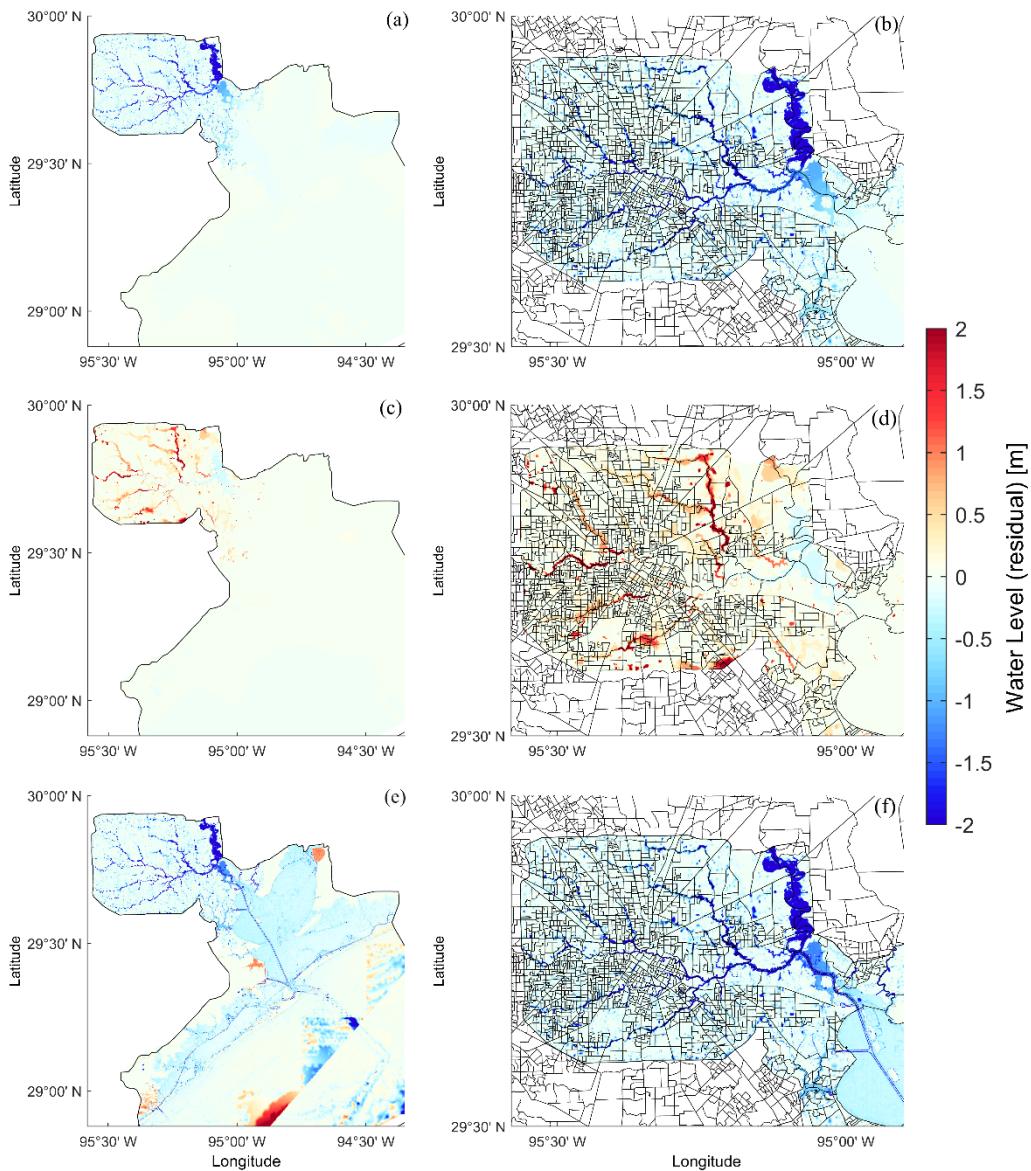
Figure S3. Effect of isolated and total uncertainty on compound flood hazard assessment in Galveston

Bay. Maximum water level residuals represent model scenarios with uncertainty stemming from (a, b)

forcing conditions, (c, d) model parameters, and (e, f) the former in addition to initial condition and

20 model structure (total uncertainty). Water level residuals are calculated with respect to the best hydrodynamic model calibrated for Hurricane Harvey. Positive and negative residuals indicate overestimation and underestimation across the model domain, respectively. Right panel shows a zoom-in window over block census groups in Harris County at the northwest side of Galveston Bay.