

Supplementary Information

Streamflow Response to Climate and Land-Use Changes in a Tropical Island Basin

Can Cao^{1, 2, 3}, Rui Sun^{1, 4*}, Zhixiang Wu^{1, 4}, Bangqian Chen^{1, 4}, Chuan Yang^{1, 4}, Qian Li^{2*}, Klaus Fraedrich⁵

¹ Rubber Research Institute, Chinese Academy of Tropical Agricultural Sciences, Haikou 571101, China

² School of Geography and Planning, Ningxia University, Yinchuan 750021, China

³ Key Laboratory of Water Cycle and Related Land Surface Processes, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China

⁴ Hainan Danzhou Tropical Agro-ecosystem National Observation and Research Station, Danzhou 571737, China

⁵ Max Planck Institute for Meteorology, Hamburg 20146, Germany

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Tables S1–S5 and their captions

Table S1. Parameter information and fitted values.

No.	Parameter ^a	Description	Fitted Values	Range
1	r__EPCO.hru	Plant uptake compensation factor	-0.86	[-1, 1]
2	r__SLSUBBSN.hru	Average slope length	8.85	[0, 15]
3	v__CH_K2.rte	Effective hydraulic conductivity in main channel	11.75	[5, 20]
4	r__SOL_BD.sol	Soil moist bulk density	1.63	[0.9, 2.5]
5	v__GW_DELAY.gw	Groundwater delay (days)	5.37	[1, 20]
6	v__GW_REVAP.gw	Groundwater "revap" coefficient	-0.82	[-1, 1]
7	v__ALPHA_BF.gw	Baseflow alpha factor (days)	0.23	[0, 1]
8	r__SOL_Z.sol	Depth from soil surface to bottom of layer	0.54	[0, 1]
9	v__GWQMN.gw	Threshold depth of water in the shallow aquifer required for return flow to occur (mm)	1.94	[0, 2]
10	v__ALPHA_BNK.rte	Baseflow alpha factor for bank storage	0.69	[0, 1]
11	r__SOL_AWC.sol	Available water capacity of the soil layer	0.78	[0, 1]
12	r__SOL_K.sol	Saturated hydraulic conductivity	0.9	[0, 1]
13	v__REVAPMN.gw	Threshold depth of water in the shallow aquifer for "revap" to occur (mm)	3.3	[0, 10]
14	v__ESCO.hru	Soil evaporation compensation factor	0.13	[0, 1]

15	r__CANMX.hru	Maximum canopy storage	0.74	[0, 1]
16	r__HRU_SLP.hru	Average slope steepness	0.034	[0, 0.2]
17	v__CH_N2.rte	Manning's "n" value for the main channel	0.22	[-0.01, 1]
18	r__CN2.mgt	SCS runoff curve number for moisture condition II	-0.23	[-1, 10]

a: Those parameters given to the multiplier (1, 2, 4, 8, 11, 12,15,16,18) are expressed as (r_ parameter) and their values indicate a multiplicative change to the default values. Other v_ parameters are directly replaced with the best values.

Table S2. Changes in hydrological components due to LUCC in the Nandu River Basin from 1990 to 2015.

Year	Unit	ET	PET	Surface Runoff	Subsurface Flow	Shallow Percolation	Shallow Water Storage	Deep Recharge	Aquifer Return Flow
1990	mm	730.90	904.80	416.06	64.24	762.40	18.08	38.12	724.21
2015	mm	759.80	941.20	397.73	44.83	770.92	18.78	38.55	732.29
Variation	mm	28.90	36.40	-18.33	-19.41	8.52	0.70	0.43	8.08
Rate	%	3.95	4.02	-4.41	-30.21	1.12	3.87	1.13	1.12

Note: Values represent the annual average of the study area during the simulation period. The annual average precipitation from 1990 to 2015 was 1975 mm.

Table S3. Proportion of hydrological components in Nandu River Basin in the years 1990 and 2015.

Year	Base Flow /Streamflow	Surface Runoff /Streamflow	Streamflow /Precipitation	Deep Recharge / Precipitation	ET /Precipitation
1990	0.65	0.35	0.61	0.02	0.37
2015	0.66	0.34	0.59	0.02	0.38

Table S4. Changes in hydrological components due to Future LUCC in Nandu River Basin.

Year	Unit	ET	PET	Surface Runoff	Subsurface Flow	Shallow Percolation	Shallow Water Storage	Deep Aquifer Recharge	Return Flow
2015	mm	759.8	941.2	397.73	44.83	770.92	18.78	38.55	732.29
2040	mm	736.4	904.7	419.03	15.74	802.48	18.08	40.12	762.27
Variation	mm	-23.4	-36.5	21.3	-29.09	31.56	-0.7	1.57	29.98
Rate	%	-3.08	-3.88	5.36	-64.89	4.09	-3.73	4.07	4.09

Note: values represent the annual average of the study area during the simulation period.

Table S5. Proportion of hydrological components in Nandu River Basin in the years 2015 and 2040.

Year	Base Flow /Streamflow	Surface Runoff /Streamflow	Streamflow /Precipitation	Deep Recharge / Precipitation	ET /Precipitation
2015	0.66	0.34	0.59	0.02	0.38
2040	0.65	0.35	0.61	0.02	0.37