Supplementary Material

Subgrid Model of Fluid Force Acting on Buildings for Three-Dimensional Flood Inundation Simulations

Riku Kubota, Jin Kashiwada and Yasuo Nihei

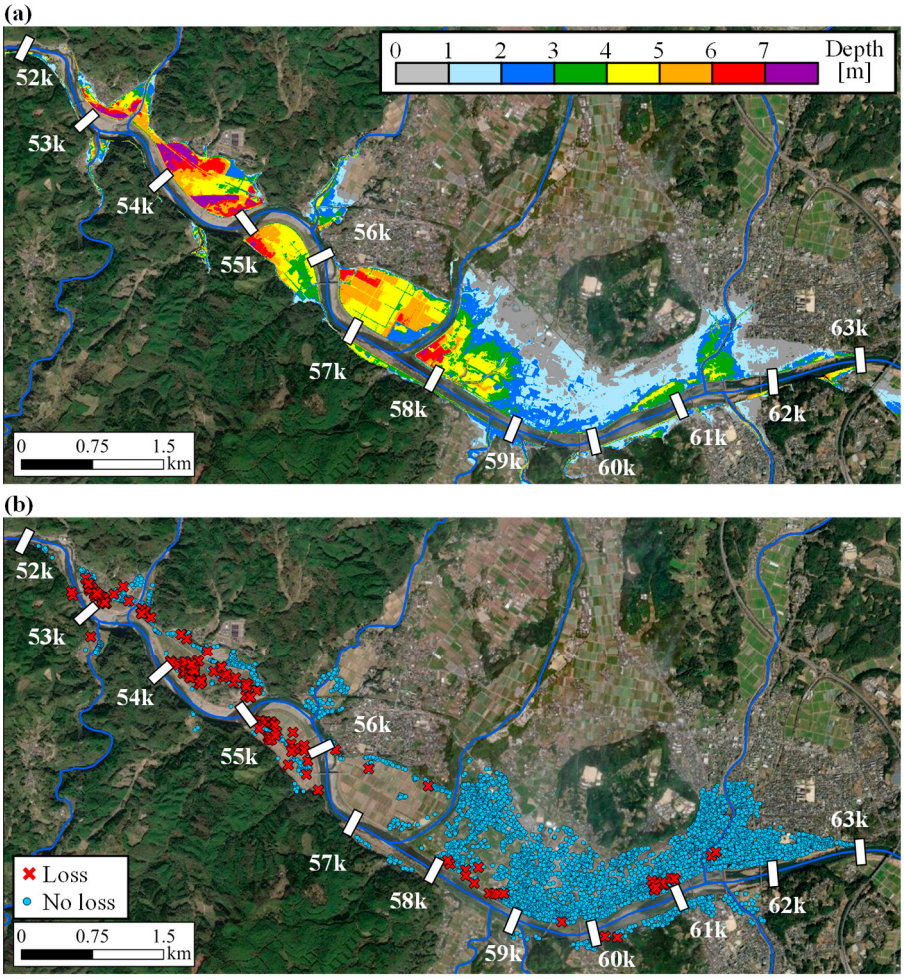

Figure S1. Measured results from 52 to 63 kp along the Kuma River after heavy rainfall in July 2020, obtained from Ogata et al. [54]. **(a)** Contour map for inundation depth and **(b)** and map of building damage are shown. Building damages are classified into "loss," "no loss with inundation," and "without inundation" in which the two formers are depicted in part **(b)**.

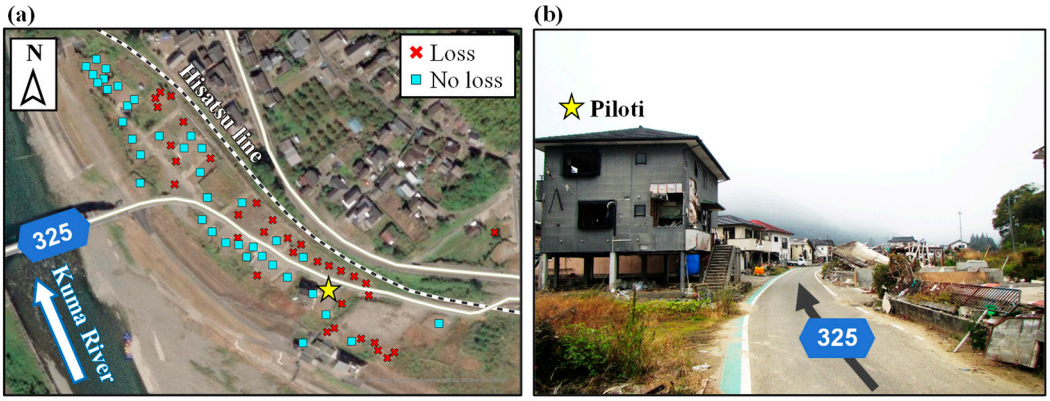

Figure S2. (a) Map of building damage in Chaya district located near 53 kp on the Kuma River and **(b)** photograph taken along the direction of the arrow after the flood disaster of July 2020 heavy rainfall. A piloti structure was located at an upstream point in this district, and the building downstream of the piloti structure was less damaged by this flooding.

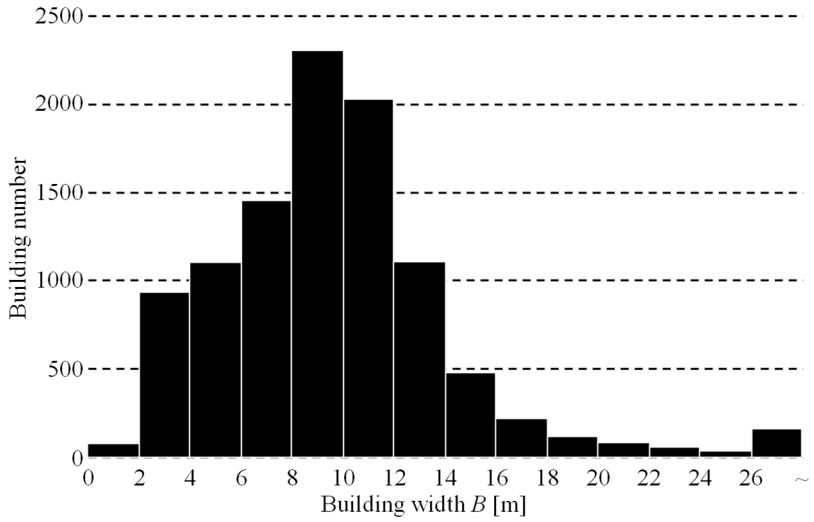

Figure S3. Histogram of building width B in the computational area. Building width B was evaluated using the plane area of building A_b and Eq. (8).

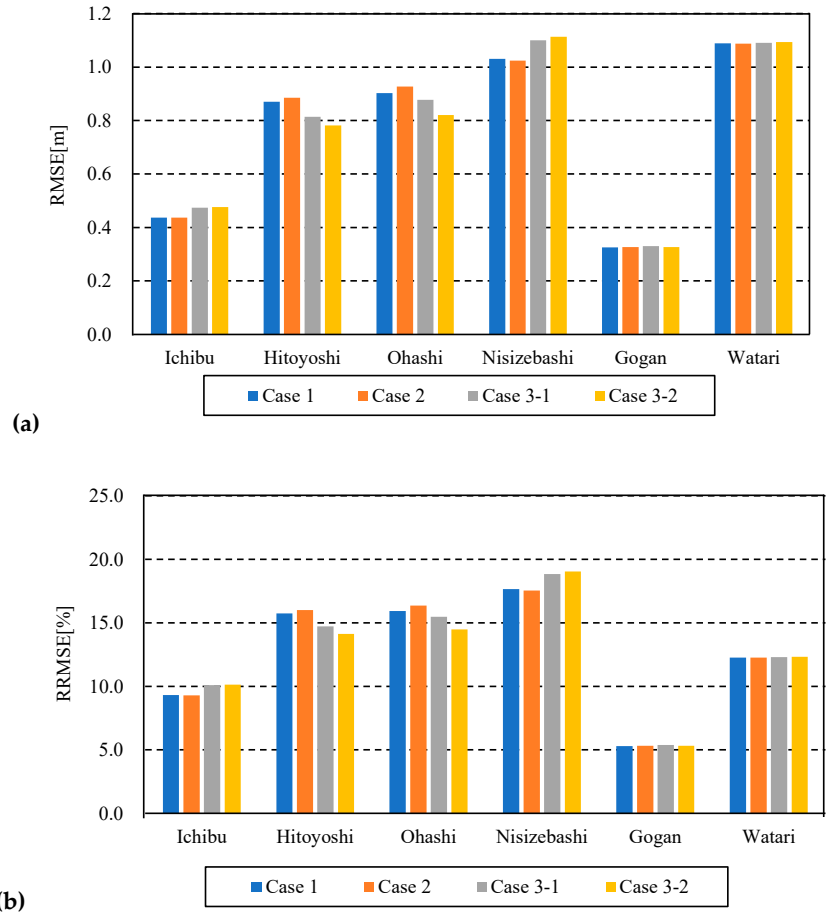

Figure S4. RMSE and RRMSE values for the calculated hydrograph of the water level at six observatory stations. The data shown in Figure 7 are used here.