A daily and 500m coupled evapotranspiration and gross primary production product across China during 2000-2020

Shaoyang He[1,2], Yongqiang Zhang[1*], Ning Ma[1], Jing Tian[1], Dongdong Kong[3], Changming Liu[1]

[1]Key Laboratory of Water Cycle and Related Land Surface Processes, Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing 100101, China

[2]University of Chinese Academy of Sciences, Beijing 100040, China

[3]Department of Atmospheric Science, School of Environmental Studies, China University of Geosciences, Wuhan 430074, China

Correspondence to: Yongqiang Zhang (zhangyq@igsnrr.ac.cn)

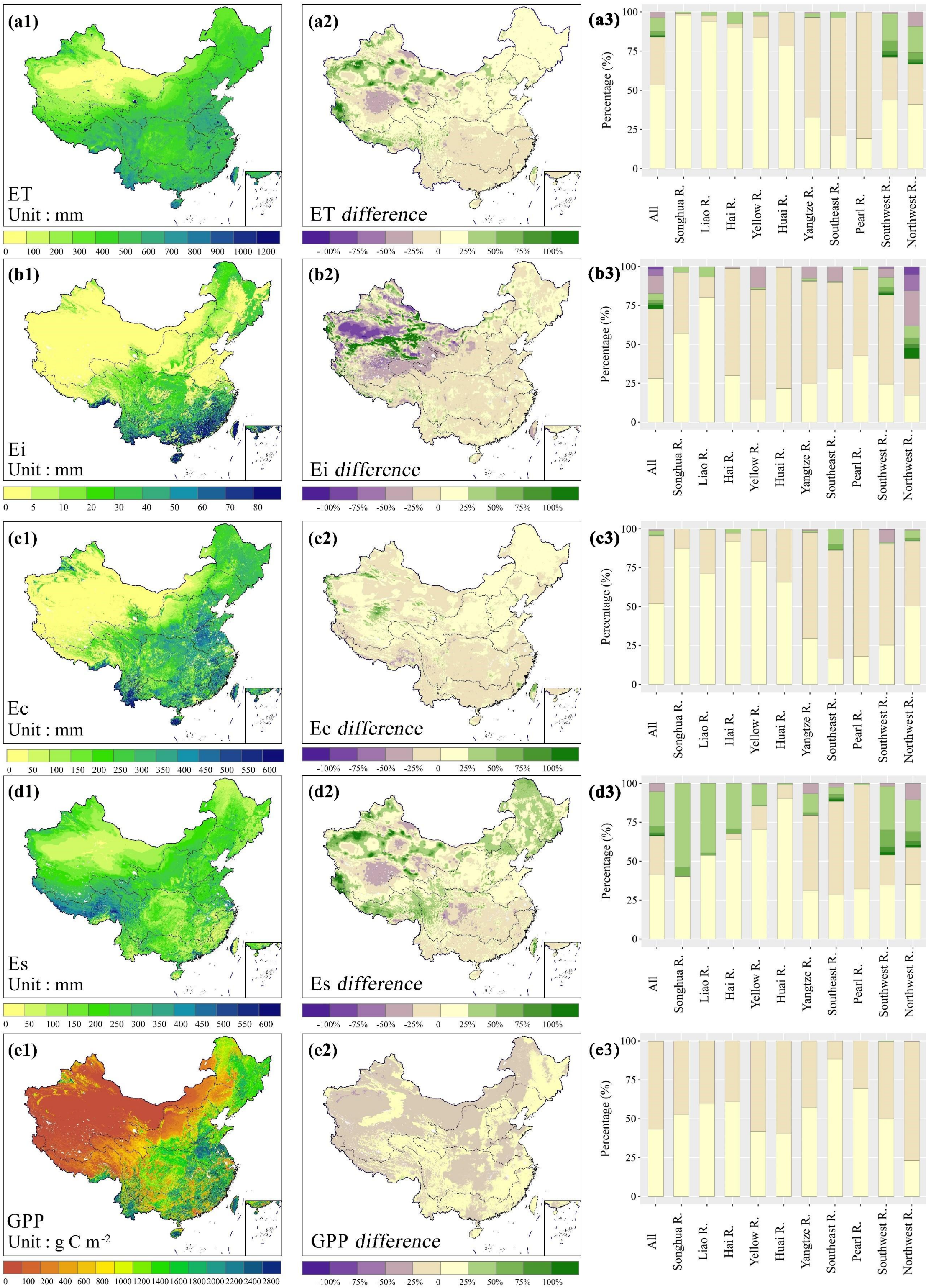
Supplement

Table S1: The calibrated parameter values for nine PFTs used in PML-V2(China).

Parameter	ENF	EBF	MF	OSH	SAV	GRA	WET	CRO	BSV
β	0.0372	0.0389	0.0388	0.0289	0.0392	0.0499	0.0281	0.0391	0.0125
η	0.0429	0.0092	0.0223	0.0627	0.0151	0.0687	0.0312	0.0599	0.0416
m_s	3.7259	7.9996	7.7992	6.3180	6.3644	13.7067	21.8661	4.9718	5.5359
A_{m_25}	46.3662	9.6550	9.6552	12.8114	2.3992	6.8200	46.3697	29.9989	46.3572
Da	1.9870	0.9779	0.7992	0.8987	0.8828	0.5161	1.6043	1.9924	1.9952
k_Q	1.0000	0.5447	0.5058	0.5362	0.4231	0.9981	0.1054	0.2030	0.9954
k_A	0.6829	0.8002	0.8878	0.1426	0.8890	0.8972	0.8900	0.8856	0.6936
S_{sls}	0.1674	0.1155	0.0587	0.1598	0.0546	0.1276	0.0005	0.0091	0.1697
f_{ER}	0.0074	0.0156	0.0171	0.0696	0.1459	0.0031	0.0054	0.0106	0.1469
D_{min}	0.6503	0.6501	0.7307	0.7891	1.4103	1.4846	0.6517	1.3936	1.4895
D_{max}	5.3248	4.9345	5.4764	3.5021	6.4998	6.4721	5.5137	4.9973	6.4963

Table S2: Model performance for daily ET and GPP estimates at the 26 flux sites.

Site code	ET				GPP			
	NSE	*RMSE* (mm d^{-1})	*R*	*Bias* (%)	*NSE*	*RMSE* (g C m^{-2} d^{-1})	*R*	*Bias* (%)
ARCJZ	0.83	0.59	0.92	-13.39	0.87	1.03	0.94	17.66
BNXJL	0.42	0.72	0.65	-0.81	0.41	1.23	0.65	0.28
CF-CBF	0.82	0.49	0.91	-0.21	0.89	1.41	0.94	-2.26
CF-HBG_S01	0.81	0.57	0.91	-10.09	0.91	0.86	0.96	-10.52
CF-HBG_W01	0.78	0.73	0.90	-8.17	0.85	2.76	0.96	-12.26
CF-NMG	0.58	0.58	0.82	12.20	0.80	0.67	0.91	25.77
CF-QYF	0.70	0.71	0.85	-7.86	0.74	1.33	0.88	-2.55
CF-YCA	0.39	1.22	0.70	-18.05	0.60	4.59	0.82	-25.63
CN-Cng	0.70	0.65	0.85	-12.81	0.70	1.22	0.90	-28.22
CN-Du2	0.55	0.75	0.78	1.41	0.71	0.67	0.90	29.99
CN-HaM	0.81	0.45	0.94	19.01	0.78	1.42	0.92	-18.93
DMCJZ	0.84	0.77	0.94	-22.94	0.82	2.34	0.91	3.03
DSLZ	0.76	0.69	0.89	4.49	0.25	1.49	0.92	32.13
DXZ	0.41	0.90	0.79	-3.41	0.43	2.49	0.83	45.37
DYKGTSLZ	0.55	0.63	0.84	16.49	0.55	1.78	0.81	-16.85
GTZ	0.63	0.68	0.87	12.62	0.45	2.67	0.91	25.94
HLZ	0.65	0.74	0.87	7.96	0.82	2.66	0.92	-10.58
HZZHMZ	0.48	0.70	0.74	-27.03	0.41	0.33	0.74	-9.97
MYZ	0.74	0.61	0.92	12.47	0.29	2.39	0.91	60.83
QZ-BJ	0.68	0.70	0.84	-13.13	0.38	0.76	0.66	12.98
QZ-NAMORS	0.41	1.04	0.73	-27.81	0.44	0.60	0.67	-6.51
QZ-QOMS	0.05	0.50	0.69	39.42	0.64	0.26	0.80	-3.96
YJGRHG	0.36	0.39	0.67	-6.79	0.67	0.80	0.82	-3.03
YKGQLZZ	0.87	0.62	0.94	-15.74	0.85	2.48	0.92	-3.16
YKZ	0.39	0.77	0.74	-2.06	0.54	0.47	0.76	3.30
ZYSDZ	0.83	1.04	0.94	-2.68	0.77	1.77	0.91	29.44



(a1)
ET
Unit : mm
0 100 200 300 400 500 600 700 800 900 1000 1200
(a2)
ET difference
-100% -75% -50% -25% 0 25% 50% 75% 100%
(a3)
Percentage (%)
0 25 50 75 100
All
Songhua R.
Liao R.
Hai R.
Yellow R.
Huai R.
Yangtze R.
Southeast R.
Pearl R.
Southwest R.
Northwest R.
(b1)
Ei
Unit : mm
0 5 10 20 30 40 50 60 70 80
(b2)
Ei difference
-100% -75% -50% -25% 0 25% 50% 75% 100%
(b3)
Percentage (%)
(c1)
Ec
Unit : mm
0 50 100 150 200 250 300 350 400 450 500 550 600
(c2)
Ec difference
-100% -75% -50% -25% 0 25% 50% 75% 100%
(c3)
Percentage (%)
(d1)
Es
Unit : mm
0 50 100 150 200 250 300 350 400 450 500 550 600
(d2)
Es difference
-100% -75% -50% -25% 0 25% 50% 75% 100%
(d3)
Percentage (%)
(e1)
GPP
Unit : g C m-2
0 100 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2800
(e2)
GPP difference
-100% -75% -50% -25% 0 25% 50% 75% 100%
(e3)
Percentage (%)

Figure S1: The modelling results using GLDAS-2.1 meteorological forcing data during 2001-2018 and comparison with the PML-V2(China) product using CMFD: (a1-e1) Spatial distribution of the 18-year mean of five variables; (a2-e2) Spatial distribution of the *difference* using two forcing datasets, calculated by $(\textbf{PML-V2}(\textbf{China})_{\textbf{GLDAS-2.1}} - \textbf{PML-V2}(\textbf{China})_{\textbf{CMFD}})/\textbf{PML-V2}(\textbf{China})_{\textbf{CMFD}}$; and (a3-e3) Proportion of *difference* in each river basin. 'ALL' represents the whole study area. The legends for (a3-e3) are the same as that for (a2-e2). Taking Fig.(a3) as an example, the area percentage of ET *difference* in 0 ~ 25% in the Songhua River Basin is about 99%.