



Supplement of

Quantifying the impacts of the Three Gorges Dam on the spatial-temporal water level dynamics in the upper Yangtze River estuary

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nonlinear term $\alpha[\mathcal{Q}/\operatorname{std}(\mathcal{Q})]^{p}$ in Equation (1).							
Stations		Z_0	α	β	γ	RMSE/m	Standard deviation/m
JY	pre-TGD	-0.10	0.31	0.62	0.49	0.06	0.64
	post-TGD	-0.44	0.55	0.45	0.43	0.08	0.59
ZJ	pre-TGD	0.00	0.89	0.92	0.48	0.13	1.23
	post-TGD	-0.27	1.02	0.82	0.43	0.14	1.12
NJ	pre-TGD	-0.37	1.84	0.81	0.40	0.17	1.72
	post-TGD	-0.55	1.57	0.84	0.40	0.19	1.54
MAS	pre-TGD	-0.57	2.50	0.77	0.38	0.20	2.02
	post-TGD	-0.64	2.03	0.83	0.37	0.21	1.80
WH	pre-TGD	-1.31	3.78	0.66	0.32	0.21	2.35
	post-TGD	-1.36	3.09	0.71	0.32	0.21	2.07

Table S1. Calibrated regression coefficients for both the pre-TGD and post-TGD periods along the YRE by replacing the terms $\alpha Q/\text{std}(Q) + \gamma Z_{up}/\text{std}(Z_{up})$ with the nonlinear term $\alpha [Q/\text{std}(Q)]^{\beta}$ in Equation (1).



Figure S1. Relationship between water level and river discharge at the DT hydrological station (a) and that between residual water level slope for the whole estuary and river discharge (b).



Figure S2. Autoregressive power spectral density estimate of the daily averaged water level observed at TSG gauging station.



Figure S3. Comparison between predicted and observed daily averaged water levels for both the pre-TGD and post-TGD periods at different gauging stations along the YRE by replacing the terms $\alpha Q/\text{std}(Q) + \gamma Z_{up}/\text{std}(Z_{up})$ with the nonlinear term $\alpha [Q/\text{std}(Q)]^{\beta}$ in Equation (1): (a) Jiangyin (JY), (b) Zhenjiang (ZJ), (c) Nanjing (NJ), (d) Maanshan (MAS), (e) Wuhu (WH).



Figure S4. Variance contributions induced by the riverine Δp_r and tidal Δp_t forcing at different gauging stations along the upper Yangtze River estuary during the pre-TGD period.



Figure S5. Variance contributions induced by the riverine Δp_r and tidal Δp_t forcing at different gauging stations along the upper Yangtze River estuary during the post-TGD period.