

A Combined Hydrological and Hydraulic Model for Flood Prediction in Vietnam Applied to the Huong River Basin as a Test Case Study

Table S1. Calibrated parameters of the WetSpa model with 95% confidence intervals for the three upstream sub-catchments of the Huong River (for details about the WetSpa parameters, see [21]).

Symbol	Parameters	Sub-catchment		
		Ta Trach	Huu Trach	Bo
ki	Interflow scaling factor (-)	4.25 ± 0.21	5.70 ± 0.32	2.5 ± 0.25
kg	Groundwater recession coefficient (6h) ⁻¹	0.0014 ± 0.0003	0.00255 ± 0.00051	0.0073 ± 0.0011
k_ss	Initial soil moisture (-)	0.85 ± 0.15	1.27 ± 0.22	0.68 ± 0.12
k_ep	Correction factor for PET (-)	1.16 ± 0.12	1.28 ± 0.1	1.24 ± 0.15
g0	Initial ground water storage (mm)	50 ± 10	106 ± 20	64 ± 11
g_max	Groundwater storage scaling factor (mm)	327 ± 56	206 ± 38	225 ± 44
k_run	Surface runoff exponent (-)	7.4 ± 0.3	4.48 ± 0.27	3.9 ± 0.43
p_max	Rainfall intensity scaling factor (mm/6h)	42.2 ± 18.5	43.7 ± 17.9	62.7 ± 18.7

Table S2. Calibrated Manning coefficients of the HEC-RAS model for the 11 river reaches of the Huong floodplain (for the location of the river reaches see Figure S1).

No.	Reach	Manning coefficient	
		Main channel	River banks
1	Huong 3	0.023	0.125
2	Huong 4	0.027	0.135
3	Huong 5	0.033	0.140
4	Huong 6	0.033	0.140
5	La Y	0.035	0.135
6	Dai Giang	0.035	0.135
7	Song Bo 1	0.033	0.135
8	Song Bo 2	0.035	0.140
9	An Xuan	0.035	0.140
10	Ta Trach	0.020	0.150
11	Huu Trach	0.020	0.150

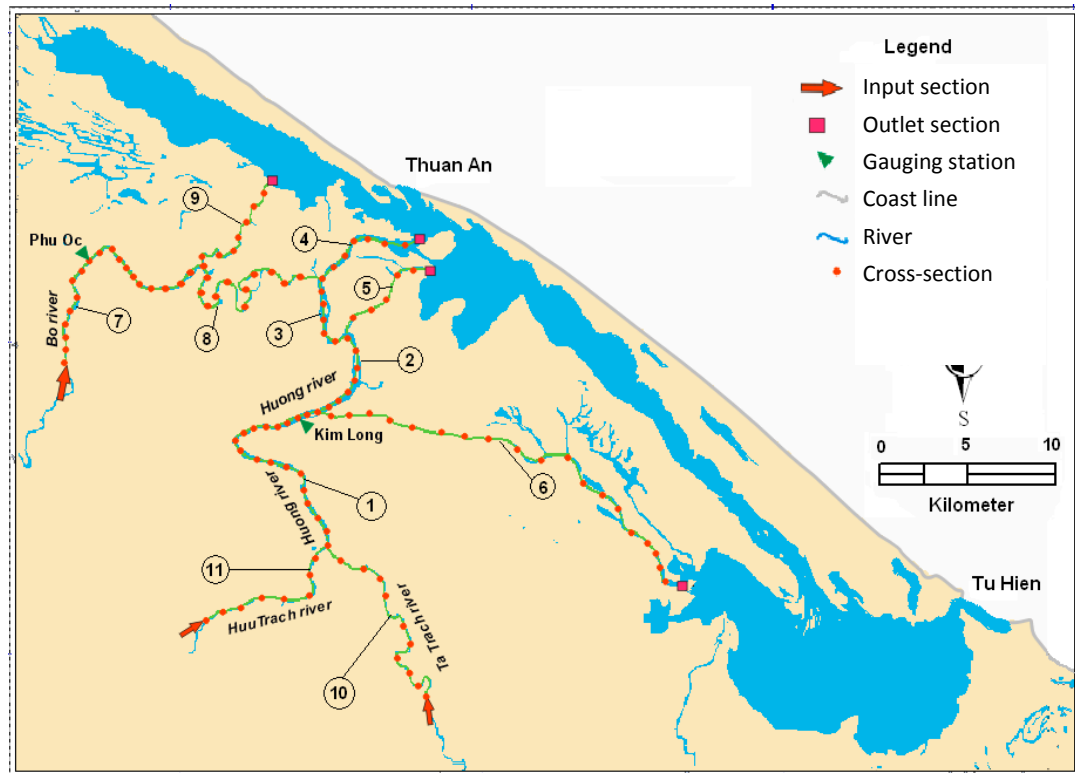
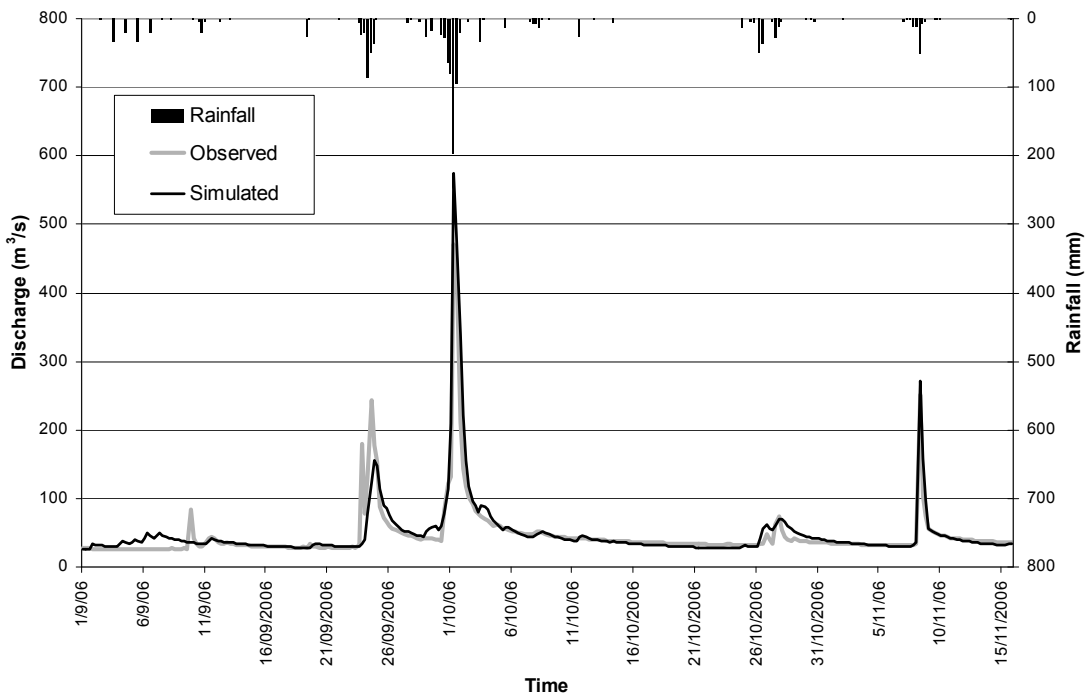
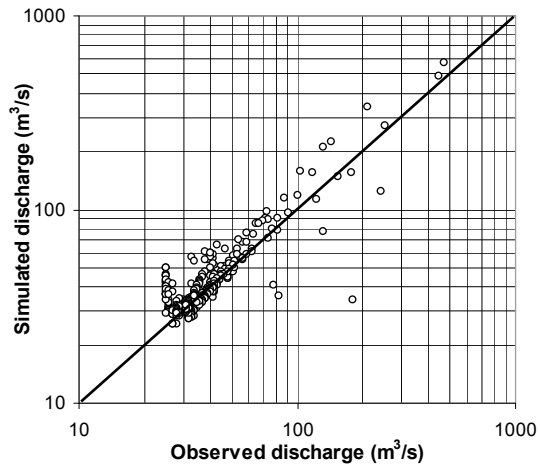


Figure S1. Layout of the hydraulic model in the Huong floodplain, showing the eleven river reaches, three upstream end sections with inflow from the upstream sub-catchments, four downstream end sections with outflow to coastal lagoons, and location of the surveyed cross sections.

A



B



C

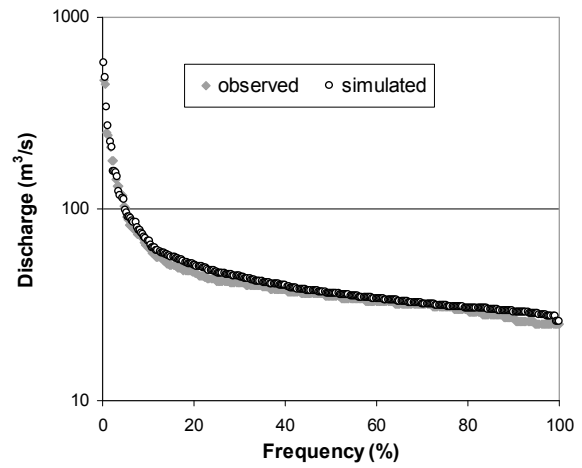


Figure S2. Comparison between simulated and observed flow for the 2006 flood season at the Thuong Nhat gauging station at the Ta Trach river: (a) observed and simulated 6-hourly flow versus time; (b) scatter plot of observed versus simulated flow; (c) ranked observed and simulated flow.

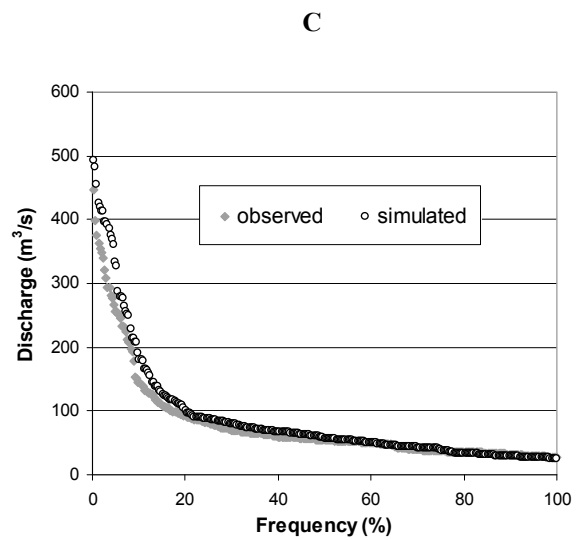
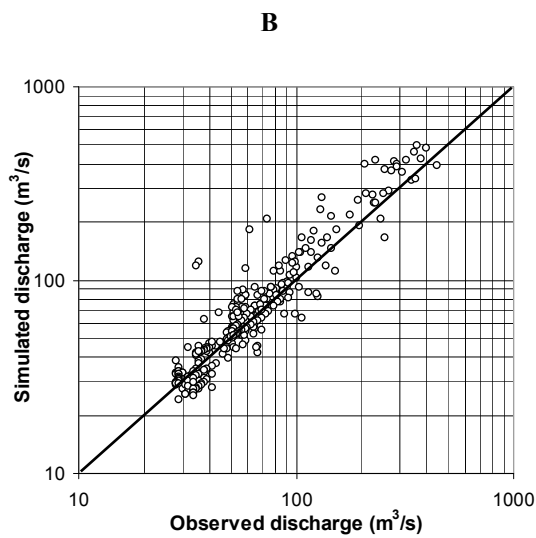
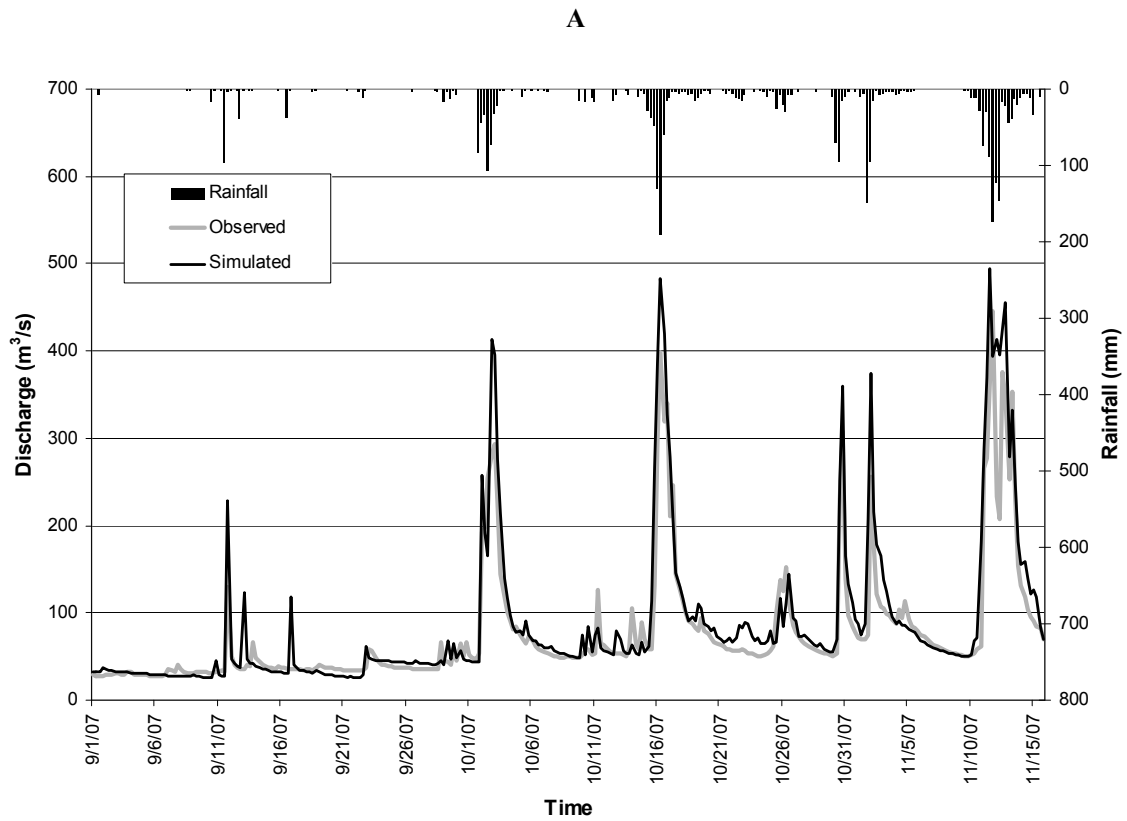
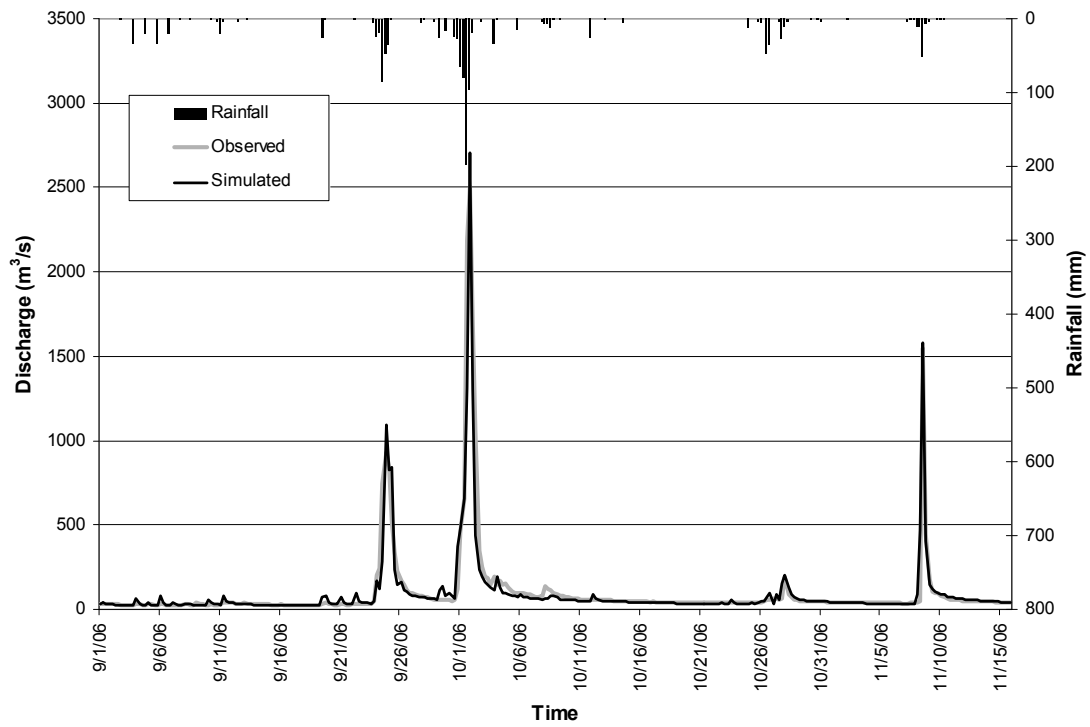
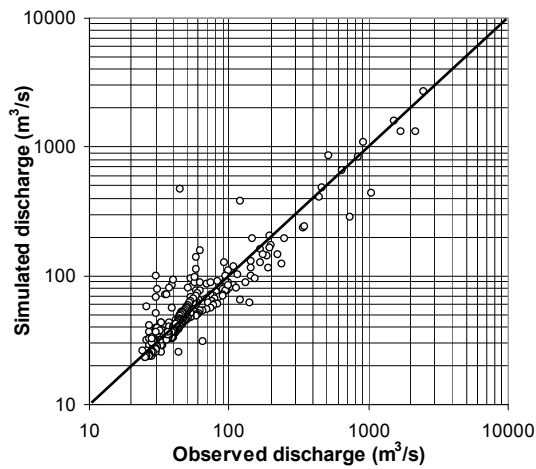


Figure S3. Comparison between simulated and observed flow for the 2007 flood season at the Thuong Nhat gauging station at the Ta Trach river: (a) observed and simulated 6-hourly flow versus time; (b) scatter plot of observed versus simulated flow; (c) ranked observed and simulated flow.

A



B



C

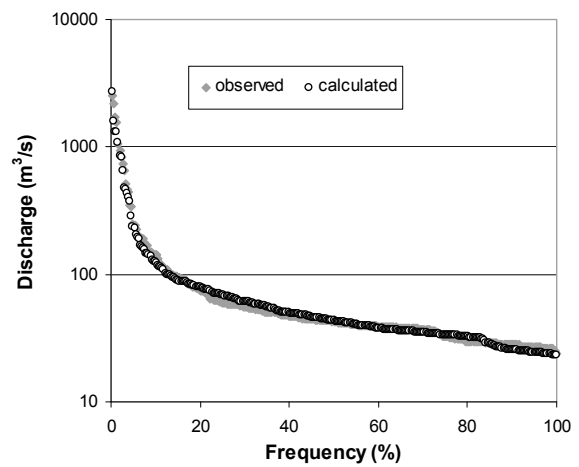


Figure S4. Comparison between simulated and observed flow for the 2006 flood season at the Binh Dien gauging station at the Huu Trach River: (a) observed and simulated 6-hourly flow versus time; (b) scatter plot of observed versus simulated flow; (c) ranked observed and simulated flow.

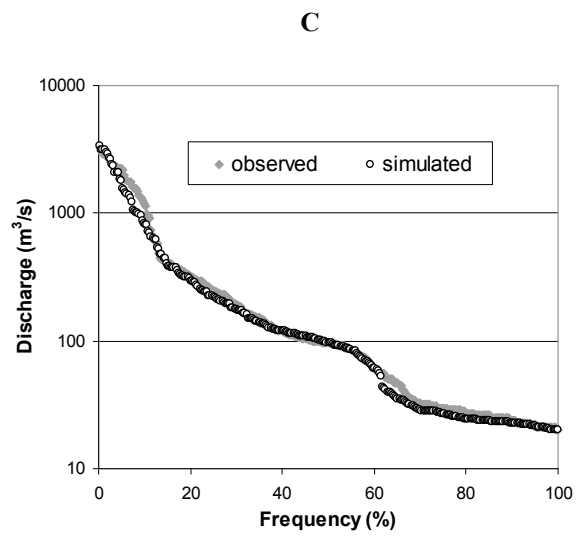
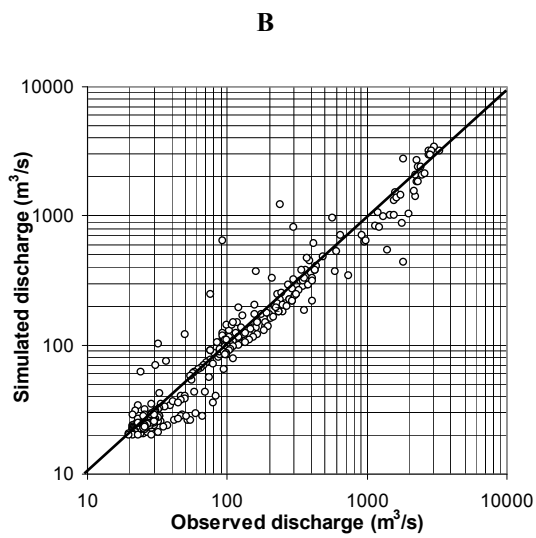
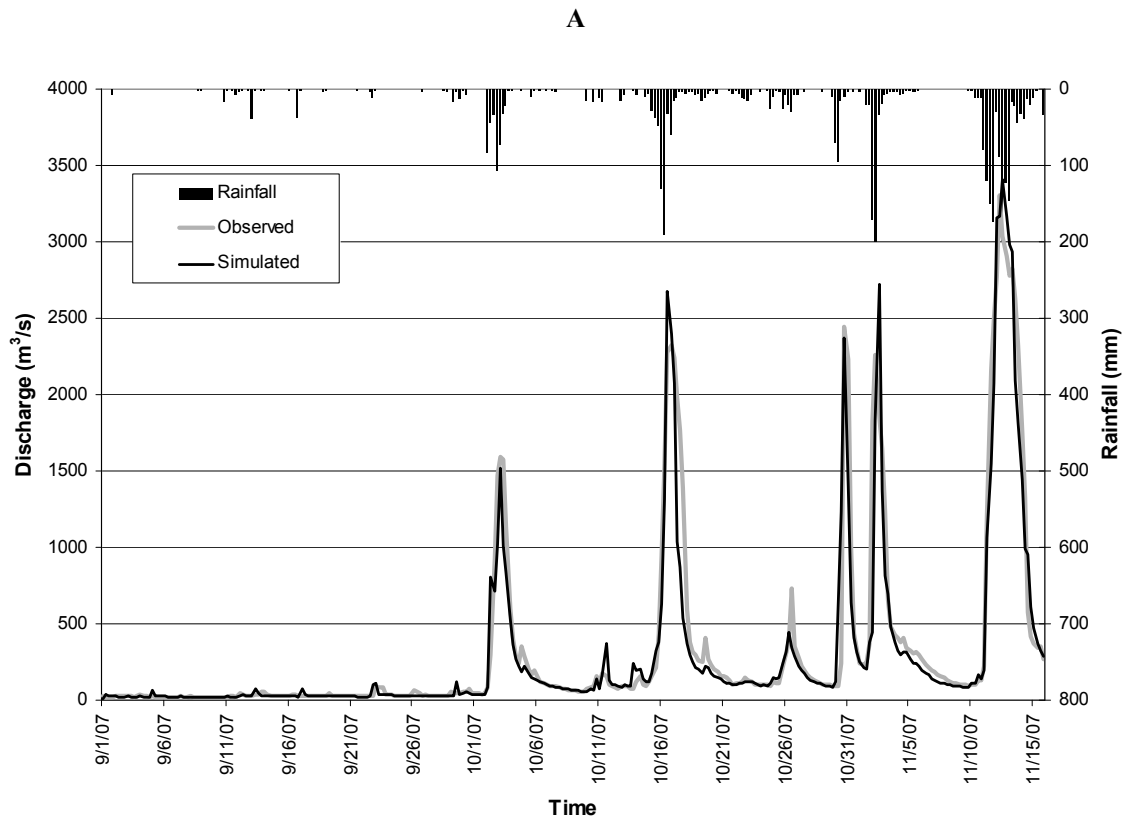


Figure S5. Comparison between simulated and observed flow for the 2007 flood season at the Binh Dien gauging station at the Huu Trach River: (a) observed and simulated 6-hourly flow versus time; (b) scatter plot of observed versus simulated flow; (c) ranked observed and simulated flow.

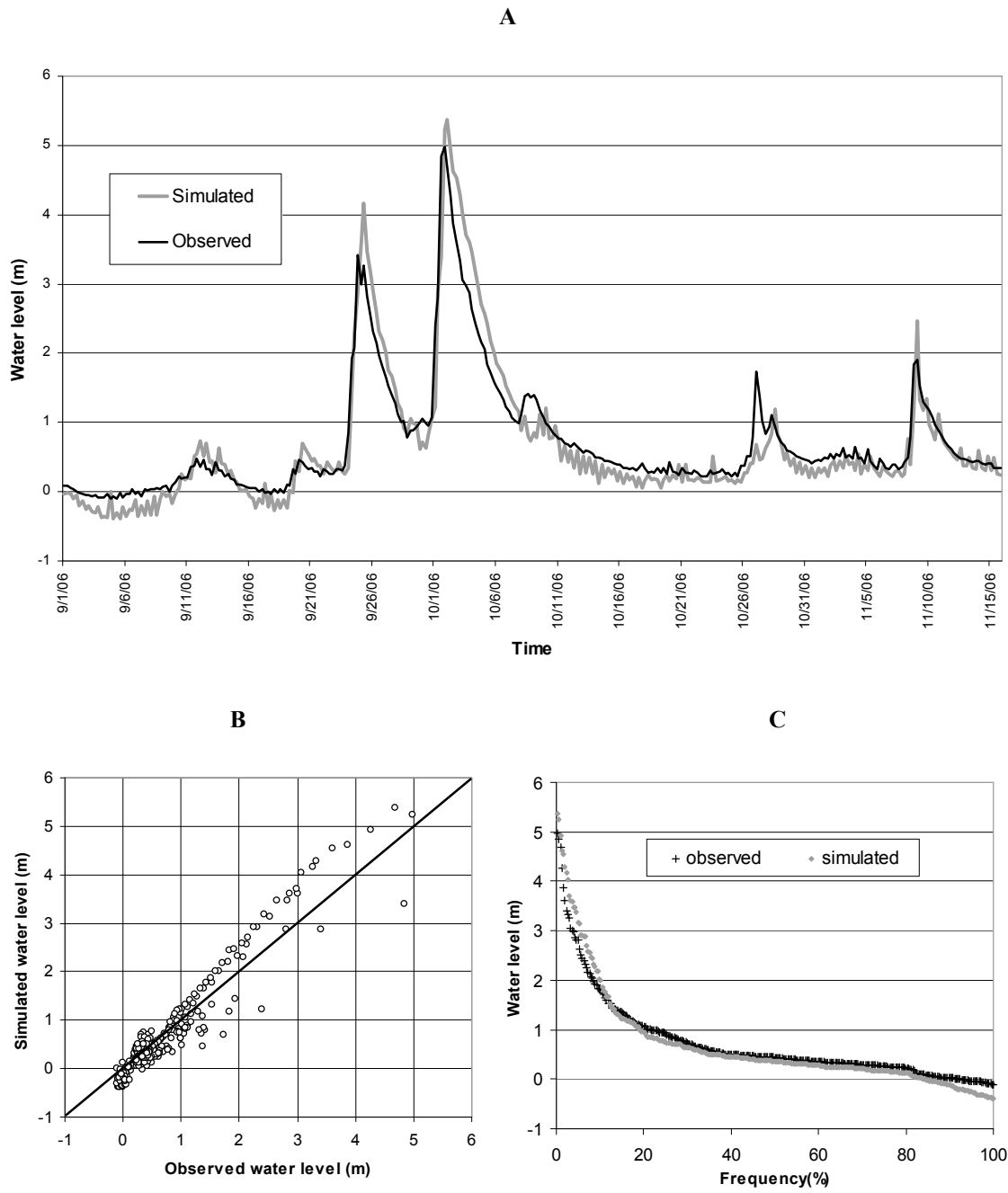


Figure S6. Comparison between simulated and observed water surface level for the 2006 flood season at the Phu Oc gauging station at the Bo River: (a) observed and simulated 6-hourly water level versus time; (b) scatter plot of observed versus simulated water level; (c) ranked observed and simulated water level.

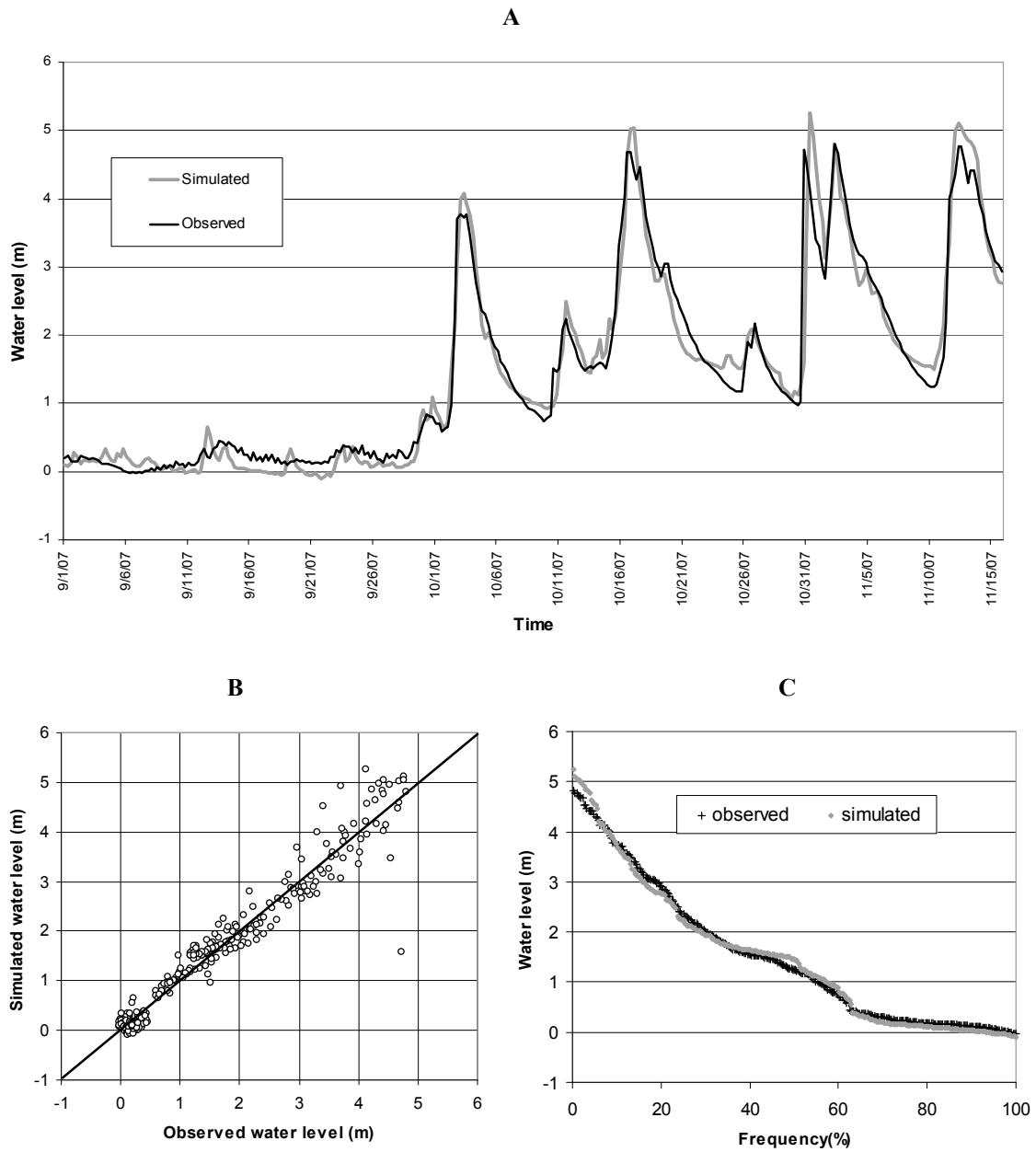


Figure S7. Comparison between simulated and observed water surface level for the 2007 flood season at the Phu Oc gauging station at the Bo River: (a) observed and simulated 6-hourly water level versus time; (b) scatter plot of observed versus simulated water level; (c) ranked observed and simulated water level.

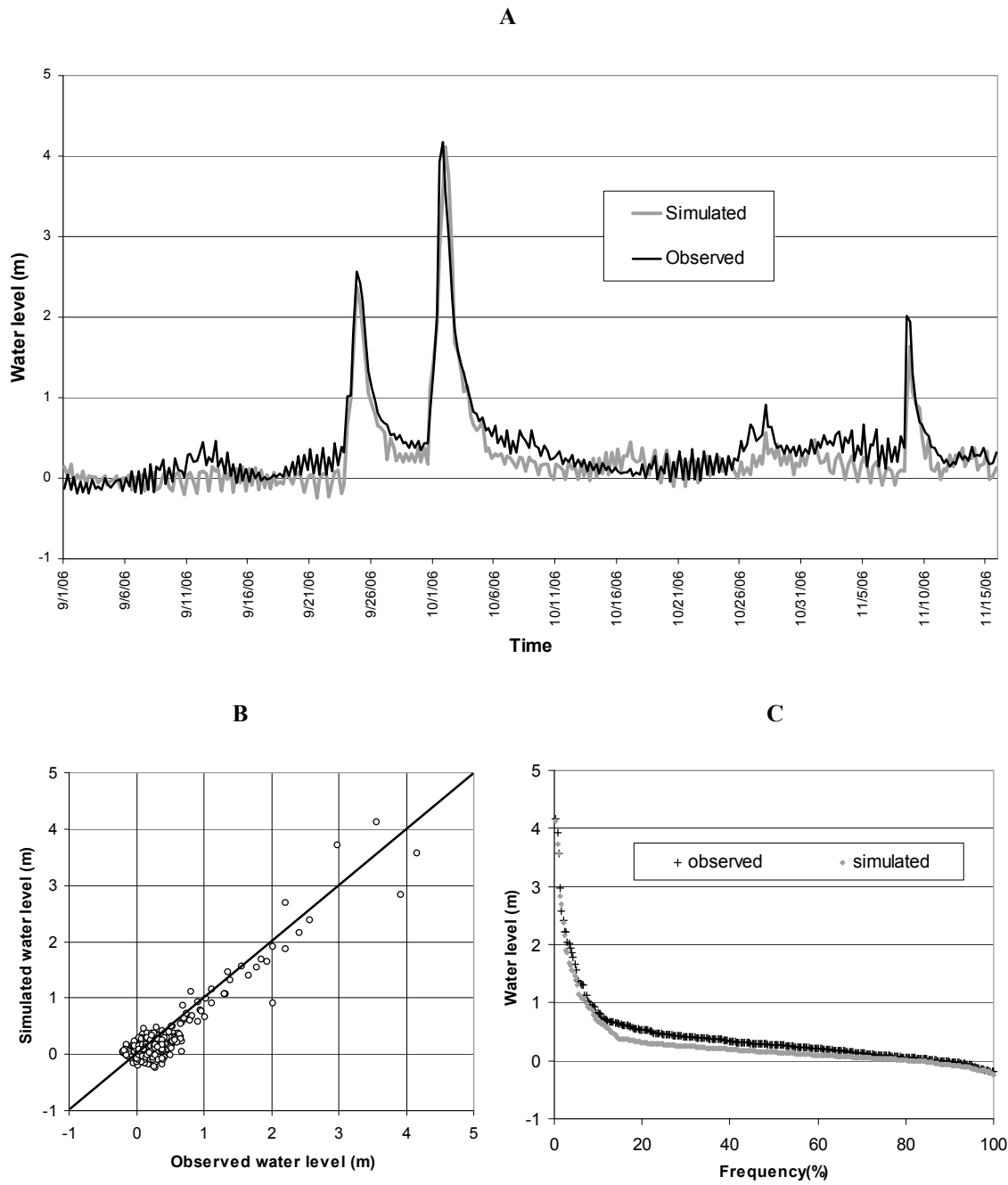


Figure S8. Comparison between simulated and observed water surface level for the 2006 flood season at the Kim Long gauging station at the Huong River: (a) observed and simulated 6-hourly water level versus time; (b) scatter plot of observed versus simulated water level; (c) ranked observed and simulated water level.

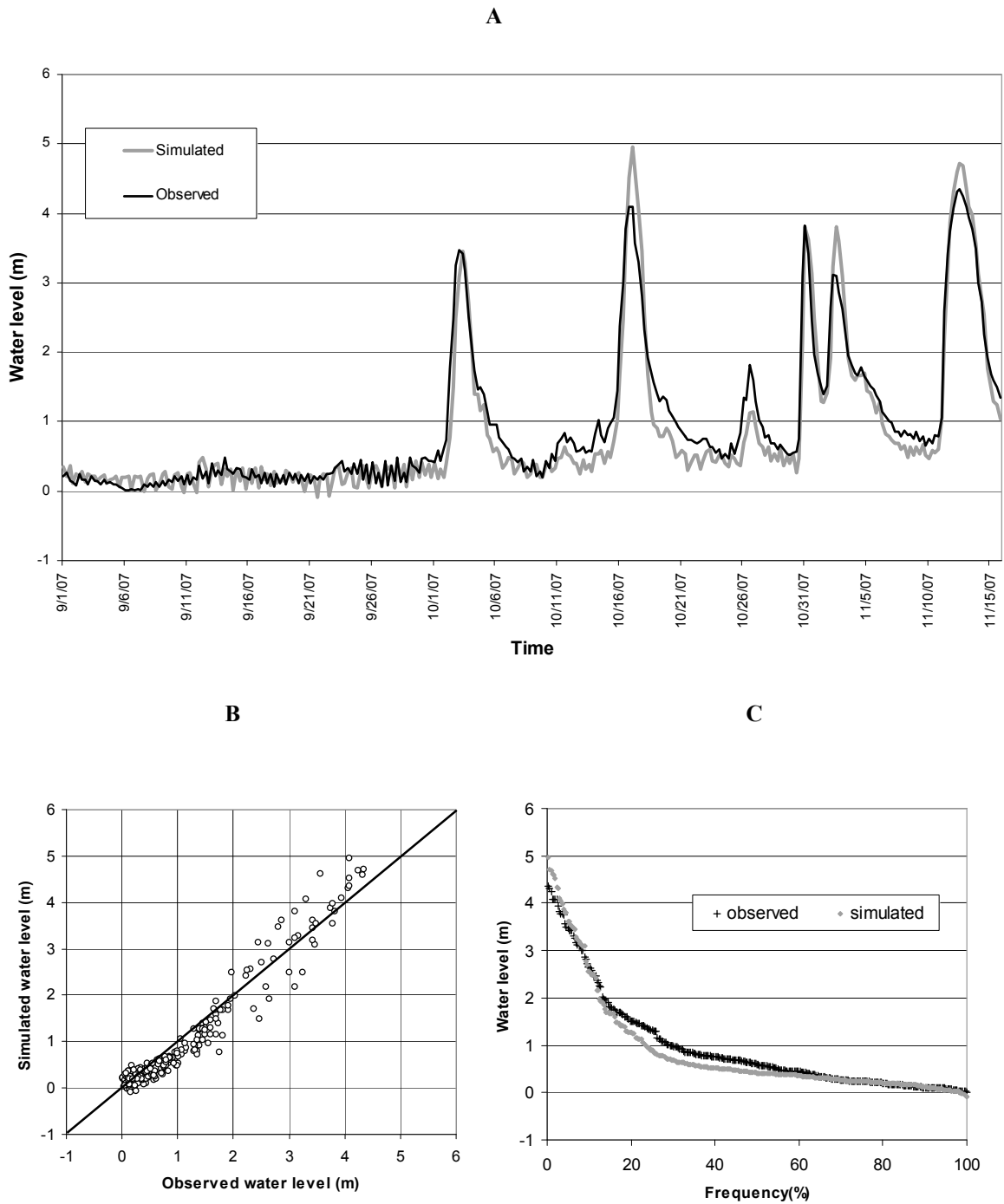


Figure S9. Comparison between simulated and observed water surface level for the 2007 flood season at the Kim Long gauging station at the Huong River: (a) observed and simulated 6-hourly water level versus time; (b) scatter plot of observed versus simulated water level; (c) ranked observed and simulated water level.