

Table S6 Surface soil properties for model operation.

Site name ^a	CS ^c	DY ^d	FQP ^e	SZ ^f	YTA ^g
Soil Texture ^b	L	SC	SL	L	L
Bulk density (g cm ⁻³)	1.04	1.18	1.45	1.12	1.16
Clay (%)	20.6	42.3	10.0	19.5	18.0
Sand (%)	42.4	34.8	52.0	41.0	19.2
pH	7.1	5.4	8.8	6.1	5.8
Soil organic carbon content (g C kg ⁻¹)	25.5	17.0	4.9	20.8	18.0

^a The sites are Changshu (CS), Danyang (DY), Fengqiu with rice paddy fields (FQP), Shenzhen (SZ), and Yingtian (YTA).

^b The soil textures are loam (L), sandy clay (SC) and sandy loam (SL).

^c Clay and sand fractions: 0–30 cm, cited from the Second National Soil Survey data (10×10 km² grid) provided by the Institute of Soil Science, Chinese Academy of Sciences (SNSS); Soil pH: 0–20 cm, observed (Song et al., 2004); Soil organic carbon content (SOC): 0–20 cm, estimated from the observed soil organic matter content divided by 1.724; Bulk density (BD): 0–20 cm, estimated from SOC using the algorithm in Li (2016).

^d Clay fraction and soil pH: topsoil, observed (Cai et al., 1986); Sand fraction: 0–30 cm, SNSS; SOC: topsoil, estimated from the observed organic nitrogen (ON) multiplied by 10; BD: topsoil, estimated from SOC using the algorithm in Li (2016).

^e Clay fraction and soil pH: topsoil, observed (Zhu et al., 1989); Sand fractions: 0–30 cm, SNSS; SOC: 0–15 cm, estimated from the observed ON multiplied by 10; BD: 0–15 cm, estimated from SOC using the algorithm in Li (2016).

^f Clay and sand fractions: 0–30 cm, SNSS; SOC and soil pH: 0–30 cm, observed (Gong et al., 2013); BD: 0–30 cm, estimated from SOC using the algorithm in Li (2016).

^g Clay fraction and soil pH: topsoil, observed (Cai et al., 1992); Sand fraction: 0–30 cm, SNSS; SOC: 0–15 cm, estimated from the observed ON multiplied by 10; BD: 0–15 cm, estimated from SOC using the algorithm in Li (2016).