Supplementary Materials for

TECO-CNP Sv1.0: A coupled carbon-nitrogen-phosphorus model with data assimilation for subtropical forests

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This PDF file includes:

Supplementary tables

Table S1 Carbon cycling observations from study site for model development.

Variables	Value	Unit	Sources	Measured Year
Evaluation				
Leaf C	0.22 ± 0.02	kg C m^{-2}	Zhou, 2020	2013-2017
Wood C	8.67 ± 0.56	kg C m^{-2}	Zhou, 2020	2013-2017
Root C	0.47 ± 0.03	kg kg^{-1}	Measured data	2007
Root biomass	0.32 ± 0.11	kg m^{-2}	Zeng et al., 2008	2004-2005
Soil C	26.48 ± 10.99	kg C m^{-2}	Measured data	2017
Leaf C litterfall rate	0.23 ± 0.05	kg C m^{-2}	Measured data	2008-2018
Litterfall rate	0.44 ± 0.04	kg C m^{-2} a^{-1}	Zhou, 2020	2011-2016
Soil respiration	0.99 ± 0.07	g C m^{-2} a^{-1}	Zhou, 2020	2015-2017
Mean LAI	3.75 ± 0.15	m^2 m^{-2}	Measured data	2021
Parametrization & Calibration				
LAI_{max}	5.2	m^2 m^{-2}	Measured data	2021
LAI_{min}	2.8	m^2 m^{-2}	Measured data	2021
Plant height	19.5±2.33	m	Measured data	2020
SLA	136.65 ± 15.87	cm^2 g^{-1}	Measured data	2020
V_{cmax}	26.2±0.97	μmol m^{-2} s^{-1}	Measured data	2020
Fruit C	464.25 ± 19.56	g kg^{-1}	Measured data	2007
J_{max}	38.01±1.75	μmol m^{-2} s^{-1}	Measured data	2020

Table S2 Nitrogen cycling observations from study site for model development.

Variables	Value	Unit	Sources	Measured Year
Leaf N	6.1 ± 0.5	g C g N^{-1}	Zhou, 2020	2013-2017
Wood N	31.42 ± 2.04	g C g N^{-1}	Zhou, 2020	2013-2017
Root N	9.28 ± 2.18	g kg^{-1}	Measured	2007
Fruit N	7.06 ± 0.25	g kg^{-1}	Measured	2007
Soil N	1860.48 ± 550.90	gN m^{-2}	Measured	2017
Inorganic N	3.45 ± 0.59	gN m^{-2}	Zhou, 2020	2011-2013
Litterfall N rate	6.74 ± 0.68	g N m^{-2} a^{-1}	Zhou, 2020	2013-2017
N net immobilization	13.14 ± 0.73	g m2 yr-1	Li, 2014	2014
Parametrization & Calibration				
CN_{leaf}	35.63 ± 4.23	g C gN-1	Measured	2020
CN_{wood}	275.99 ± 25.37	g C gN-1	Zhou, 2020	2013-2017
CN_{root}	50.56 ± 12.2	g C gN-1	Zhou, 2020	2013-2017
CNfruit	65.76 ± 3.62	g C gN-1	Measured	2007
CN_{soil}	14.24 ± 7.26	g C gN-1	Measured	2017
N resorption rate	35.23 ± 19.42	%	Measured	2020

Table S3 Phosphorus cycling observations from study site for model development.

Variables	Value	Unit	Sources	Measured Year
Leaf P	0.19 ± 0.05	g C g P^{-1}	Measured data	2020
Leaf N:P	32.84 ± 9.12	g N g P^{-1}	Measured data	2020
Wood P	1.75 ± 0.11	g C g P^{-1}	Zhou, 2020	2013-2017
Root P	0.56 ± 0.17	g kg^{-1}	Measured data	2007
Fruit P	0.68 ± 0.21	g kg^{-1}	Measured data	2007
Soil P	181.59 ± 60.18	gP m^{-2}	Measured data	2017
Labile P	1.04 ± 0.56	gP m-2	Measured data	2022
Secondary P	9.427 ± 0.521	gP m^{-2}	Wang 2022	2022
Litterfall P rate	0.79 ± 0.24	g P m^{-2} a^{-1}	Zhou, 2020	2013-2017
Parametrization & Calibration				
CP_{leaf}	1144 ± 610.05	g C gP-1	Measured	2020
CP_{wood}	4955.15 ± 448.27	g C gP-1	Zhou, 2020	2013-2017
CP_{root}	837.84 ± 258.81	g C gP-1	Zhou, 2020	2013-2017
CP_{fruit}	682.72 ± 212.79	g C gP-1	Measured	2007
CP_{soil}	145.85 ± 77.46	g C gP-1	Measured	2017
P resorption rate	54.53 ± 20.55	%	Measured data	2020

Table S4. Reference codes and corresponding citations used in the main text.

Reference Code	Citation
1	Wang et al., 2010
2	Xu et al., 2020
3	Yan, 2006
4	Zhu et al., 2016
5	Du et al., 2018
6	Goll et al., 2017
7	Schachtman et al., 1998
8	Olander & Vitousek, 2005
9	Bonan et al., 2014
10	Barraclough and Tinker, 1981
11	Mollier et al., 2008