Supplement of Hydrol. Earth Syst. Sci., 26, 5647–5667, 2022
https://doi.org/10.5194/hess-26-5647-2022-supplement

Hydrology and Earth System Sciences
Open Access
EGU

Supplement of

Revisiting large-scale interception patterns constrained by a synthesis of global experimental data

Feng Zhong et al.

Correspondence to: Diego G. Miralles (diego.miralles@ugent.be) and Liliang Ren (rll@hhu.edu.cn)

Table S1. A detailed summary of short vegetation storage capacity and related variables from 17 publications. "Veg type" denotes vegetation types, including herbaceous plant (H) and shrubs (S). "Opt" and "Reg" denote that storage capacity is obtained from optimization and regression methods, respectively.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Van Dijk and Bruijnzeel (2001)	West Java	Maize	H	0.73 (0.55–0.94)	2.10 (1.1–3.8)	0.12	0.16	0.077	Spraying/ Immersion	0.05	Spraying/ Immersion
		Rice	H					0.042		0.05	
		Cassava	H					0.049		0.03	
Fernandes et al. (2017)	Brazil	Sugarcane	H	0.0–0.97	0.0–5.70			0.080	Opt	0.24	Opt
Finch and Riche (2010)	England	Miscanthus	H					0.018	Opt	0.22	Opt
Zhang et al. (2017)	China	H. rhamnoides	S		1.90–2.93		0.37–0.58	0.197	Immersion	0.64–0.72	Immersion
		S. pubescens	S		3.92–5.01		0.69–0.88	0.175	Immersion	0.17–0.21	Immersion
Pitman (1989)	U. K.	Bracken	H		5.88	0.95/2.71		0.162/0.461	Drainage experiments (min/max)		
					4.90	0.78/2.29		0.159/0.467			
					3.43	0.51/1.58		0.149/0.461			
					3.34	0.47/1.57		0.141/0.470			
					2.63	0.36/1.18		0.137/0.449			
					1.84	0.35/0.94		0.190/0.511			
					0.91	0.18/0.46		0.198/0.505			
					0.40	0.06/0.17		0.150/0.425			
Garcia-Estringana et al. (2010)	Mediterranean	Dorycnium pentaphyllum	S		1.50		0.71/0.77	0.473/0.513	Rainfall simulation/ Immersion		
		Medicago strasseri	S		1.90		0.26/0.35	0.137/0.184			
		Colutea arborescens	S		1.10		0.13/0.78	0.118/0.709			
		Cistus ladanifer	S		3.80		0.39/0.54	0.103/0.142			
		Cistus albidus	S		2.10		1.13/1.48	0.538/0.705			
		Rosmarinus officinalis	S		2.80		0.85/1.20	0.304/0.429			
		Lavandula latifolia	S		3.20		2.26/3.24	0.706/1.013			
		Weighted average			2.50		0.67/1.02	0.268/0.408			
Nazari et al. (2020)	Iran	Maize	H						Reg		Reg
		Seedling		0.16	1.39	0.55		0.396		0.20	
		Jointing		0.57	3.48	0.910		0.261		0.40	
		Tasseling		0.72	3.99	0.990		0.248		0.57	
		Maturity		0.78	4.12	0.940		0.228		0.56	

Table S1 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Zhang et al. (2018)	China	Potentilla fruticosa	S	0.95	2.73	0.58	0.61	0.212	Rainfall simulation	0.55	Rainfall simulation
Drastig et al. (2019)	German	Oilseed rape	H		3.00	0.09		0.030	Reg (Leyton, 1967)		
Van Dijk (2010)	Australia	All Vegatation	H/S					0.100			
Bastiaanssen et al. (2012)	Indus Basin	All Vegatation	H/S					0.200			
Cui et al. (2014); Zheng and Jia (2020)	China	Crops/Grass	H					0.060	Reference		
		Shrus	S					0.550	Reference		
Herbst et al. (2006)	U. K.	Hedgerow	S								
		leafed				2.56			Reg (David et al., 2006a)	0.01	Reg (Gash and Morton, 1978)
		leafless				1.22				0.01	
Návar and Bryan (1994)	Mexico	Shrubs	S	0.87		0.87	1.000		Reg (Leyton, 1967)	0.02–0.04	Reg (Gash and Morton, 1978)
Návar et al. (1999)	Mexico	Thornscrub	S	0.85		0.46	0.541		Reg (Leyton, 1967)	0.04	Reference
Calder et al. (1984)	U. K.	Heather	S		1.65	1.4±0.2		0.848	Lysimeter		

Table S2. A detailed summary of tall vegetation storage capacity and related variables from 85 publications. "Veg type" denotes vegetation types, including Evergreen Needleleaf Forests (ENF) and Deciduous Needleleaf Forests (DNF), Evergreen Broadleaf Forests (EBF), Deciduous Broadleaf Forests (DBF) and Mixed Forests (MF). "Reg" denotes that storage capacity is obtained from regression methods.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Gash et al. (1995); Zeng et al. (2000)	France, Les Landes	Pine	EBF	0.45	2.30	0.25	0.56	0.109	Reg (Gash and Morton, 1978)	0.17	Reg (Gash and Morton, 1978)
Sadeghi et al. (2014)	Iran, Teheran	P. eldarica	ENF	0.83	4.37	1.06	1.28	0.243	Average value of multi methods		
		C. arizonica	ENF	0.76	1.97	0.55	0.72	0.279			
Valente et al. (1997)	Portugal	Eucalyptus	EBF	0.60	3.20	0.21	0.35	0.066	Reg (Valente et al., 1997)	0.02	Reg (Gash and Morton, 1978)
		Maritime pine forest	ENF	0.64	2.70	0.41	0.64	0.152			
Valente et al. (2019)	Portugal	Olive	EBF	0.19	3.10	0.19	0.97	0.061	Reg (Valente et al., 1997)	0.09	Reg (Valente et al., 1997)
Marin et al. (2000)	Amazonia	Sedimentary plain rainforest	EBF	0.83	4.40	1.16	1.39	0.264			
		High terrace rainforest	EBF	0.85	4.90	1.28	1.51	0.261	Reg (Klaassen et al., 1998)		
		Low terrace rainforest	EBF	0.88	5.60	1.32	1.50	0.236			
		Flood plain rainforest	EBF	0.92	6.60	1.55	1.69	0.235			
Bittner et al. (2010)	Germany	Beech stands	DBF								
		Foliated		0.89	7.00	1.02	1.15	0.146			
		Defoliated		0.89		0.94	1.06				
		Beech–ash–linden stands	DBF								
		Foliated		0.88	6.40	1.35	1.53	0.211	Reg (Klaassen et al., 1998)		
		Defoliated		0.88		0.70	0.80				
		Beech–ash–linden–hornbeam–maple stands	DBF								
		Foliated		0.84	7.10	0.45	0.54	0.063			
		Defoliated		0.84		0.59	0.70				
Carlyle-Moses et al. (2010)	Panama	Acacia mangium	EBF	0.79	2.51	0.93	1.18	0.371	Reg (Valente et al., 1997)	0.15	Canopy water balance
		Gliricidia sepium	EBF	0.75	1.86	0.80	1.06	0.427		0.11	
		Guazuma ulmifolia	EBF	0.73	1.75	0.84	1.15	0.480		0.15	
		Ochroma pyramidale	EBF	0.71	1.25	0.59	0.83	0.471		0.06	
		Pachira quinata	EBF	0.73	2.38	0.71	0.97	0.298		0.16	
Carlyle-Moses and Price (1999)	Canada	Hardwood forest	DBF	0.86			1.15		Reg (Leyton, 1967)	0.07	Reg (Gash and Morton, 1978)
Price and Carlyle-Moses (2003)	US, Ontario	Mixed forest	DBF			0.90			Opt	0.15	Opt

Table S2 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Mużyło et al., 2012	Spain	Oaks	DBF	0.64	3.35	0.49	0.77	0.146	Reg (Gash and Morton, 1978)	0.07	Reg (Gash and Morton, 1978)
Junior et al. (2019)	Brazil	Forest	Mix	0.76–0.89	4.23	1.30	1.56	0.306	Reg (Gash and Morton, 1978)	0.75	Reg (Gash and Morton, 1978)
Pypker et al. (2005)	Washington	Douglas–fir forest	ENF								
		Young		0.47	10.20	1.26	2.68	0.263	Reg (Klaassen et al., 1998)		
		Old		0.97	9.60	3.32	3.42	0.346			
Asdak et al. (1998a); (1998b)	Indonesia	Rainforest	EBF								
		Unlogged		0.96	5.48	1.35	1.41	0.246	Reg (Leyton, 1967; Lloyd et al., 1988)	0.01	Reg (Lloyd et al., 1988)
		Logged		0.60		1.00	2.30			0.001	
Deguchi et al. (2006)	Japan	Mixed forest	DBF								
		Growing season		0.85	3.48	1.26	1.48	0.362	Reg (Leyton, 1967)		
		Dormant season		0.55	2.05	0.97	1.76	0.473			
		Whole year		0.68	3.05	1.07	1.57	0.351			
Ghimire et al. (2017)	Madagascar	Secondary forests	EBF								
		Semi–mature		0.70	3.39	1.20	1.71	0.354	Reg (Jackson, 1975)	0.10	Reg (Gash and Morton, 1978)
		Young		0.55	1.83	0.47	0.86	0.257		0.13	
Ghimire et al. (2012)	Central Nepal	Natural forest	EBF	0.81		0.89	1.10		Reg (Jackson, 1975)	0.02	Reg (Gash and Morton, 1978)
		Pine plantation	ENF	0.73		0.67	0.92			0.03	
Fleischbein et al. (2005)	Zamora–Chinchipe	Mixed forest	EBF	0.94	7.30	2.46	2.63	0.337	Reg (Gash, 1979)	0.09	Reg (Gash, 1979)
Vernimmen et al. (2007)	Central Kalimantan	Lowland Evergreen Rainforest	EBF	0.55	9.20	1.48	2.69	0.161	Reg (Jackson, 1975)	0.028	Reg (Gash and Morton, 1978))
		Tall Heath Forest	EBF	0.39	6.00	0.88	2.26	0.147		0.025	
		Stunted Heath Forest	EBF	0.46	4.80	0.77	1.67	0.160		0.022	
Cuartas et al. (2007)	Brazil	Rainforests	EBF	0.97	6.10	1.05	1.08	0.172	Reg (Lloyd et al., 1988)	0.06	Reg (Gash and Morton, 1978)
Aboal et al. (1999)	Canary Islands	Laurel forest	EBF	0.93	7.80	2.45	2.64	0.314	Reg (Leyton, 1967)	0.08	Reg (Rutter et al., 1975)
Wallace et al. (2013)	Australia	Rainforests	EBF	0.96	4.1±0.3			0.25±0.05	Reg (Wallace and Mcjannet, 2006)	0.15	Reg (Lloyd et al., 1988)
		Jarrah forests	EBF	0.46	2.0±0.2			0.06		0.11	
Wallace et al. (2008)	Queensland, Australia	Vine Forest	EBF	0.96	4.14	2.96	3.08	0.715	Reg (Klaassen et al., 1998)	0.15	Reference
Hölscher et al. (2004)	Costa Rica	Rain forest (Oaks)	EBF		7.70			0.140	Leaf wetting experiments	0.34	Reference (including epiphytes)

Table S2 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Herbst et al. (2008)	U.K.	Woodland	DBF								
		Leafed		0.81		1.20	1.48		Reg (Link et al., 2004)	0.05	Reg (Gash and Morton, 1978)
		Leafless		0.43		0.61	1.42			0.27	
Shinohara et al. (2015)	Japan	Japan cedar	ENF	0.98	4.80	1.34	1.37	0.279	Reg (Klaassen et al., 1998)	0.61	Reg (Valente et al., 1997)
Liu et al. (2018)	China	Larch plantation	DNF	0.73		2.67	3.66		Reg (Wallace and Mcjannet, 2006)	0.09	Reg (Gash and Morton, 1978)
Zhang et al. (2006)	China	Forest									
		Top–canopy layer	ENF	0.82		1.40	1.71		Reg (Wallace and Mcjannet, 2006)	0.16	Reg (Gash and Morton, 1978)
		Sub–canopy layer	EBF	0.41		0.72	1.76			0.09	
Su et al. (2016)	China	Mixed forest	DBF/ EBF	0.85		2.24	2.64		Reg (Wallace and Mcjannet, 2006)	0.09	Reg (Gash and Morton, 1978)
Fan et al. (2014)	Australia	Banksia woodland	EBF/S	0.48	2.33	0.45	0.94	0.193	Reg (Jackson, 1975)	0.02	Reg (Gash and Morton, 1978)
		Exotic pine	ENF	0.53	2.05	1.31	2.47	0.639		0.07	
Návar (2013)	Mexico	Pine	ENF	0.74		1.03	1.39		Reg (Gash and Morton, 1978)	0.01	Reg (Gash and Morton, 1978)
		Oak	DBF	0.92		0.90	0.98			0.02	
		Oak–pine	MF	0.95		1.03	1.08			0.004	
Sun et al. (2014); (2015)	Japan	Cypress plantations	ENF						Reg (Link et al., 2004)		Reg (Gash and Morton, 1978)
		Pre–thinning		0.97		2.42	2.48			0.39	
		Post–thinning		0.76		1.54	2.03			0.34	
Chen and Li (2016)	Taiwan	Rainforest	EBF								
		Wet season		0.50	4.63	1.86	3.72	0.402	Reg (Double–mass curve)		
		Dry season		0.36	2.23	0.91	2.54	0.408			
Limousin et al. (2008)	France	Quercus ilex coppice	EBF	0.90	3.10	2.60	2.89	0.839	Reg (Klaassen et al., 1998)	0.98	Reg (Gash and Morton, 1978)
Dunin et al. (1988)	Australia	Eucalypt forest	EBF		3.0	0.50		0.167			
Lloyd et al. (1988)	Amazonas	Rainforest	EBF			0.74			Reg (Lloyd et al., 1988)	0.15	Reg (Lloyd et al., 1988)
Dykes (1997)	Brunei	Rainforest	EBF			0.93–1.1			Reg (Gash, 1979)	0.10	Reference
Pereira et al. (2009)	Portugal	Oak	EBF	0.39	2.60	0.26	0.67	0.100			
Šraj et al. (2008)	Slovenia	Deciduous forest	DBF								
		South plot			6.60	0.4–1.2		0.182	Reg (Leyton, 1967)	0.05–0.09	Reg (Gash and Morton, 1978)
		North plot			6.90	0.2–1.3		0.188		0.06–0.08	

Table S2 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Valente et al. (1997)	Central Portugal	Eucalyptus	EBF	0.60	3.20	0.21	0.35	0.066	Reg (Valente et al., 1997)	0.02	Reg (Gash and Morton, 1978)
Lankreijer et al. (1993)	Netherlands	Quercus rubra	DBF		4.90	0.5–0.7		0.122	Reg (Leyton, 1967)		
	France	Pinus pinaster	ENF		2.30	0.26		0.113			
Sadeghi et al. (2018)	Tehran, Iran	R. pseudoacacia	DBF								
		Leafless		0.28	–	0.08	0.29			0.21	
		Leafing–out		0.72	4.68	0.55	0.76	0.118		0.20	
		Full–leaf		0.70	5.89	0.63	0.90	0.107		0.15	
		Leaf–fall		0.62	3.95	0.36	0.58	0.091		0.16	
		P. orientalis	DBF						Reg (Klaassen et al., 1998)		Reg (Gash and Morton, 1978)
		Leafless		0.35	–	0.04	0.11			0.22	
		Leafing–out		0.54	1.94	0.51	0.94	0.263		0.21	
		Full–leaf		0.54	2.78	0.60	1.11	0.216		0.27	
		Leaf–fall		0.44	1.47	0.14	0.32	0.095		0.28	
Hassan et al. (2017)	Spain	Oak (Quercus ilex)	EBF	0.69	2.10	1.75	2.54	0.833	Reg (Jackson, 1975)		
		Quercus pyrenaica	DBF	0.26	1.60	0.66	2.54	0.413			
Bulcock and Jewitt (2012b, 2012a)	South Africa	E. grandis	DBF		2.70	0.41		0.152	Reg (Klaassen et al., 1998)		
		A. mearnsii	DBF		2.30	1.07		0.465			
		P. patula	DNF		1.90	0.92		0.484			
Xiao and Mcpherson (2016)	California	Urban trees	DBF			0.86			Rainfall simulation	0.25	Rainfall simulation
Gerrits et al. (2010)	Luxembourg	Beech	DBF								
		Winter			2.00	0.40		0.200	Reg (Klaassen et al., 1998)	0.11	Reg (Gash and Morton, 1978)
		Sunmmer			7.00	0.90		0.129			
Klingaman et al. (2007)	Maryland	American beech	DBF				1.48		Reference	0.09	Reference
Link et al. (2004)	Washington	Pseudotsuga menziesii	ENF		8.60	3.30		0.384	Reg (Link et al., 2004)		
Saito et al. (2013)	Japan	Ch. obtusa (Hinoki)	ENF		3.59	2.03		0.565	Reg (Leyton, 1967)		
		Cr. japonica (Sugi)	ENF		3.87	2.22		0.574			
Ringgaard et al. (2014)	Denmark	Norway spruce, Grand Fir	ENF	0.72		1.29	1.79		Opt	0.03	Reg (Gash and Morton, 1978)
Waterloo et al. (1999)	Fiji	Pine	ENF								
		Young		0.40	3.50	0.80	2.00	0.229	Reg (Gash, 1979)	0.06	Reg (Gash and Morton, 1978)
		Mature		0.44	3.50	1.20	2.73	0.343		0.06	

Table S2 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Llorens (1997)	Spain	Pinus sylvestris	ENF			1.34			Reg (Leyton, 1967)	0.06	Reg (Gash and Morton, 1978)
Loustau et al. (1992)	France	Maritime pine	ENF	0.40–0.45		0.50–0.55	1.24		Reg (Gash, 1979)	0.06–0.14	Reg (Gash, 1979)
Shi et al. (2010)	China	Pinus armandii	DNF	0.64	4.52	2.86	4.47	0.633	Reg (Wallace and Mcjannet, 2006)	0.05	Reg (Gash and Morton, 1978)
Chen et al. (2013)	China	Secondary forest	MF	0.85	2.07	1.02	1.20	0.493	Reg (Link et al., 2004)	0.83	Reg (Gash and Morton, 1978)
Schellekens et al. (1999)	Puerto Rico	Rainforest	MF		6.40	1.15		0.180	Reg (Gash and Morton, 1978)		
Steidle Neto et al. (2012)	Brazil	Eucalyptus hybrid plantation	EBF	0.58	4.20	0.24	0.41	0.099	Reg (Leyton, 1967)	0.04	Reg (Gash and Morton, 1978)
Holwerda et al. (2012)	Puerto Rico	Rainforest	EBF		6.70	0.37		0.055	Reg (Klaassen et al., 1998)	0.14	Reg (Gash and Morton, 1978)
Zhang et al. (2019)	Leyte	Mixed forest	EBF		4.80	0.45		0.094	Reg (Klaassen et al., 1998)	0.08	Reg (Gash and Morton, 1978)
Sun et al. (2013)	China	A. fabri	ENF								
		Mature			10.20	3.15		0.309	Reg (Pereira et al., 2009)	2.56	Spraying
		Middle–age			7.80	1.21		0.155		1.33	
		Young			8.00	1.23		0.154		1.33	
Rowe (1983)	New Zealand	Beech forest	EBF	1.00		1.20	1.20		Reg (Gash and Morton, 1978)	0.03	Reg (Gash and Morton, 1978)
Gash et al. (1980)	Britain	Sitka spruce	ENF	1.00		1.20	1.20		Reg (Leyton, 1967)	0.74	Reg (Gash and Morton, 1978)
		Scots pine	ENF	0.87		1.02	1.17			0.03	
		Sitka spruce	ENF	1.00		0.75	0.75			0.25	
Hörmann et al. (1996)	Germany	Beech forest	DBF						Reg (Gash and Morton, 1978)		Reg (Gash and Morton, 1978)
		Foliated		0.95		1.28	1.35			0.28	
		Non–foliated		0.20		0.84	4.20			0.09	
Bryant et al. (2005)	US	Wetland	DBF	0.88		0.98	1.11		Reg	0.16	Reg (Gash and Morton, 1978)
		Pine	ENF	0.64		1.97	3.08			0.13	
		Pine Plantation	ENF	0.43		1.70	3.95			0.46	
		Hardwood	DBF	0.52		1.40	2.69			0.08	
		Mixed	DBF	0.74		1.58	2.14			0.10	
Medeiros et al. (2009)	Brazil	Woodland	DBF	0.74		0.51	0.69			0.07	
Van Dijk (2010)	Australia	All Vegatation	MF					0.100			

Table S2 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Bastiaanssen et al. (2012)	Indus Basin	All Vegatation	MF					0.200			
Cui et al. (2014); Zheng and Jia (2020)	China	Needleleaf forest	NF					0.250			
		Broadleaf forest	DBF					0.150	Reference		
		Mixed forest	MF					0.200			
Mużyło et al. (2012)	Spain	Forest	DBF	0.50		0.30	0.60			0.07	
		Leafed		0.64	3.35	0.49	0.77	0.146		0.07	
		Leafless		0.35		0.17	0.49			0.03	
Ma et al. (2019)	China	R. pseudoacacia	DBF								
		Growing season		0.73	2.40	1.34	1.84	0.558	Reg (Wallace and Mcjannet, 2006)	0.07	Reg (Gash and Morton, 1978)
		Dormant season		0.23	0.41	0.20	0.87	0.488		0.05	
		P. tabuliformis	ENF								
		Growing season		0.63	2.55	1.43	2.27	0.561	Reg (Wallace and Mcjannet, 2006)	0.04	Reg (Gash and Morton, 1978)
		Dormant season		0.61	2.50	1.38	2.26	0.552		0.04	
Siles et al. (2010)	Costa Rica	I. densiflora	EBF								
		2004			1.32	0.18		0.136			
		2005			1.22	0.10		0.082			
		Coffee	EBF								
		2004			4.64	0.42		0.091	$LAI*S_L$		
		2005			3.80	0.34		0.089			
		2004			4.71	0.42		0.089			
		2005			4.60	0.41		0.089			
Wallace and Mcjannet (2008)	Australia	Mesophyll Vine Forest	EBF	0.97	4.20	3.60	3.73	0.857	Reg (Klaassen et al., 1998)	0.15	Reference (Lloyd et al. ,1988)
		Mesophyll Vine Forest	EBF	0.95	3.80	2.00	2.11	0.526		0.15	
		Notophyll Vine Forest	EBF	0.97	4.50	3.60	3.70	0.800		0.15	
		Notophyll Vine Forest	EBF	0.96	4.10	2.90	3.02	0.707		0.15	
		Notophyll Vine Forest	EBF	0.96	4.10	2.70	2.81	0.659		0.15	
Shuttleworth (1988); Zeng et al. (2000)	Amazon	Natural forest	EBF	0.92		0.74	0.80				
Fathizadeh et al. (2017); (2018)	Ilam, Iran	Oak	DBF								
		Leafed		0.41		0.97	2.27		Reg (Klaassen et al., 1998)		
		Leafless		0.19		0.10	0.45				
Sadeghi et al. (2015a)	Iran	*F. rotundifolia*.	DBF								
		Growing season		0.61		0.24			Average value of multi methods		
		Dormant season		0.48		0.15					

Table S2 Continued.

Reference	Location	Vegetation	Veg Type	*c*	*LAI*	Canopy storage (mm)				Stem storage (mm)	
						S	S_C	S_L	Method	S_S	Method
Chai et al. (2013)	China	Mixed forests	MF	0.81		1.44	1.77			0.09	
Sadeghi et al. (2015b)	Teheran, Iran	*P. eldarica*	ENF	0.62		1.24	2.00		Average value of multi methods		
		C. arizonica	ENF	0.51		0.67	1.31				
Hutjes et al. (1990)	Ivory Coast	Forests	EBF	0.97		0.61			Reg (Leyton, 1967)		
Holwerda et al. (2010)	Mexico	Mature forest (oaks)	DBF								
		Wet season		0.77			3.88				
		Dry season		0.87			2.78				
		Secondary forest (alder)	DBF						Non–linear least square optimization		
		Wet season		0.28			1.92				
		Dry season		0.77			1.09				
Rodrigues et al. (2021)	Brazil	Semi–deciduous forests	DBF	0.72	3.7–5.0	1.22	1.69	0.277	Reg (Valente et al., 1997)	0.03	Reg (Valente et al., 1997)

Table S3. A detailed summary of tall vegetation E_C, R and E_C/R from 50 publications, and their corresponding estimations in this study. "Long" and "Lat" denote the longitude and latitude of experiment sites. The methods to obtain E_C include the Penman–Monteith equation (PM), Regression (Reg), Optimization (Opt) and Other (Oth) methods.

References	Long	Lat	Duration	Vegetation	Observations					Estimates	
					c	E_C	Method	R	E_C/R	R	E_C/R
Valente et al. (2020)	–7.46	39.82	2011.08.25–2013.04.30	Olive	0.19	0.22	Dalton	1.95	0.115	3.38	0.127
Ghimire et al. (2017)	48.41	–18.93	2014.10.01–2015.09.30	Semi–mature secondary forests	0.70	0.39	Reg	1.60	0.240	4.12	0.146
					0.70	0.39	Opt	1.60	0.240		
	48.40	–18.95	2014.10.01–2015.09.30	Young secondary forests	0.55	0.38	Reg	1.60	0.240	4.12	0.146
					0.55	0.36	Opt	1.60	0.230		
Pereira et al. (2009)	–8.02	38.53	1996.10–1998.09	Oak woodlands		0.27	Dalton	2.00	0.135	3.64	0.129
						0.30	Dalton	2.00	0.150		
	–8.00	38.53	2006.07–2007.05	Oak woodlands		0.27	Dalton	2.20	0.123	3.58	0.128
						0.30	Dalton	2.20	0.136		
Valente et al. (1997)	–8.60	38.63	1992.01.04–1994.07.31	Eucalyptus	0.60	0.20	PM	1.81	0.110	2.76	0.151
	–8.85	38.83	1992.01.04–1994.07.31	Maritime pine	0.64	0.32	PM	1.74	0.181	2.57	0.162
Link et al. (2004)	–121.95	45.82	1999.04.08–11.08	Douglas–fir forest	0.64		Reg		0.191	2.91	0.192
					0.64		PM		0.159		
	–121.95	45.82	2000.03.30–12.03	Douglas–fir forest	0.64		Reg		0.191	2.45	0.150
					0.64		PM		0.091		
Wallace and Mcjannet (2008)	145.43	–16.13	2001.06.22–2004.06.30	Mesophyll Vine Forest	0.97	0.36	Reg	4.60	0.079	6.09	0.152
	145.40	–16.19	2001.09.09–2004.06.30	Mesophyll Vine Forest	0.95	0.47	Reg	4.00	0.119	5.25	0.137
	145.27	–16.52	2000.12.21–2004.06.30	Notophyll Vine Forest	0.97	0.47	Reg	3.20	0.148	5.44	0.158
	145.27	–16.52	2001.07.13–2004.06.30	Notophyll Vine Forest	0.96	0.57	Reg	3.30	0.173	4.70	0.166
	145.49	–17.45	2000.11.30–2004.06.30	Notophyll Vine Forest	0.96	0.84	Reg	3.90	0.216	5.21	0.162
Ghimire et al. (2012)	85.60	27.63	2011.06.20–09.09	Natural forest	0.81	0.31	Opt	3.01	0.103	4.70	0.070
					0.81	0.48	Reg	3.01	0.160		
					0.81	0.15	PM	3.01	0.049		
	85.60	27.63	2011.06.20–09.09	Pine plantation	0.73	0.41	Opt	3.58	0.115	4.70	0.070
					0.73	0.47	Reg	3.58	0.130		
					0.73	0.15	PM	3.58	0.042		
Sun et al. (2014); (2015)	139.60	36.37	2010.11–2011.10	Pre–thinning Cypress	0.97	0.38	PM	2.37	0.160	3.88	0.104
			2011.11–2012.10	Post–thinning Cypress	0.76	0.32	PM	3.46	0.092	3.47	0.122
Carlyle-Moses et al. (2010)	–79.58	9.17	2006.07.23–09.20	Acacia mangium	0.79	0.99	Reg	4.45	0.222	7.10	0.052
				Gliricidia sepium	0.75	0.35	Reg	4.49	0.078		
				Guazuma ulmifolia	0.73	0.25	Reg	4.06	0.062		
				Ochroma pyramidale	0.71	0.90	Reg	4.37	0.206		
				Pachira quinata	0.73	0.22	Reg	4.04	0.054		
Shi et al. (2010)	106.26	35.49	2005.06–09	Pinus armandii	0.64	0.26	PM	1.99	0.131	3.51	0.110

Table S3 Continued.

References	Long	Lat	Duration	Vegetation	Observations					Estimates	
					c	E_C	Method	*R*	E_C/R	*R*	E_C/R
Liu et al. (2018)	106.35	35.46	2015.05.06–2015.10.31	Larch plantation	0.73	0.07	PM	2.51	0.027	1.97	0.214
Pypker et al. (2005)	–121.90	45.82	2000.03.30–12.03	Young douglas–fir	0.88		Reg		0.205	2.45	0.150
							Oth		0.216		
							Reg		0.136		
							Oth		0.159		
				Old douglas–fir	0.58		Reg		0.293		
							Oth		0.172		
Limousin et al. (2008)	3.60	43.74	2006.04.25–2007.05.15	Quercus ilex coppice	0.75	0.45	PM	0.88	0.511	2.73	0.151
Návar (2013)	–99.87	24.72	1997.05–1998.11	Pine	0.74	0.76	Reg	11.87	0.064	3.89	0.162
				Oak	0.92	1.10	Reg	12.55	0.088		
				Oak–pine	0.95	1.02	Reg	12.65	0.081		
Cuartas et al. (2007)			2002.11–2004.10	Rainforests	0.97	0.32	PM	7.13	0.045		
Zhang et al. (2006)	112.4	27.85	2003.01–12	Top–canopy–layer	0.82	0.96	PM	5.30	0.182	2.76	0.164
				Sub–canopy layer	0.41	0.32	PM	3.80	0.084		
Su et al. (2016)	110.47	31.31	2014.05.01–10.31	Mixed forest	0.85	0.25	Reg	2.68	0.093	4.37	0.081
Herbst et al. (2008)	–1.27	51.45	2006.04.05–2007.04.25	Mixed forest						2.53	0.170
				Full leaf	0.81	0.19	PM	1.63	0.118		
				Leafless	0.43	0.20	PM	1.32	0.150		
Bittner et al. (2010)	10.00	51.00	2005–2007	Beech stands							
				Foliated	0.89		Reg		0.220		
				Defoliated	0.89		Reg		0.160		
				Beech–ash–linden							
				Foliated	0.88		Reg		0.220		
				Defoliated	0.88		Reg		0.210		
				Beech–ash–linden–hornbeam–maple						2.37	0.176
				Foliated	0.84		Reg		0.210		
				Defoliated	0.84		Reg		0.230		
Deguchi et al. (2006)	137.18	35.03	2000.04–2002.12	Mixed forest							
				growing season	0.85	0.36	Reg	2.36	0.153		
				dormant season	0.55	0.23	Reg	1.31	0.176		
				whole year	0.68	0.35	Reg	1.82	0.192	7.97	0.074
Chen and Li (2016)	120.89	23.93	2008.05–2009.04	Rainforest						10.33	0.084
				wet season	0.50	0.88	Reg	5.81	0.152		
				dry season	0.36	1.01	Reg	3.63	0.277		

Table S3 Continued.

References	Long	Lat	Duration	Vegetation	Observations					Estimates	
					c	E_C	Method	R	E_C/R	R	E_C/R
Price and Carlyle-Moses (2003)	–79.65	44.55	1995.05.15–08.28	Mixed forests	0.85	0.33	Opt	4.87	0.068	4.96	0.094
Gash et al. (1995); Zeng et al. (2000)	–0.08	44.08	1986.02.09–1987.01.03	Maritime pine forest	0.45	0.17	PM	1.65	0.103	2.31	0.149
Shuttleworth (1988); Zeng et al. (2000)	–59.95	–2.95	1983.09.01–1985.9.30	Natural forest	0.92	0.21	PM			6.87	0.057
Jackson (2000)	37.13	–1.55	1994.11–1997.06	Agroforestry plantation		0.23	PM	2.28	0.101	3.24	0.149
Wallace and Mcjannet (2006)	145.44	–16.14	2001.08.25–2004.01.31	Mesophyll Vine Forest	0.97	0.24	PM	4.5	0.053	4.37	0.163
					0.97	0.33	Reg	4.5	0.074		
Zhang et al. (2019)	124.93	11.28	2013.06–2014.05	Mixed forest	0.70	1.00	Reg	5.00	0.199	6.68	0.083
Ringgaard et al. (2014)	9.34	56.07	2010.02–2011.12	Norway spruce	0.72	0.19	Opt			2.32	0.181
					0.72	0.13	Oth				
Sadeghi et al. (2015b)	51.13	35.70	2012.08.23–2013.08.23	Pinus eldarica	0.62		Reg		0.113	2.92	0.244
				Cupressus arizonica	0.51		Reg		0.235		
Sadeghi et al. (2015a)	51.17	35.17	2012.09–11.20; 2013.03.15–05.25	F. rotundifolia. growing season	0.61		Reg		0.213	0.88	0.317
			2012.11.21–2013.03.14	dormant season	0.48		Reg		0.229	2.13	0.202
Fan et al. (2014)	153.14	–26.98	2012.05–2013.04	Banksia woodland	0.48	0.81	Reg	2.76	0.294	4.73	0.139
					0.48	0.19	PM	2.76	0.069		
					0.48	0.71	Opt	2.76	0.257		
				Exotic pine	0.53	0.87	Reg	2.76	0.314		
					0.53	0.22	PM	2.76	0.080		
					0.53	0.66	Opt	2.76	0.239		
Hutjes et al. (1990)	–7.34	5.85	1987.08.04–12.20	Forest	0.97	0.35	Reg	19.99	0.018	4.87	0.083
					0.97	0.18	PM	19.99	0.009		
Rowe (1983)	172.75	–41.60	1980.04–1981.03	Beech forest						3.40	0.117
				winter	1.00	0.39	Reg	1.95	0.200		
				summer	1.00	0.53	Reg	2.11	0.250		
Llorens (1997)	2.00	42.20	1993.07–1995.12	Pinus sylvestris	0.87	0.54	Reg	3.83	0.141	2.30	0.184
					0.87	0.36	PM	3.83	0.094		
Lankreijer et al. (1993)	–0.08	44.08	1986.02.08–12.31(85d)	Pinus pinaster	0.57	0.19	PM	1.26	0.151	2.32	0.147
					0.57	0.10	PM	1.26	0.079		
					0.57	0.16	Reg	1.26	0.125		
	5.66	52.03	1988&1989.07–09	Quercus rubra	0.69	0.25	PM	1.89	0.130	2.76	0.125
					0.69	0.15	PM	1.89	0.077		
					0.69	0.29	Reg	1.89	0.153		

Table S3 Continued.

References	Long	Lat	Duration	Vegetation	Observations					Estimates	
					c	E_C	Method	*R*	E_C/R	*R*	E_C/R
Holwerda et al. (2012)	–65.83	18.17	2000.11.28–2001.10.29	Rainforest		0.58	PM	3.16	0.180	4.25	0.138
						0.16	PM	3.16	0.050		
						0.40	PM	3.16	0.130		
Dolman (1987)	4.64	52.55	1985(119d)	Oak forest						1.92	0.190
				Full leaf	0.70	0.46	Reg	1.44	0.317		
				Leafless	0.20	0.55	Reg	1.20	0.458		
Aboal et al. (1999)	–16.40	28.45	1994.12.30–1995.12.31	Laurel forest	0.93	0.04	PM	1.64	0.026	2.11	0.241
					0.93	0.03	PM	1.64	0.017		
Waterloo et al. (1999)	177.45	–18.00	1990.01.04–11.13	Young pine	0.40		Reg		0.375	6.16	0.106
				Mature pine	0.44		Reg		0.273		
Hörmann et al. (1996)	10.24	54.10	1990.06–1991.12	Beech forest						2.61	0.147
				Full leaf	0.95	0.05	Bowen	1.91	0.028		
				Leafless	0.20	0.05	Bowen	1.48	0.034		
Asdak et al. (1998a)	112.38	–1.30	1993.11–1994.04	Unlogged rainforest	0.90	0.30	PM	5.50	0.055	4.88	0.069
			1994.06–1995.06	Logged rainforest	0.70	0.17	PM	5.60	0.030	6.42	0.079
Medeiros et al. (2009)	–40.25	–6.67	2003.12–2006.05	Woodland	0.74	1.42	Reg	8.69	0.163	5.29	0.124
Mużyło et al. (2012)	1.82	42.20	05.20–11.20	Leafed oaks	0.64	0.38	PM	2.33	0.163	4.36	0.088
					0.64	0.49	Reg	2.33	0.210		
			11.21–05.19	Leafless oaks	0.35	0.24	PM	1.26	0.190	2.76	0.154
					0.35	0.13	Reg	1.26	0.103		
			2007.04.04–2009.09.21	average	0.50	0.32	PM	1.77	0.181	3.49	0.120
					0.50	0.44	Reg	1.77	0.249		
Attarod et al. (2015)	55.80	38.07	2009.03.21–2010.03.20	P. eldarica	0.83		Reg		0.253	1.32	0.263
				C. arizonica	0.80		Reg		0.150		
Sheng et al. (2010)	124.22	41.73	2005–2008, 06–08	Larch plantation		0.21	PM	3.53	0.059	5.40	0.063
Junior et al. (2019)	–44.96	–21.33	2012.09.01–2015.03.15	Semi–Deciduous Forest		0.10	PM	2.76	0.038	6.31	0.076
Hölscher et al. (2004)	–83.74	9.59	1999.09–2000.08	Oaks		0.243	Opt	2.09	0.116	5.85	0.066
Van Dijk (2010)	Australia						Oth		0.200		
Wallace et al. (2013)	Oliver Creek					0.35	Opt	4.61	0.070		
	Upper Barron					0.81	Opt	3.90	0.210		
	Huntly					0.41	Opt	1.37	0.300		
	Bates					0.38	Opt	1.31	0.290		

Table S4. A detailed summary of short vegetation E_C, R and E_C/R from 8 publications, and their corresponding estimations in this study. The abbreviations are same with Table 3.

References	Long	Lat	Duration	Vegetation	Observations				Estimates		
					E_C	Method	R	E_C/R	E_C	R	E_C/R
Návar et al. (1999)	–99.53	24.78	1995.09–1997.04	Thornscrub	2.96	Reg	18.08	0.164	0.10	3.15	0.065
Návar and Bryan (1994)	–99.53	24.78	1987.05–08	Shrubs	2.95	Reg	13.52	0.218	0.16	6.54	0.028
(Zhang et al., 2018)	100.01	37.59	2012.06.01–2012.09.11	Potentilla fruticosa	0.09		0.60	0.150	0.11	1.99	0.058
Herbst et al. (2006)	–1.70	51.60	2004.06.21–2005.02.09	Hedgerow							
				Full leaf	0.37		1.84	0.201	0.03	2.02	0.017
				Leafless	0.10		1.40	0.071			
Fernandes et al. (2017)	–47.67	–2.61	2012.07–2013.05	Sugarcane							
				Tillering	0.10	Opt	3.1	0.032			
				Stems elongation	0.58	Opt	3.1	0.187	0.14	6.81	0.027
				Ripening	0.69	Opt	3.1	0.223			
Finch and Riche (2010)	–0.35	51.81	1997.06.26–1998.01.19	Miscanthus	0.15	Opt	1.2	0.125	0.03	1.91	0.021
Nazari et al. (2020)	51.63	35.28	2015&2016.05–09	Maize							
				Seedling				1.500			
				Jointing				0.298			
				Tasseling				0.208			
				Maturity				0.256			
				Average	1.59	Reg	3.65	0.436	0.09	0.51	0.176
Van Dijk and Bruijnzeel (2001)	108.07	–7.05	1995.01.08–1995.05.11	Mixed crops	1.18	Opt	4.7	0.251	0.13	7.48	0.018
			1999.01.02–1999.07.17	Mixed crops	0.55	Opt	4.3	0.127	0.13	5.87	0.029

Table S5. Field observations of *I* and its related variables used for validation from 116 publications. Asterisk denotes the average value of different study plots or/and study periods from the same experiment. The modelled site-level *I* and *I/P* are shown in the last two columns.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Valente et al. (2020)	–7.46	39.82	365	2011.08.25–2013.04.30	EBF	19.4	2.21	0.08	3.50	8.45	75.10	2.33	0.08	3.50
Ghimire et al. (2017)	48.41	–18.93	950	2014.10.01–2015.09.30	EBF	70/55	4.62	1.05*	22.61*	62.08	36.21	6.50	1.40	21.59
Mcjannet et al. (2007)	145.43	–16.13	30	2001.08.22–2004.06.30	EBF		8.41	1.85	22.00	74.73	22.30	6.19	0.96	15.52
	145.27	–16.52	1160	2001.07.13–2004.06.30	EBF		7.15	1.14	16.00	64.66	30.02	3.97	0.67	16.88
Wallace and Mcjannet (2006); Wallace et al. (2013)	145.43	–16.13	30	2001.09–2004.01.31	EBF		4.58*	1.15*	25.10*	74.43	22.62	4.38	0.92	21.02
Manfroi et al. (2006)	114.03	4.20		2001.07.01–2004.07.17	EBF		6.65	0.79	12.00	61.52	32.04	7.99	0.83	10.34
Vernimmen et al. (2007)	114.00	–0.06	180	2002.06.14–2003.06.13	EBF	46.7	8.21	1.29*	15.80*	62.42	35.11	8.35	1.07	12.78
Zhang et al. (2019)	124.93	11.28	110	2013.06.01–11.07	EBF		4.09	0.60	14.60	43.25	49.64	9.07	1.04	11.51
Shuttleworth (1988)	–59.95	–2.95		1983.09.01–1985.9.30	EBF	92.0	7.22	0.90	12.44	50.05	34.81	6.53	0.66	10.11
Chen and Li (2016)	120.89	23.93	750*	2008.05–2009.04	EBF	50/36	2.51*	0.29*	11.60*	51.81	43.44	9.27	0.96	10.41
Limousin et al. (2008)	3.60	43.74	270	2006.04.25–2007.05.15	EBF	90	4.16	1.06	25.55	44.35	45.46	1.73	0.34	19.73
Pereira et al. (2009)	–8.02	38.53	243	1996.10–1998.09	EBF	39	1.39	0.13	9.00	10.01	72.11	2.33	0.06	2.60
	–8.00	38.53	243	2006.07–2007.05	EBF	21	1.58	0.10	6.20	8.90	64.02	2.23	0.17	7.79
Dietz et al. (2006)	120.04	–1.50	970*	2004.04.05–2005.04.04	EBF		5.01	1.08*	21.50*	81.72	17.19	4.68	1.06	22.54
Cuartas et al. (2007)	–60.20	–2.61		2002.11–2003.10	EBF	96.9	5.55	1.25	22.60	79.72	15.77	5.64	1.05	18.69
	–60.20	–2.61		2003.11–2004.10	EBF	96.9	7.66	1.02	13.30	80.17	17.92	6.71	1.15	17.07
Valente et al. (1997)	–8.60	38.63		1992.01.04–1994.07.31	EBF	60	1.64	0.18	10.80	12.73	70.78	1.49	0.05	3.49
	–8.85	38.83		1992.01.04–1994.07.31	EBF	64	1.45	0.25	17.10	9.47	75.17	1.46	0.08	5.20
Lloyd et al. (1988)	–59.95	–2.95		1983.09.03–1985.08.21	EBF		7.69	0.68	8.90	49.87	35.05	6.71	0.67	9.93
Marin et al. (2000)	–72.09	–0.76	225*	1996.02.01–1997.08.31	EBF	86.98	5.56	0.75*	13.53*	75.95	21.57	7.99	1.77	22.17
Czikowsky and Fitzjarrald (2009)	–54.92	–2.89	1170	2001.04–2003.07	EBF				11.60	75.55	18.09	5.67	0.82	14.54
Gomez-Peralta et al. (2008)	–75.35	–10.53	2641.5*	2003.07.29–2004.08.10	EBF	89.3	6.56	1.15	18.65	41.89	50.69	2.82	0.45	16.13
Asdak et al. (1998b)	112.37	–1.29	200*	1993.11.1–1994.04.14	EBF	96	13.33	1.52	11.43	73.46	24.72	11.22	1.38	12.27
				1994.06.11–1995.07.02	EBF	70	9.21	0.57	6.16	69.14	29.14	9.87	1.05	10.63

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Rowe (1983)	172.75	–41.60		1980.04–1981.03	EBF		3.58	1.01	28.35	65.78	33.36	3.98	0.69	17.23
Mosello et al. (2002)	10.70	43.40	150	1998–1999	EBF		2.36*	0.44*	19.39*	30.91	56.97	2.04	0.24	11.82
Calder et al. (1986)	106.28	–6.58	80	1980.05.21–1981.06.14	EBF		7.31	1.53	21.00	38.88	50.65	10.30	1.45	14.07
Robson et al. (1994)	–3.21	51.67		1989–1991	EBF				15.00*	20.16	65.56	3.07	0.16	5.07
Holwerda et al. (2012)	–65.83	18.17		2000.11.28–2001.10.29	EBF		6.54	1.44	22.00	30.18	60.31	4.25	1.28	30.11
Dunin et al. (1988)	150.24	–35.60	46	1982.03–1983.02	EBF		1.62	0.24	15.00	67.09	32.71	1.47	0.32	21.50
				1983.03–1984.02	EBF		4.18	0.54	13.00	69.10	30.35	4.29	0.45	10.54
				1984.03–1985.02	EBF		3.30	0.33	10.00	65.24	33.78	3.21	0.41	12.88
				1982.03–1985.02	EBF		3.03	0.36	12.00	67.14	32.28	2.99	0.39	13.17
David et al. (2006b)	–8.02	38.53	243	1996.10–1998.09	EBF	39	2.38	0.20	8.50	10.01	72.11	2.33	0.06	2.60
Ren and Xue (2008)	117.65	27.75	1200	2004	EBF		4.83	0.59	12.30	72.33	16.81	4.58	0.56	12.24
Wang et al. (2006)	101.20	21.95	756	2003	EBF		3.41	0.72	21.10	58.93	39.91	3.53	0.56	15.93
Xu et al. (2005)	128.17	26.75	260	1998.01–2000.12	EBF		9.11	1.38	15.20	42.53	38.71	7.59	1.13	14.86
				1998	EBF		11.84	1.51	12.80	43.57	37.91	9.03	1.28	14.15
				1999	EBF		6.11	1.21	19.70	40.84	39.83	6.47	1.10	17.06
				2000	EBF		9.36	1.41	15.10	43.18	38.38	7.26	1.00	13.75
Shinohara et al. (2013)	133.52	33.63	80	2008.06.30–2009.7.14	EBF		4.31	0.44	10.00	62.91	29.49	4.13	0.43	10.52
Siles et al. (2010)	–84.14	10.04	1200	2005.07–11	EBF		11.27	1.19	10.50*	30.93	64.34	10.51	1.39	13.21
Fathizadeh et al. (2018); (2017)	46.37	33.70	1650*	2015.02–2016.02	DBF		2.09	0.21	10.25	0.99	49.97	1.60	0.23	14.42
Herbst et al. (2008)	–1.27	51.45	115	2006.04.05–04.25	DBF		2.14	0.53	24.90	26.62	62.19	2.05	0.58	28.03
Deguchi et al. (2006)	137.18	35.03		2000.04–2002.12	DBF	68	3.84	0.65	16.80	14.24	55.20	5.13	0.59	11.57
Brasil et al. (2018)	–39.26	–6.39	217	2010.01–2017.12	DBF		1.63	0.24	14.60	5.46	66.35	2.80	0.34	12.17
Bulcock and Jewitt (2012b)	30.65	–29.21		2008.04–2011.03	DBF		1.74	0.26	14.90	31.87	55.54	2.33	0.30	12.87
Mosello et al. (2002)	13.07	43.29	775	1998	DBF		2.84	0.49	17.24	8.07	69.28	2.44	0.49	19.89
	13.07	43.29	775	1999	DBF		3.19	0.44	13.72	6.08	70.64	2.98	0.53	17.89

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Mosello et al. (2002)	16.18	38.43	1100	1998–1999	DBF		4.25*	0.96*	20.23*	47.38	43.68	2.21	0.54	24.63
	11.40	44.30	975	1998	DBF		2.32	0.63	27.34	25.07	59.05	1.84	0.43	23.27
	11.40	44.30	975	1999	DBF		3.93	0.60	15.28	26.79	57.50	2.88	0.46	15.98
	13.12	45.79	6	1999	DBF		2.63	0.59	22.58	11.25	62.28	2.49	0.41	16.56
Lankreijer et al. (1993)	5.66	52.03		1988–1989.07–09	DBF		3.53	0.69	19.56	41.45	55.90	2.23	0.48	21.41
Medeiros et al. (2009)	–40.25	–6.67		2003.12–2006.05	DBF		1.88	0.24	13.00	9.45	65.91	1.65	0.24	14.70
Holwerda et al. (2010)	–97.04	19.50	2100	2006.09–2008.08	DBF	67.3	2.68	0.42*	14.23*	46.74	49.99	4.17	0.46	10.92
Mużyło et al. (2012)	1.82	42.20	1100	2007.04.04–2009.09.21	DBF	50	1.06	0.16	14.80	42.94	44.55	2.39	0.25	10.37
Klingaman et al. (2007)	–75.83	39.70	72	2004.12.01–2005.04.30	DBF		2.17	0.13	5.80	20.49	35.46	3.07	0.10	3.30
Staelens et al. (2008)	3.82	50.97	16	2002.05.17–2004.05.16	DBF		1.98	0.42	21.05	10.35	69.36	2.04	0.49	23.74
				2002.05.17–2003.04.24	DBF		2.24*	0.42*	17.96*	10.93	66.27	2.22	0.47	21.22
				2003.04.25–2004.4.24	DBF		1.77*	0.40*	23.72*	9.81	71.76	1.91	0.51	26.41
Van Stan et al. (2015)	–75.85	39.70		2007.11–2011.03	DBF				26.00	27.95	51.70	3.22	0.51	15.71
Ahmadi et al. (2013)	51.62	36.58	1410	2008.06.24–12.05; 2009.05.05–11.30	DBF		2.67	0.64	24.1	50.48	43.40	2.37	0.57	24.01
Michopoulos et al. (2001)	20.93	44.08	1080*	1996.06–2000.05	DBF				16.4	9.43	65.13	1.91	0.43	22.37
Granier et al. (2000)	7.08	48.67	300	1996.05.02–10.27	DBF		2.56	0.65	25.3	44.51	54.46	2.50	0.37	14.71
				1997.05.02–10.27	DBF		2.61	0.70	26.8	48.15	51.43	2.22	0.43	19.28
Rodrigues et al. (2021)	–44.96	–21.23	930	2013.01.01–2019.12.31	DBF	72	2.86	0.61	21.2	14.67	71.97	3.60	0.57	15.83
				2013	DBF	72	3.78	0.48	15.70	13.26	74.88	4.39	0.58	13.21
				2014	DBF	72	2.98	0.51	19.00	11.29	71.57	3.20	0.39	12.15
				2015	DBF	72	3.41	0.69	23.70	17.21	71.52	4.13	0.53	12.76
				2016	DBF	72	3.39	0.54	22.20	13.03	74.55	4.02	0.55	13.71
				2017	DBF	72	3.01	0.65	22.10	14.23	72.82	2.63	0.54	20.46
				2018	DBF	72	3.52	0.63	23.40	17.31	68.05	3.37	0.66	19.50
				2019	DBF	72	3.14	0.73	22.60	16.38	70.41	3.45	0.68	19.75
Krämer and Hölscher (2009)	10.39	51.10	330*	2006.05–2007.8	DBF		2.51	0.71	28.43	14.82	74.24	2.31	0.66	28.70

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Dawoe et al. (2018)	–1.87	6.67		2007–2008	DBF		3.77		12.27	19.60	71.09	3.57	0.29	8.10
Whitworth-Hulse et al. (2020)	–64.28	–31.15	697*	2015.01–2016.10	DBF	85	1.34		26.9	15.52	62.94	2.33	0.50	21.62
Fathizadeh et al. (2013)	46.43	33.62	1383	2010.03.23-2011.03.22	DBF		1.17	0.23	19.95	2.99	47.71	1.17	0.16	13.78
Link et al. (2004)	–121.95	45.82	367.5	1999.04.08–11.08	ENF		2.10	0.48	22.80	73.76	17.68	2.21	0.49	21.98
				2000.03.30–12.03	ENF		2.48	0.62	25.00	74.06	16.85	2.43	0.49	20.36
Shinohara et al. (2015)	130.52	33.63	100	2010.04.07–09.30	ENF	98	7.31	1.00	14.00	53.77	39.69	7.28	0.48	6.55
				2010.10.30–2011.07.22	ENF		5.11	0.41	8.00	48.28	29.94	5.10	0.36	7.06
Gash et al. (1995)	–0.08	44.08		1986.02.09–1987.1.03	ENF	45	1.86	0.22	11.90	37.54	50.31	2.37	0.25	10.42
Liang and Ding (2013)	117.59	41.83	1270	2010.06–2010.10	ENF		1.37	0.41	29.82	28.01	61.65	2.84	0.61	21.58
Ringgaard et al. (2014)	9.34	56.07		2010.02–12	ENF	72	2.54	0.83	32.70	33.68	53.68	2.35	0.69	29.45
				2011.01–12	ENF	72	2.50	0.91	36.50	39.72	46.42	1.98	0.67	34.05
Sadeghi et al. (2016)	51.13	35.70	1235	2011.03.16–2014.03.15	ENF		0.67	0.14	21.20	0.69	32.18	0.76	0.17	22.52
Sadeghi et al. (2015b)	51.13	35.70	1235	2012.08.23–2013.08.23	ENF		0.75	0.19*	25.50*	1.06	32.44	0.84	0.15	17.40
Návar (2013)	–99.87	24.72	1550	1997.05–1998.11	ENF	74/92/	1.88	0.31*	16.70*	32.25	59.98	1.83	0.15	7.94
Gavazzi et al. (2016)	–76.67	35.80		2005.05–12.31	ENF		4.92	0.59	11.94	17.63	63.93	4.40	0.63	14.35
				2006	ENF		3.90	0.57	14.67	15.66	62.06	4.16	0.59	14.17
				2008	ENF		2.78	0.34	12.30	12.60	62.66	2.71	0.55	20.25
				2010	ENF		3.90	0.54	13.85	12.40	55.12	3.17	0.39	12.29
				2011	ENF		3.58	0.52	14.00	15.63	64.09	3.32	0.49	14.84
				2012	ENF		3.63	0.35	10.00	20.94	54.31	3.55	0.60	17.02
				2013	ENF		3.48	0.60	17.00	16.13	59.48	3.25	0.57	17.66
				2014	ENF		2.93	0.48	16.00	16.19	56.22	3.14	0.51	16.38
				2005.05–2014	ENF		3.47	0.42	12.00	15.90	59.73	3.36	0.54	16.13
Sun et al. (2015)	139.60	36.37	198	2010.11–2011.10	ENF	97.4	3.96	1.00	25.20	22.62	51.89	3.70	0.72	19.46
				2011.11–2012.10	ENF	75.8	3.46	0.59	17.00	25.77	48.32	3.41	0.74	21.64
Mosello et al. (2002)	13.59	46.51	820	1998	ENF		3.66	0.78	21.35	50.68	27.05	4.21	0.67	15.93
				1999	ENF		4.08	0.89	21.76	50.08	27.70	4.98	0.72	14.50

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Mosello et al. (2002)	11.50	46.36	1775	1998	ENF		2.87	0.50	17.56	46.85	34.08	1.87	0.31	16.67
				1999	ENF		3.11	0.76	24.49	52.60	26.77	2.03	0.43	21.07
	9.55	46.24	1190	1998	ENF		4.36	0.79	18.20	19.89	41.32	2.77	0.65	23.38
				1999	ENF		5.91	1.15	19.43	13.66	43.79	3.35	0.70	20.78
Huber and Iroumé (2001)	–73.23	–39.80		1982.01–1982.12	ENF	72	6.55	0.72	11.00	28.46	60.03	7.27	1.09	14.98
				1983.01–1983.12	ENF	72	4.46	0.54	12.00	28.50	59.98	4.54	0.78	17.13
				1984.01–1984.12	ENF	72	5.63	0.96	17.00	28.21	60.26	5.98	1.00	16.66
				1985.01–1985.12	ENF	72	6.29	1.07	17.00	32.09	56.19	5.82	0.91	15.71
				1986.01–1986.12	ENF	72	6.41	1.09	17.00	28.41	60.07	6.85	1.09	15.98
				1987.01–1987.12	ENF	72	5.04	0.81	16.00	28.48	59.94	5.91	0.93	15.79
				1988.01–1988.12	ENF	72	3.73	0.82	22.00	29.92	58.35	3.61	0.79	21.85
				1992.10–1993.09	ENF	76	8.01	1.48	18.50	31.04	57.17	8.00	1.03	12.93
				1993.10–1994.09	ENF	83	5.68	1.04	18.30	29.59	58.61	6.02	1.02	16.97
				1994.10–1995.09	ENF	85	6.56	1.08	16.50	28.40	60.00	6.23	0.95	15.16
				1996.10–1997.09	ENF	69	7.05	1.06	15.00	28.27	60.20	7.34	0.99	13.52
				1997.10–1998.09	ENF	69	4.59	0.57	12.50	28.22	60.25	4.76	0.87	18.31
Balestrini and Tagliaferri (2001)	9.59	46.24	1190	1994.06–1999.05	ENF				24.0	16.29	42.71	2.77	0.66	23.84
	9.54	46.10	1490	1994.06–1999.05	ENF				22.0	23.40	50.09	2.73	0.68	24.95
Pypker et al. (2005)	–121.99	45.82	558	2002.06.27–11.30	ENF	47	2.67	0.56	21.40	75.38	16.29	1.88	0.32	16.91
	–121.90	45.82	368	2000.03.30–12.03	ENF	97	2.48	0.60	24.00	74.06	16.85	2.43	0.49	20.36
Llorens (1997); Llorens et al. (1997)	2.00	42.20	1400	1993.07–1995.12	ENF		2.00	0.48	24.00	48.83	41.82	2.24	0.34	15.22
Domingo et al. (1994)	–2.40	37.20	1560	1988–1989	ENF		0.89	0.14	15.51	13.29	43.51	2.69	0.27	9.95
Viville et al. (1993)	7.20	48.20	1075	1988.05.24–11.02	ENF		3.58	1.16	32.40	71.91	26.01	3.45	0.95	27.67
				1989.04.24–10.16	ENF		3.34	1.04	31.20	77.06	21.70	2.20	0.71	32.29
				1990.05.07–11.05	ENF		2.95	1.16	39.30	72.28	25.65	2.61	0.75	28.90
Loustau et al. (1992)	–0.77	44.70	60	1987.06.20–09.22	ENF	40	1.17	0.22	18.90	27.97	71.83	0.99	0.16	15.88

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Loustau et al. (1992)	–0.77	44.70	60	1988	ENF	41	2.59	0.42	16.21	26.80	56.83	2.34	0.19	8.05
				1989	ENF	46	0.78	0.12	15.94	27.36	56.57	1.89	0.15	7.87
Lankreijer et al. (1999)	17.48	60.08	45	1995.05.22–10.30 (except 06.05–07.02)	ENF		1.10	0.29	25.80	56.15	43.61	1.44	0.35	24.11
Tallaksen et al. (1996)	10.60	59.90		1993.06–09;1994	ENF		4.81		26.63	56.31	34.34	1.91	0.41	21.37
Kelliher et al. (1992)	176.42	–38.55	580	1986.11–1987.12	ENF		2.71	0.81	30.00	61.48	37.28	3.76	0.81	21.43
Teklehaimanot et al. (1991)	–3.27	55.70	400	1988.05.01–1988.10.31	ENF		2.40	0.70	29.12	27.86	69.61	2.82	0.90	31.99
Lankreijer et al. (1993)	–0.08	44.08		1986.02.08–12.31	ENF		4.35	0.54	12.52	37.47	50.32	2.36	0.24	10.34
Waterloo et al. (1999)	177.45	–18.00	99*	1990.01.04–11.13	ENF				18.33*	40.39	51.72	4.67	0.87	18.54
Waterloo (1994)	177.45	–18.00	99*	1990.01.06–11.15	ENF		4.90	1.01	19.61*	40.37	51.68	4.58	0.86	18.77
				1990.07.23–1991.08.30	ENF		3.64	0.60*	16.43*	41.71	51.92	5.06	0.81	16.08
	177.28	–17.98	47	1990.01.08–11.19	ENF		4.65	0.99	21.08	24.33	66.82	4.06	0.72	17.61
				1990.01.08–1991.09.02	ENF		4.36	0.74	17.04	23.66	68.23	4.69	0.73	15.52
Li et al. (2015)	122.29	53.43	570	2012.07.01–2013.09.30	ENF		1.81	0.40	22.08	54.46	38.34	3.12	0.53	16.83
Sun et al. (2013)	101.50–102.25	29.33–30.33	2000*	2009.05–10	ENF		6.37	1.48*	23.17*	26.98	61.28	4.48	0.71	15.82
Bulcock and Jewitt (2012b)	30.66	–29.19	1065	2008.04–2011.03	DNF		1.74	0.37	21.40	30.63	55.75	2.20	0.40	18.25
Meng et al. (2001)	103.40	26.45		1997–1999	DNF	85	2.76	0.58	20.90	10.62	56.13	2.99	0.79	26.45
Sheng et al. (2009)	128.87	47.18	400	2005.04–09	DNF		2.75	0.60	21.71	59.96	29.39	3.53	0.83	23.41
Sheng et al. (2010)	124.22	41.73	240	2005–2008, 06–08	DNF		3.79	0.71	18.80	52.52	47.48	5.33	0.78	14.62
Dong et al. (2020)	118.52	41.32	998	2013–2014,05–09	ENF		2.80	0.73	26.00*	35.08	59.37	2.48	0.67	27.20
Aydin et al. (2018)	33.47	41.47	1070*	2012–2014	ENF		0.99	0.22*	22.40*	40.42	38.40	1.74	0.36	20.66
Iida et al. (2017)	140.18	36.17	320*	2008–2010	ENF		4.24	0.42	19.90	33.47	49.02	4.09	0.55	13.42
Zhou et al. (2013)	112.25	36.52		2011.05–09	C	50–80	4.15	0.85*	20.39*	38.93	57.25	3.52	0.75	21.38
Chen et al. (2013)	108.33	33.30	1625*	2006.06–2008.10	MF	85	1.78	0.59	33.20	51.37	29.79	2.33	0.64	27.60
Asdak et al. (1998a)	112.38	–1.30	200	1993.11–1994.04	MF	100	4.72	0.52	11.00	73.30	24.94	11.28	1.40	12.43
				1994.06–1995.06	MF	60	5.37	0.32	6.00	69.16	29.07	10.02	1.04	10.36

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Sinun et al. (1992)	117.84	4.98	426	1989.09–1990.09	MF		9.91	1.72	17.40	80.60	18.03	6.17	1.19	19.32
Su et al. (2016)	110.47	31.31	1650	2014.05.01–10.31	MF	85	8.55	1.23	14.30	65.80	32.78	5.56	0.72	12.91
Bryant et al. (2005)	–84.75	32.49	116.5*	2001.04.04–2002.11.06	MF	64.2	1.25	0.23*	18.73*	40.78	50.64	2.49	0.45	18.14
Buttle and Farnsworth (2012)	–78.50	44.08	351.5	2009–2010 .05.11–10.22	MF		8.06	1.48*	18.35*	35.46	63.06	2.55	0.28	10.93
Silva and Rodríguez (2001)	–99.87	24.72	1600	1996.10–1999.06	MF		0.97	0.18*	18.60*	31.81	57.30	1.49	0.12	8.17
Xiao and Song (1993)	121.78	29.80	476.5*	1990.06–1991.05	MF		4.25	0.90*	21.22*	44.20	42.03	3.71	0.72	19.49
Liu et al. (1991)	102.75	24.11	1925*	1986–1987, 05–10	MF		3.92	0.62*	15.80*	12.20	70.00	4.79	0.81	16.99
Junior et al. (2019)	–44.96	–21.23	930	2012.09.01–2015.03.15	MF	76	3.48	0.42	12.10	12.75	72.78	4.01	0.52	13.02
Sheng and Cai (2019)	128.80	47.24		2010–2011,05–09	MF		2.40	0.53	22.00	63.42	32.13	3.30	0.59	17.83
Chai et al. (2013)	128.80	47.24		2010.07–10; 2011.05–10	MF		1.67	0.43	25.70	62.94	30.24	2.86	0.53	18.45
Ji and Cai (2015)	128.80	47.24		2006–2007,05–09	MF		2.71	0.58	21.50	69.42	25.94	2.81	0.58	20.82
Cai et al. (2008)	128.80	47.24		2005.05–10	MF		2.73	0.54	19.60	63.72	28.01	3.25	0.48	14.80
Liu et al. (1993)	128.80	47.24		1993.01–12	MF		2.05	0.41	20.28	60.26	25.59	2.98	0.35	11.57
Kermavnar and Vilhar (2017)	14.52	46.07	303*	2008.01.01–2013.12.31	MF			0.36	9.667	23.88	50.68	3.82	0.43	11.25
Reid and Lewis (2009)	–123.73	39.35	245*	1998.12.05–2001.05.27	MF		2.71		22.40	69.63	23.66	2.81	0.48	17.25
				1998.12.05–1999.11.08	MF		2.89		18.35	67.57	26.30	2.69	0.40	14.73
				2000	MF		3.31		23.00	71.21	21.19	2.70	0.55	20.41
				2001.01.01–2001.05.27	MF		4.94		26.30	71.93	22.24	2.65	0.41	15.58
Fan et al. (2014)	153.14	–26.98		2012.05–2013.04	MF		4.09		*19.65*	43.83	45.67	4.39	0.70	16.06
Huber and Iroumé (2001)	–73.57	–40.17		1982.06–1983.05	MF	88.5*	11.19*	1.83*	17.00*	80.28	16.41	5.76	1.05	18.16
	–72.75	–37.50		1991.10–1992.09	MF		5.39	0.97	18.00	65.28	33.78	4.53	0.64	14.24
	–72.42	–37.92		1996.04–1997.03	MF	63.57	2.85	0.18	29.43	39.44	55.38	2.49	0.50	20.11
				1997.04–1998.03	MF	63.57	5.09	0.55	28.80	42.80	52.67	4.29	0.65	15.08
				1998.04–1999.03	MF	63.57	2.01	0.22	29.67	50.06	45.42	1.93	0.44	22.60
Wang and Wang (2020)	107.67	35.22	1200	2013–2016, 05–09	S				9.10	17.73	77.65	2.69	0.22	8.48

Table S5 Continued.

Sites' information						Observations				Forcing data			Estimates	
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	*c_TV* (%)	*c_SV* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)
Li and Bai (2013)	109.25	36.72	1270	2008–2010, 4.20–11.30	S		1.65	0.15	8.90	15.11	55.33	2.01	0.15	7.61
Herbst et al. (2006)	–1.7	51.6	103*	2004.06.21–2005.02.09	S		2.12	0.52	23.70	19.20	64.88	2.03	0.21	10.48
Zhang et al. (2015)	105.033	37.533	1300	2011.06.26–11.07; 2012.04.11–09.25; 2013.05.15–11.30	S		0.92	0.18	19.49	3.03	57.28	1.08	0.07	7.10
Zhang et al. (2016)	105.033	37.533	1250	2004-2014 (except 2007)	S		0.34	0.09	23.10	1.22	36.28	0.55	0.05	9.52
Finch and Riche (2010)	–0.353	51.808	128	1997.06.26–1998.01.19	H		1.88	0.47	25.00	11.46	65.96	1.95	0.13	6.78
				1998.06.12–1999.02.01	H		2.74	0.66	24.00	11.67	66.86	2.58	0.15	5.69
Fernandes et al. (2017)	–47.666	–2.613	510	2012.07–2013.05	H		3.27	0.79	24.00	27.20	60.90	7.15	0.61	8.56
Zheng et al. (2018)	108.4	34.3	521	2015–2016.06–10.01	H		2.16	0.27	12.50	6.92	67.49	2.48	0.18	7.29
Návar et al. (1999)	–99.53	24.78	355	1995.09–1997.04	S		1.09	0.18	16.50	5.18	72.64	1.35	0.10	7.49
				1997.04–1998.03	S		1.25	0.23	18.30	8.00	75.74	1.74	0.13	7.37
Van Dijk and Bruijnzeel (2001)	–108.07	–7.05	600*	1995.01.08–1995.05.11	H		12.7	2.29	18.00	16.14	82.19	13.70	0.70	5.10
				1999.01.02–1999.07.17	H		8.3	0.67	8.00	10.07	88.08	11.13	0.55	4.98
Jian et al. (2012)	104.38	35.35	2075*	2011.05–10	S		1.14		23.15	5.74	71.82	2.23	0.18	7.91
Zheng et al. (2019)	108.40	34.30	521	2015–2017, 06–10	H				13.80	6.20	61.21	2.68	0.17	6.59
Waterloo et al. (1999)	177.32	–17.95		1990.01.04–11.13	H				4.53	36.58	56.12	4.48	0.28	6.19

Table S6. Overview of discarded experimental sites for field validation collected from 53 publications.

Sites' information						Observations				Remarks
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I*/*P* (%)	
Ziegler et al. (2009)	98.65	19.05	1350*	2002.06.21–10.07	EBF		10.40	1.87	18.00	Shorter than 6 months
Hutjes et al. (1990)	–7.34	5.85		1987.08.04–12.20	EBF	97	7.35	0.68	9.20	
Brooks and Spencer (1995)	117.85	4.95		1992.06.01–08.31	EBF				29.00	
Dykes (1997)	115.17	4.53	130	1991.10.23–1992.02.14	EBF		7.18	1.29	18.00	
Carlyle-Moses et al. (2010)	–79.58	9.17		2006.07.23–09.20	EBF	74.2	5.83	0.83	14.27	
Lundgren and Lundgren (1979)	38.50	–4.85	1500	1973.07–1975.12	EBF		2.88	0.64	22.00	Earlier than 1980
Mcjannet et al. (2007)	145.40	–16.19	20	2001.11.09–2004.06.30	EBF		7.34	1.62	22.00	The same pixel with Ref.24.
	145.27	–16.52	1100	2000.12.21–2004.06.30	EBF		9.10	2.09	23.00	
Wallace et al. (2013)	145.49	–17.45	1050	2000.12–2004.03	EBF		1.03	0.34	33.40	Including cloud interception
Fleischbein et al. (2005)	–79.2	–4.00	2000*	1998.04.18–2001.04.18	EBF		2.25	0.88	39.21	Epiphytes, mostly bryophytes
	–78.97	–4.08	2000*	1998.04.18–2001.04.18	EBF		2.25	0.88	39.21	
Aboal et al. (1999)	–16.4	28.45	830	1994.12.30–1995.11.31	EBF		1.86	0.41	22.17	Forcing *P* is too small
Veneklaas and Van Ek (1990)	–75.53	4.80	2550	1986.08.20–1987.08.19	EBF		5.79	0.72	12.40	Abundant Epiphytes
	–75.42	4.77	3370	1986.08.20–1987.08.19	EBF		3.98	0.73	18.30	
Hölscher et al. (2004)	–83.74	9.59	2900	1999.09–2000.08	EBF		5.87	1.67	28.42	
Price and Carlyle-Moses (2003)	–79.65	44.55	137	1995.05.15–08.28	DBF		2.45	0.46	18.80	Shorter than 6 months
Carlyle-Moses and Price (1999)	–79.72	43.55	137	1995.05.15–09.27	DBF	86	1.57	0.30	19.30	
Dolman (1987)	4.64	52.55		1985(119d)	DBF		1.22	0.20	15.95	
Ahmadi et al. (2009)	51.62	36.58	1410	2008.6.24–2008.10.25	DBF		2.50	0.74	29.80	
Mosello et al. (2002)	10.20	44.72	200	1998	DBF		1.55	0.04	2.82	Observed *I* is too small compared to other sites in Mosello et al. (2002).
	10.20	44.72	200	1999	DBF		2.55	0.25	10.01	
Šraj et al. (2008)	13.75	45.4	200	2000.10.05–2001.09.12	DBF		3.69	1.00*	26.90*	Fixed and roving gauges
Hörmann et al. (1996)	10.24	54.10		1990.06–1991.12	DBF		2.09	0.20	10.89	Located in the border region of the Weichsel glacial age
Neal et al. (1993)	–1.26	51.15	125*	1989.04–1991.10	DBF				16.00	*cc_TV > FF*
Giacomin and Trucchi (1992)	11.01	44.01	880*	1980–1989	DBF				24.80	

Table S6 Continued.

Sites' information						Observations				Remarks
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	
Sun et al. (2014)	139.60	36.37	198	2011.07–10	ENF	97.4	7.16	1.80	25.20	Shorter than 6 months
Price et al. (1997)	–98.15	55.45		1994.06.24–09.06	ENF		1.41	0.33	23.30	
Teklehaimanot and Jarvis (1991)	–3.27	55.71		1989.06.20–09.22	ENF				29.00	
Gash et al. (1980)	–3.68	52.45	410	1975.09–1978.06	ENF	100	5.11	1.36	26.69	Earlier than 1980
	–3.48	57.68	10	1977.01–12	ENF	87	1.75	0.74	42.39	
	–2.40	55.22	220	1977.08–1978.09	ENF	100	2.66	0.84	31.67	
Motahari et al. (2013)	51.17	35.17	1269	2009.09–2010.04	ENF		0.68	0.25	37.20	Conducted within Chitgar Forest Park in Tehran
Saito et al. (2013)	130.65	33.50	350*	2010.06.05–2011.12.31	ENF	97	4.97	1.27*	25.50*	19 rain gauges were not repositioned.
Gavazzi et al. (2016)	–76.67	35.80		2007	ENF		2.46	0.20	8.03	Observed *I* is too small compared to other years.
	–76.67	35.80		2009	ENF		3.63	0.05	2.00	
Molina and Del Campo (2012)	–1.21	39.09	950	2009.03–2010.02	ENF		0.85	0.27	32.27	The effects of experimental thinning on throughfall and stemflow; *P* was measured just for 18 weeks.
Johnson (1990)	–4.40	56.50		1983.10–1986.06	ENF		5.77	1.63	28.18	Both rainfall and snow interception are measured.
Bons (1990)	107.75	–6.83	1584*	1985.11.05–1987.12.11	ENF				28.00	Relative interception is from Albert' review
Attarod et al. (2015)	55.80	38.07	1091	2009.03.21–2010.03.20	ENF		0.31	0.10*	38.00*	Conducted in an afforested Park located in a city
Seonghun et al. (2019)	130.53	33.63	100.000	2017.04–10	ENF		5.03	1.41*	28.00*	
Shi et al. (2010)	106.26	35.49	2200	2005.06–09	DNF	64	5.86	0.83	14.16	Shorter than 6 months
Wu et al. (2006)	121.51	50.83	1150	2004.06.01–09.30	DNF		2.15		18.61	
Jiang et al. (2008)	124.03	50.28		2007.05.18–09.11	NF		2.02	0.66	32.63	
Liu et al. (2018)	106.35	35.46	2476*	2015.05.06–2015.10.31	DNF	73	2.79	0.48	17.40	
Ghimire et al. (2012)	85.60	27.63	1500	2011.06.20–09.09	EBF		8.75	1.96	22.40	
			1580	2011.06.20–09.09	ENF		10.84	1.79	16.50	
Schellekens et al. (1999); (2000)	–65.83	18.17		1996.05.05–07.09	MF		12.91	7.49	52.10	

Table S6 Continued.

Sites' information						Observations				Remarks
References	Long	Lat	Alt (m)	Duration	Veg type	*c* (%)	*P* (mm/d)	*I* (mm/d)	*I/P* (%)	
Zhang (2012)	128.95	47.22	478	2010.06–08	MF		3.86	0.76	19.60	Shorter than 6 months
Xiao et al. (2002)	128.10	42.70	740	2001.06–09	MF		3.85	0.90	23.38	
Feller (1981)	145.58	–37.63	306*	1976.04–1978.03	MF		3.55	0.70*	19.70*	Earlier than 1980
Rowe (1979)	171.78	–42.17	330	1975.10–1978.09	MF		5.68	1.45	26.00	
Schellekens et al. (2000)	–65.83	18.17	360.5*	1996	MF		10.07	1.26	48.50	
				1997	MF		9.53	1.02	39.20	
Cavelier et al. (1997)	–82.23	8.72	1200	1988.07–1989.07	MF		9.59	3.57	37.20	Abundant vascular epiphytes
Crockford and Richardson (1990)	149.32	–35.25	850	1980.03.08–1981.11.04	MF		0.88	0.12*	14.05*	*cc_TV > FF*
Tarazona et al. (1996)	42.33	4.17		1986	MF		*2.21*	0.77*	34.89*	No tree covers in modelling
				1987	MF		*4.04*	1.55*	38.39*	
				1988	MF		*4.90*	2.06*	42.04*	
				1986–1988	MF		*3.72*	1.46*	39.30*	
Elsenbeer et al. (1994)	–74.08	–10.22	300	1986.12.15–1988.05	MF		9.01	1.52	16.90	
Xiao et al. (2000)	–121.78	38.54		1996.12–1998.02	MF		2.47	0.58*	21.00*	
Pérez-Suárez et al. (2014)	–101.1	22.03	2350*	2006.08–2009.07	MF		1.08	0.13*	12.27*	Positioned throughfall containers
(Ma et al., 2019)	107.91	34.56	1085	2016.01.01–12.31	MF		1.39	0.29*	20.75*	
				05.01–10.31	MF		2.53	0.53*	21.15*	
				11.01–04.30	MF		0.25	0.04*	16.20*	
Huber and Iroumé (2001)	–71.58	–38.47		1998.04–1999.03	MF	74	3.69	0.58	30.00	
	–72.52	–37.23		1998.09–1999.08	ENF	74.5	2.75	0.10	24.00	
	–72.43	–37.3		1998.09–1999.08	ENF	77	2.84	0.13	27.50	
Zabret et al. (2017)	14.82	46.07		2014.01.01–2017.06.30	MF		3.22		35.32*	
Návar and Bryan (1994)	–99.53	24.78	355	1987.05–08	S		1.98	0.55	27.94	Shorter than 6 months
Zhang et al. (2018)	100.01	37.59	3353	2012.06.01–2012.09.11	S		4.71	1.01	21.40	
Zhang et al. (2017)	109.52	36.70	1429*	2015.06–09	S		0.96	0.21	22.05*	
Jackson (2000)	37.13	–1.55	1560	1994.11–1995.03.10	H		5.05	0.46	11.30	
Yang et al. (2013)	107.68	35.2	1220	2011.05–09	S		3.19		8.70	

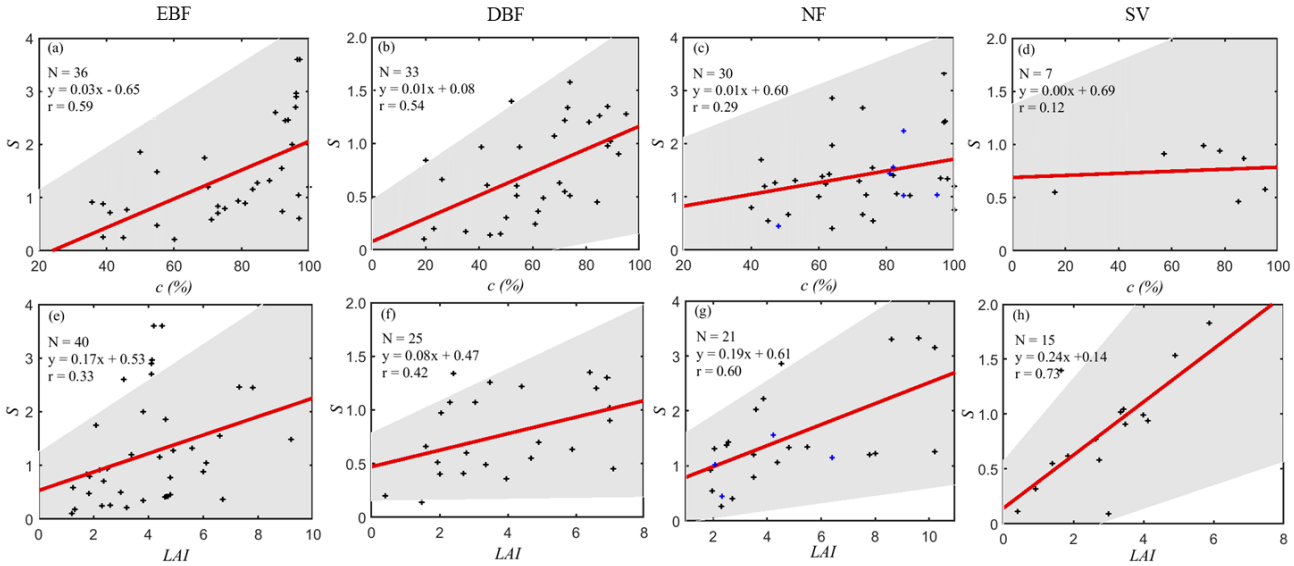

Figure S1. Linear regression between *S* and *LAI*, *c*. The red line is the regression line, and the grey shading represents the 95% confidence interval. EBF, DBF, NF, MF and SV represent Evergreen Broadleaf Forests, Deciduous Broadleaf Forests, Needleleaf Forests, Mixed forests and short vegetation plant functional types. The blue scatters in NF represent the few values collected from MF.

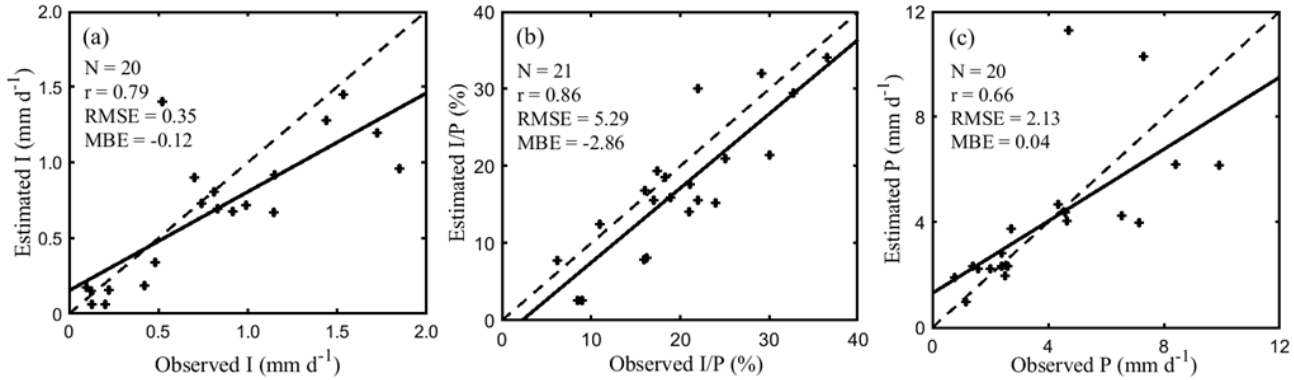

Figure S2. Field validation over marine forests. (a) *I* in mm d^{-1}, (b) *I*/*P* in %, (c) *P* in mm d^{-1}. The black solid line represents the regression line, and the black dash marks the 1-to-1 line.

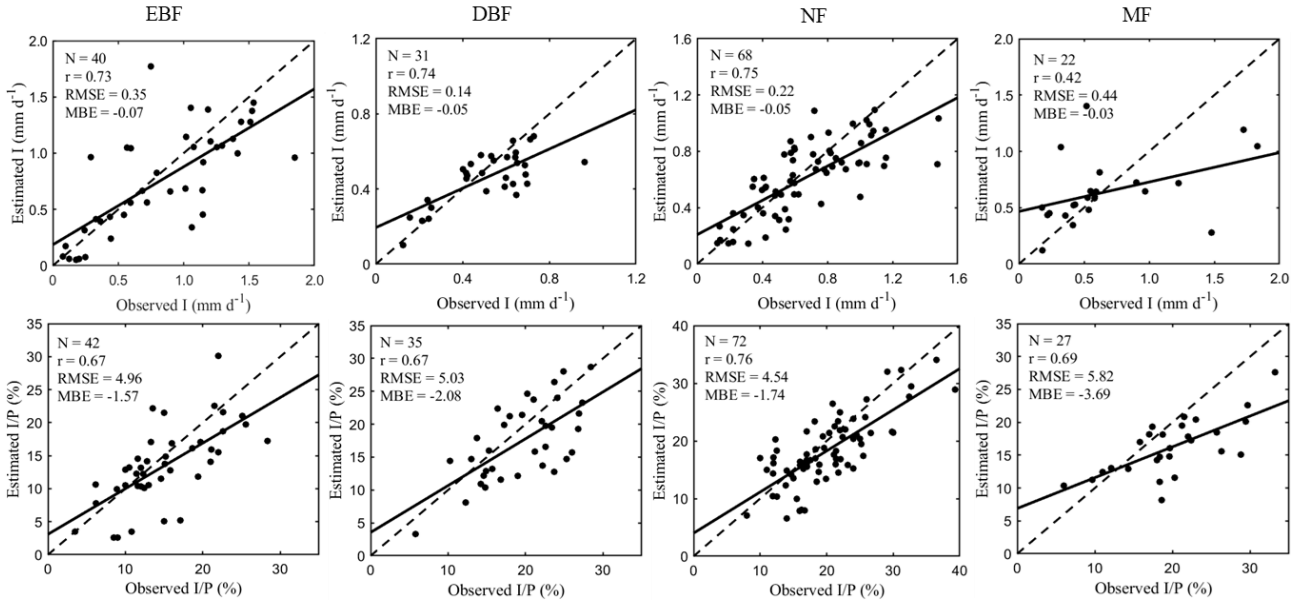

Figure S3. Field validation over different vegetation types. EBF, DBF, NF and MF represent Evergreen Broadleaf Forests, Deciduous Broadleaf Forests, Needleleaf Forests and Mixed forests, respectively. The black solid line represents the regression line, and the black dash marks the 1-to-1 line.

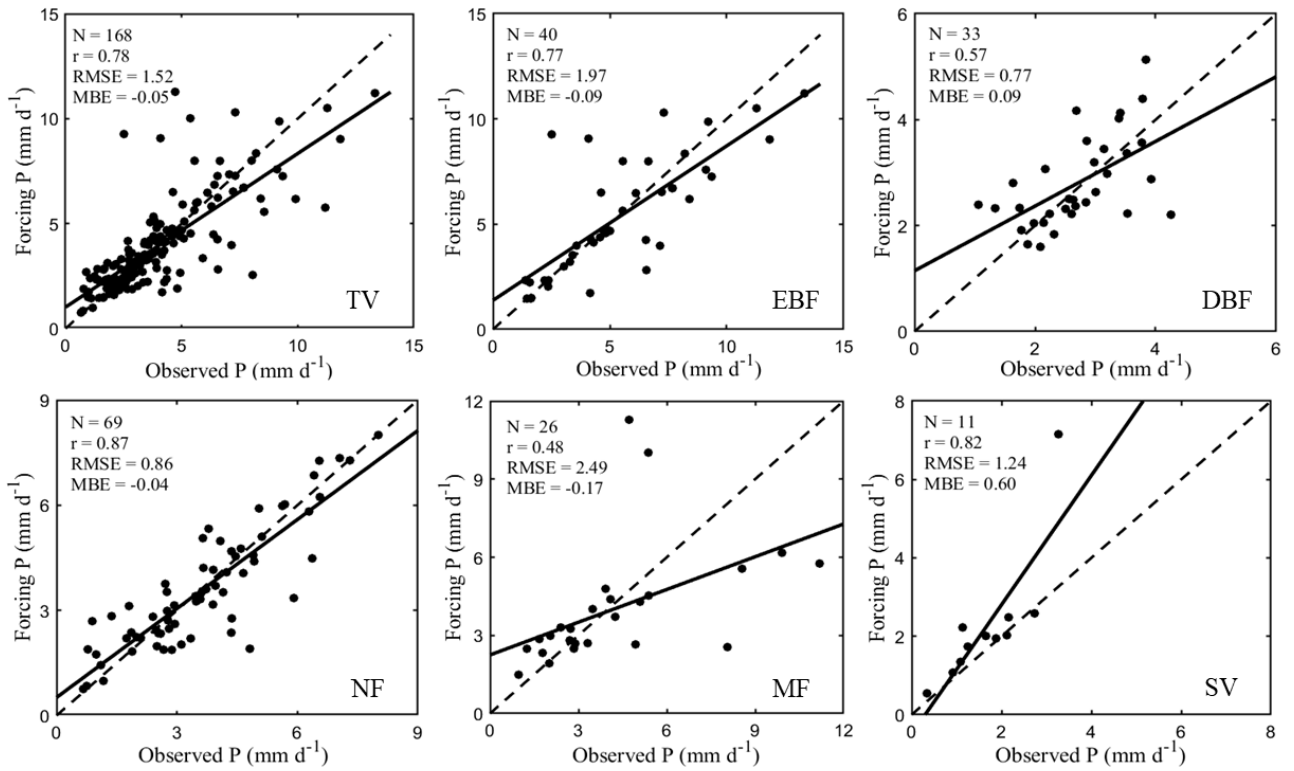

Figure S4. Linear regression between forcing and observed precipitation over field campaigns. TV, EBF, DBF, NF, MF and SV represent all tall vegetation, Evergreen Broadleaf Forests, Deciduous Broadleaf Forests, Needleleaf Forests, Mixed forests and short vegetation, respectively. The black solid line represents the regression line, and the black dash marks the 1-to-1 line.

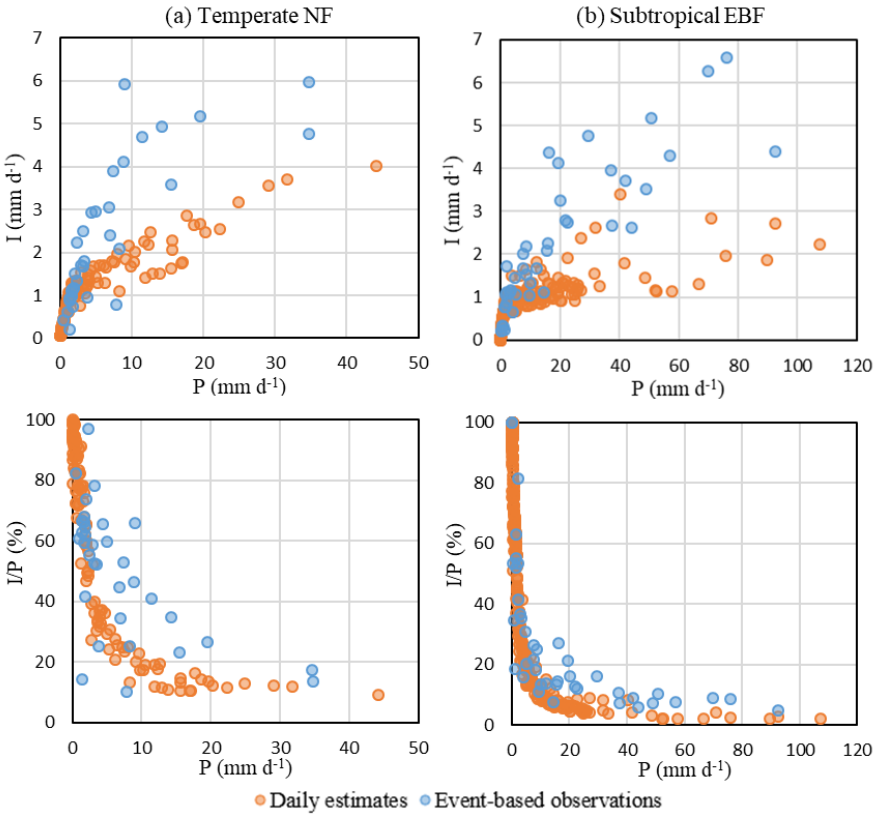

Figure S5. Comparisons between daily estimated interception with event-based observations from two field campaigns. The left column corresponds to a temperate NF in USA (Link et al., 2004), and the right column corresponds to a subtropical EBF in China (Chen and Li, 2016).

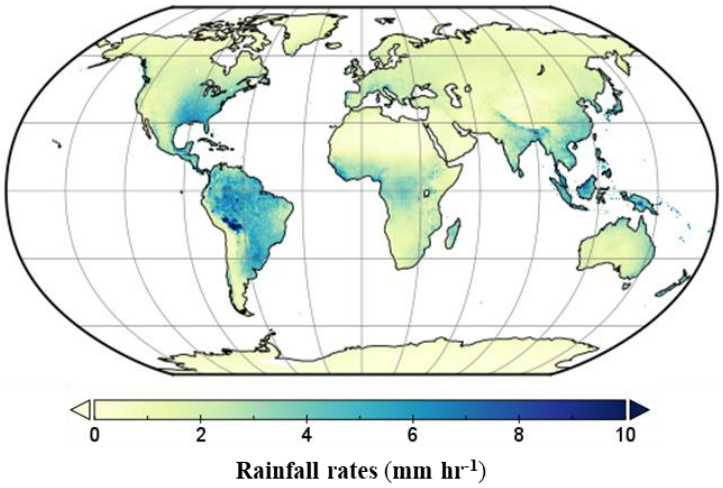

Figure S6. Global distribution of annual average rainfall rates for 1980-2019.

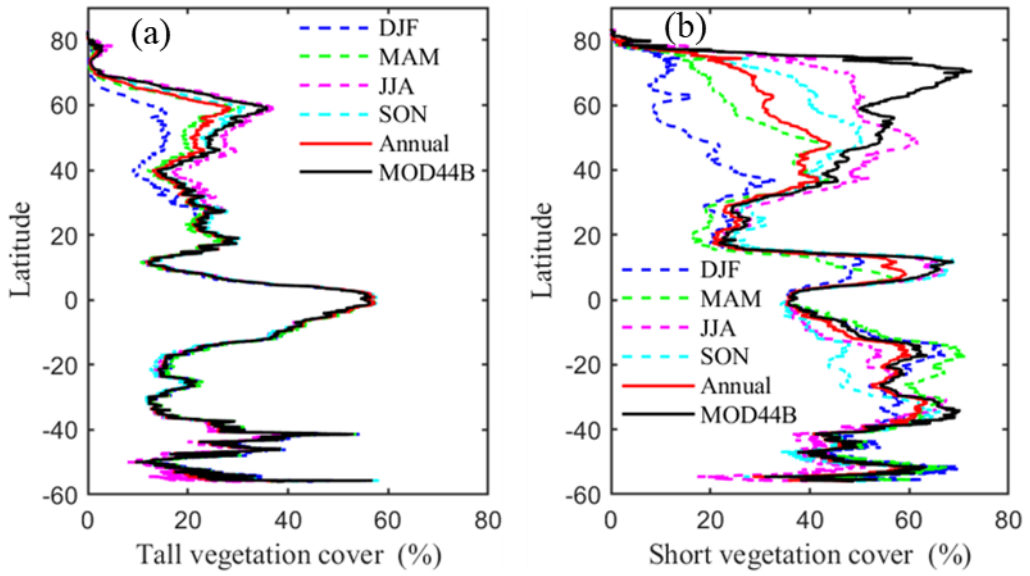

Figure S7. Variation of *c* along different latitudinal bands. The dash lines represent the seasonal average (DJF: December–February; MAM: March–May; JJA: June–August; SON: September–November). The red solid line is the annual *c* derived in this study, and the black solid line represents the annual *c* from MOD44B product.

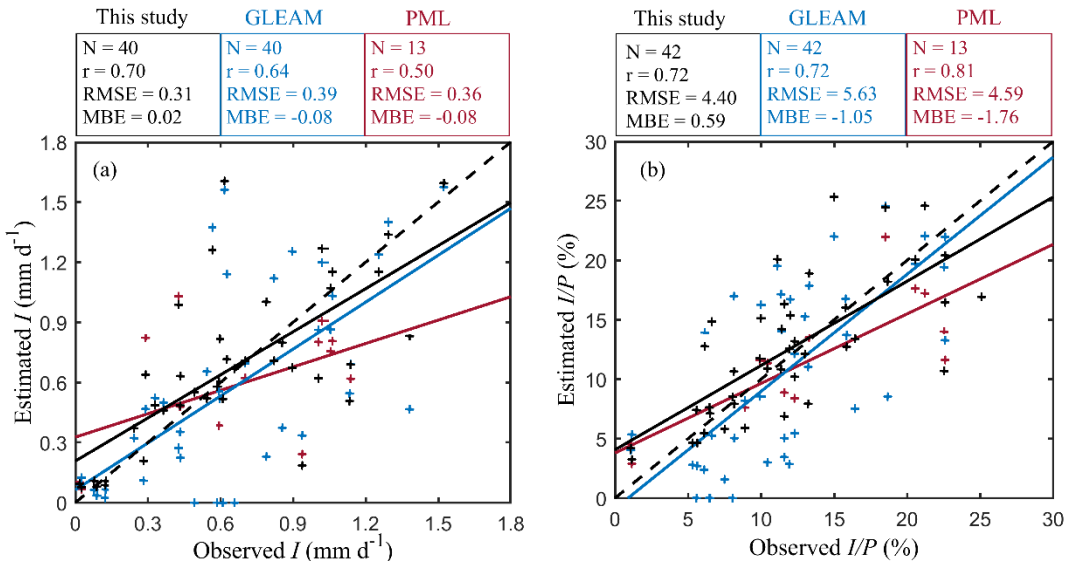

Figure S8. Field validation of rainfall interception loss for EBF sites. (a) *I* in mm d^{-1}, (b) *I*/*P* in %. Black, blue and red scatters represent the pixel-scale simulations from this study, GLEAM and PML model, respectively. Since the time series of PML v2 spans from 2003 to 2017, hence only 13 field observations can be used for validation. The solid lines in different colors are the regression lines, and the black dashed lines mark the 1-to-1 line.

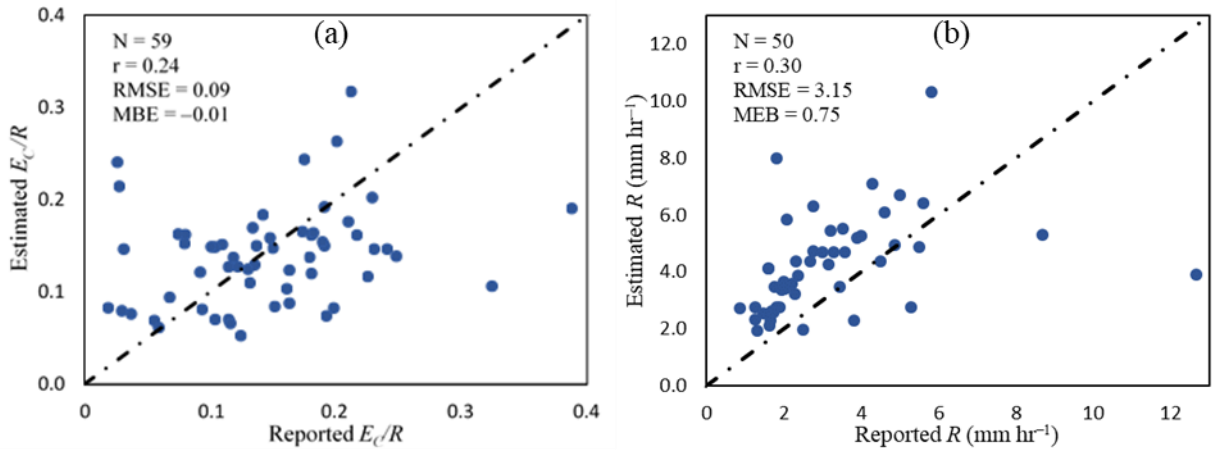

Figure S9. Comparison of tall vegetation E_C/R (a) and R (b) from publications and this study.

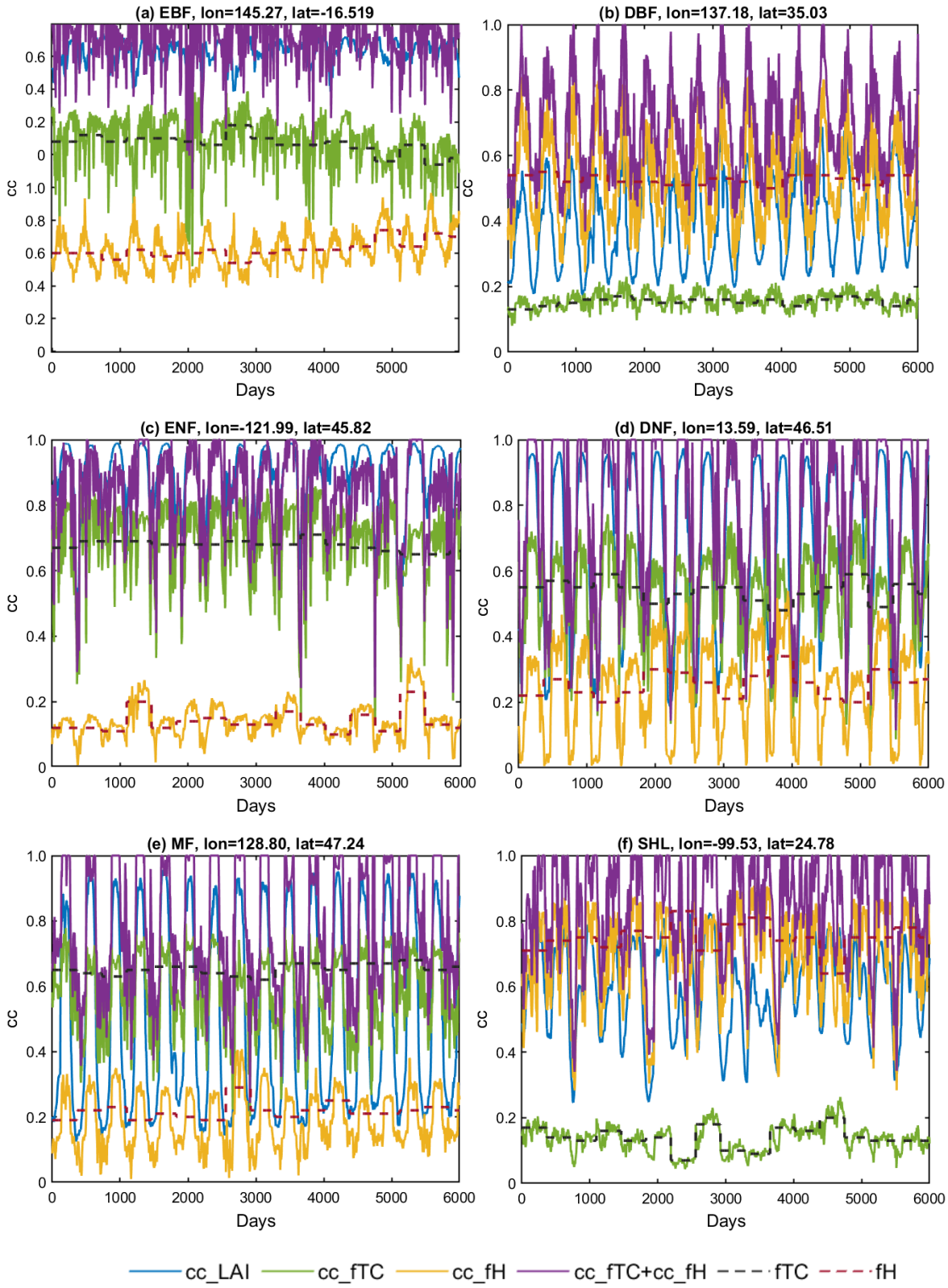

Figure S10. The time series of *c* at representative sites. cc_LAI represents *c* derived from *LAI* based on Beer–Lambert's Law. cc_fTC and cc_fH represent *c* for tall and short vegetation, respectively, in this study estimated from *fPAR*. fTC and fH are the annual tree canopies and non-tree vegetation canopies from MOD44B product.

References

Aboal, J. R., Jiménez, M. S., Morales, D., and Hernández, J. M.: Rainfall interception in laurel forest in the Canary Islands, Agr Forest Meteorol, 97, 73-86, https://doi.org/10.1016/S0168-1923(99)00083-0, 1999.

Ahmadi, M., Attarod, P., and Bayramzadeh, V.: The role of rainfall size in canopy interception loss: an observational study in a typical beech forest, Middle East Journal of Scientific Research, 13, 876-882, 2013.

Ahmadi, M. T., Attarod, P., Mohadjer, M. R. M., Rahmani, R., and Fathi, J.: Partitioning rainfall into throughfall, stemflow, and interception loss in an oriental beech (Fagus orientalis Lipsky) forest during the growing season, Turkish Journal of Agriculture and Forestry, 33, 557-568, 10.3906/tar-0902-3, 2009.

Asdak, C., Jarvis, P. G., and Gardingen, P. V.: Modelling rainfall interception in unlogged and logged forest areas of Central Kalimantan, Indonesia, Hydrol. Earth. Syst. Sci., 2, 211-220, https://doi.org/10.5194/hess-2-211-1998, 1998a.

Asdak, C., Jarvis, P., Van Gardingen, P., and Fraser, A.: Rainfall interception loss in unlogged and logged forest areas of Central Kalimantan, Indonesia, J. Hydrol., 206, 237-244, https://doi.org/10.1016/S0022-1694(98)00108-5, 1998b.

Attarod, P., Sadeghi, S. M. M., Pypker, T. G., Bagheri, H., Bagheri, M., and Bayramzadeh, V.: Needle-leaved trees impacts on rainfall interception and canopy storage capacity in an arid environment, New Forests, 46, 339-355, https://doi.org/10.1007/s11056-014-9464-2, 2015.

Aydin, M., Gunes Sen, S., and Celik, S.: Throughfall, stemflow, and interception characteristics of coniferous forest ecosystems in the western black sea region of Turkey (Daday example), Environ. Monit. Assess., 190, 316, https://doi.org/10.1007/s10661-018-6657-8, 2018.

Balestrini, R. and Tagliaferri, A.: Atmospheric deposition and canopy exchange processes in alpine forest ecosystems (northern Italy), Atmos. Environ., 35, 6421-6433, https://doi.org/10.1016/S1352-2310(01)00350-8, 2001.

Bastiaanssen, W. G. M., Cheema, M. J. M., Immerzeel, W. W., Miltenburg, I. J., and Pelgrum, H.: Surface energy balance and actual evapotranspiration of the transboundary Indus Basin estimated from satellite measurements and the ETLook model, Water Resour. Res., 48, https://doi.org/10.1029/2011WR010482, 2012.

Bittner, S., Talkner, U., Krämer, I., Beese, F., Hölscher, D., and Priesack, E.: Modeling stand water budgets of mixed temperate broad-leaved forest stands by considering variations in species specific drought response, Agr Forest Meteorol, 150, 1347-1357, https://doi.org/10.1016/j.agrformet.2010.06.006, 2010.

Bons, C.: Accelerated erosion due to clearcutting of plantation forest and subsequent Taungya cultivation in upland West Java, Indonesia, Int. Assoc. Hydrol. Sci. Publ, 192, 279-288, 1990.

Brasil, J. B., Andrade, E. M. d., Palácio, H. A. d. Q., Medeiros, P. H. A., and Santos, J. C. N. d.: Characteristics of precipitation and the process of interception in a seasonally dry tropical forest, J Hydrol-Reg Stud, 19, 307-317, https://doi.org/10.1016/j.ejrh.2018.10.006, 2018.

Brooks, S. and Spencer, T.: Vegetation modification of rainfall characteristics: implications for rainfall erosivity following logging in Sabah, Malaysia, Journal of tropical forest science, 7, 435-446, http://www.jstor.org/stable/43581837, 1995.

Bryant, M. L., Bhat, S., and Jacobs, J. M.: Measurements and modeling of throughfall variability for five forest communities in the southeastern US, J. Hydrol., 312, 95-108, https://doi.org/10.1016/j.jhydrol.2005.02.012, 2005.

Bulcock, H. H. and Jewitt, G. P. W.: Modelling canopy and litter interception in commercial forest plantations in South Africa using the Variable Storage Gash model and idealised drying curves, Hydrol. Earth. Syst. Sci., 16, 4693-4705, https://doi.org/10.5194/hess-16-3717-2012, 2012, 2012a.

Bulcock, H. H. and Jewitt, G. P. W.: Field data collection and analysis of canopy and litter interception in commercial forest plantations in the KwaZulu-Natal Midlands, South Africa, Hydrol. Earth. Syst. Sci., 16, 3717-3728, https://doi.org/10.5194/hess-16-3717-2012, 2012b.

Buttle, J. M. and Farnsworth, A. G.: Measurement and modeling of canopy water partitioning in a reforested landscape: The Ganaraska Forest, southern Ontario, Canada, J. Hydrol., 466-467, 103-114, https://doi.org/10.1016/j.jhydrol.2012.08.021, 2012.

Cai, T., Sheng, H., and Cui, X.: Rainfall redistribution of a virgin Pinus koraiensis forest and secondary Betula platyphylla forest in Northeast China, Frontiers of Forestry in China, 3, 189-193, 2008.

Calder, I., Wright, I., and Murdiyarso, D.: A study of evaporation from tropical rain forest—West Java, J. Hydrol., 89, 13-31, https://doi.org/10.1016/0022-1694(86)90139-3, 1986.

Calder, I., Hall, R., Harding, R., and Wright, I.: The use of a wet-surface weighing lysimeter system in rainfall interception studies of heather (Calluna vulgaris), Journal of Applied Meteorology and Climatology, 23, 461-473, https://doi.org/10.1175/1520-0450(1984)023<0461:TUOAWS>2.0.CO;2, 1984.

Carlyle-Moses, D. and Price, A.: An evaluation of the Gash interception model in a northern hardwood stand, J. Hydrol., 214, 103-110, https://doi.org/10.1016/S0022-1694(98)00274-1, 1999.

Carlyle-Moses, D. E., Park, A. D., and Cameron, J. L.: Modelling rainfall interception loss in forest restoration trials in Panama, Ecohydrology, 3, 272-283, https://doi.org/10.1002/eco.105, 2010.

Cavelier, J., Jaramillo, M. a., Solis, D., and de León, D.: Water balance and nutrient inputs in bulk precipitation in tropical montane cloud forest in Panama, J. Hydrol., 193, 83-96, https://doi.org/10.1016/S0022-1694(96)03151-4, 1997.

Chai, R., Cai, T., Man, X., Wang, H., and Guan, J.: Simulation of rainfall interception process of primary Korean pine forest in Xiaoxing'an Mountains by using the modified Gash model, Acta Ecologica Sinica, 33, 1276-1284, 2013.

Chen, S., Chen, C., Zou, C. B., Stebler, E., Zhang, S., Hou, L., and Wang, D.: Application of Gash analytical model and parameterized Fan model to estimate canopy interception of a Chinese red pine forest, J. For. Res., 18, 335-344, https://doi.org/10.1007/s10310-012-0364-z, 2013.

Chen, Y.-Y. and Li, M.-H.: Quantifying Rainfall Interception Loss of a Subtropical Broadleaved Forest in Central Taiwan, Water, 8, https://doi.org/10.3390/w8010014, 2016.

Crockford, R. and Richardson, D.: Partitioning of rainfall in a eucalypt forest and pine plantation in southeastern Australia: IV The relationship of interception and canopy storage capacity, the interception of these forests, and the effect on interception of thinning the pine plantation, Hydrol. Process., 4, 169-188, https://doi.org/10.1002/hyp.3360040207, 1990.

Cuartas, L. A., Tomasella, J., Nobre, A. D., Hodnett, M. G., Waterloo, M. J., and Múnera, J. C.: Interception water-partitioning dynamics for a pristine rainforest in Central Amazonia: Marked differences between normal and dry years, Agr Forest Meteorol, 145, 69-83, https://doi.org/10.1016/j.agrformet.2007.04.008, 2007.

Cui, Y., Jia, L., Hu, G., and Zhou, J.: Mapping of interception loss of vegetation in the Heihe River basin of China using remote sensing observations, IEEE Geoscience and Remote Sensing Letters, 12, 23-27, 10.1109/LGRS.2014.2324635, 2014.

Czikowsky, M. J. and Fitzjarrald, D. R.: Detecting rainfall interception in an Amazonian rain forest with eddy flux measurements, J. Hydrol., 377, 92-105, https://doi.org/10.1016/j.jhydrol.2009.08.002, 2009.

David, J. S., Valente, F., and Gash, J. H.: Evaporation of intercepted rainfall, Encyclopedia of hydrological sciences, https://doi.org/10.1002/0470848944.hsa046, 2006a.

David, T. S., Gash, J. H. C., Valente, F., Pereira, J. S., Ferreira, M. I., and David, J. S.: Rainfall interception by an isolated evergreen oak tree in a Mediterranean savannah, Hydrol. Process., 20, 2713-2726, https://doi.org/10.1002/hyp.6062, 2006b.

Dawoe, E. K., Barnes, V. R., and Oppong, S. K.: Spatio-temporal dynamics of gross rainfall partitioning and nutrient fluxes in shaded-cocoa (Theobroma cocoa) systems in a tropical semi-deciduous forest, Agroforestry systems, 92, 397-413, https://doi.org/10.1007/s10457-017-0108-3, 2018.

Deguchi, A., Hattori, S., and Park, H.-T.: The influence of seasonal changes in canopy structure on interception loss: application of the revised Gash model, J. Hydrol., 318, 80-102, https://doi.org/10.1016/j.jhydrol.2005.06.005, 2006.

Dietz, J., Hölscher, D., Leuschner, C., and Hendrayanto: Rainfall partitioning in relation to forest structure in differently managed montane forest stands in Central Sulawesi, Indonesia, For. Ecol. Manage., 237, 170-178, https://doi.org/10.1016/j.foreco.2006.09.044, 2006.

Dolman, A.: Summer and winter rainfall interception in an oak forest. Predictions with an analytical and a numerical simulation model, J. Hydrol., 90, 1-9, https://doi.org/10.1016/0022-1694(87)90169-7, 1987.

Domingo, F., Puigdefabregas, J., Moro, M. J., and Bellot, J.: Role of vegetation cover in the biogeochemical balances of a small afforested catchment in southeastern Spain, J. Hydrol., 159, 275-289, https://doi.org/10.1016/0022-1694(94)90261-5, 1994.

Dong, L., Han, H., Kang, F., Cheng, X., Zhao, J., and Song, X.: Rainfall Partitioning in Chinese Pine (Pinus tabuliformis Carr.) Stands at Three Different Ages, Forests, 11, 243, https://doi.org/10.3390/f11020243, 2020.

Drastig, K., Suárez Quiñones, T., Zare, M., Dammer, K.-H., and Prochnow, A.: Rainfall interception by winter rapeseed in Brandenburg (Germany) under various nitrogen fertilization treatments, Agr Forest Meteorol, 268, 308-317, https://doi.org/10.1016/j.agrformet.2019.01.027, 2019.

Dunin, F., O'loughlin, E., and Reyenga, W.: Interception loss from eucalypt forest: lysimeter determination of hourly rates for long term evaluation, Hydrol. Process., 2, 315-329, https://doi.org/10.1002/hyp.3360020403, 1988.

Dykes, A.: Rainfall interception from a lowland tropical rainforest in Brunei, J. Hydrol., 200, 260-279, https://doi.org/10.1016/S0022-1694(97)00023-1, 1997.

Elsenbeer, H., Cassel, D., and Zuniga, L.: Throughfall in the terra firme forest of western Amazonia, Journal of Hydrology (New Zealand), 32, 30-44, https://www.jstor.org/stable/43944724, 1994.

Fan, J., Oestergaard, K. T., Guyot, A., and Lockington, D. A.: Measuring and modeling rainfall interception losses by a native Banksia woodland and an exotic pine plantation in subtropical coastal Australia, J. Hydrol., 515, 156-165, https://doi.org/10.1016/j.jhydrol.2014.04.066, 2014.

Fathizadeh, O., Hosseini, S., Keim, R., and Boloorani, A. D.: A seasonal evaluation of the reformulated Gash interception model for semi-arid deciduous oak forest stands, For. Ecol. Manage., 409, 601-613, https://doi.org/10.1016/j.foreco.2017.11.058, 2018.

Fathizadeh, O., Attarod, P., Pypker, T., Darvishsefat, A., and Zahedi Amiri, G.: Seasonal variability of rainfall interception and canopy storage capacity measured under individual oak (Quercus brantii) trees in Western Iran, Journal of Agricultural Science and technology, 15, 175-188, 2013.

Fathizadeh, O., Hosseini, S. M., Zimmermann, A., Keim, R. F., and Darvishi Boloorani, A.: Estimating linkages between forest structural variables and rainfall interception parameters in semi-arid deciduous oak forest stands, Sci. Total Environ., 601-602, 1824-1837, https://doi.org/10.1016/j.scitotenv.2017.05.233, 2017.

Feller, M.: Water balances in Eucalyptus regnans, E. obliqua, and Pinus radiata forests in Victoria, Australian Forestry, 44, 153-161, https://doi.org/10.1080/00049158.1981.10674308, 1981.

Fernandes, R. P., da Costa Silva, R. W., Salemi, L. F., de Andrade, T. M. B., de Moraes, J. M., Van Dijk, A. I., and Martinelli, L. A.: The influence of sugarcane crop development on rainfall interception losses, J. Hydrol., 551, 532-539, https://doi.org/10.1016/j.jhydrol.2017.06.027, 2017.

Finch, J. and Riche, A.: Interception losses from Miscanthus at a site in south-east England—An application of the Gash model, Hydrol. Process., 24, 2594-2600, https://doi.org/10.1002/hyp.7673, 2010.

Fleischbein, K., Wilcke, W., Goller, R., Boy, J., Valarezo, C., Zech, W., and Knoblich, K.: Rainfall interception in a lower montane forest in Ecuador: effects of canopy properties, Hydrol. Process., 19, 1355-1371, https://doi.org/10.1002/hyp.5562, 2005.

Garcia-Estringana, P., Alonso-Blázquez, N., and Alegre, J.: Water storage capacity, stemflow and water funneling in Mediterranean shrubs, J. Hydrol., 389, 363-372, https://doi.org/10.1016/j.jhydrol.2010.06.017, 2010.

Gash, J.: An analytical model of rainfall interception by forests, Q. J. R. Meteorol. Soc., 105, 43-55, https://doi.org/10.1002/qj.49710544304, 1979.

Gash, J. and Morton, A.: An application of the Rutter model to the estimation of the interception loss from Thetford forest, J. Hydrol., 38, 49-58, https://doi.org/10.1016/0022-1694(78)90131-2, 1978.

Gash, J., Wright, I., and Lloyd, C. R.: Comparative estimates of interception loss from three coniferous forests in Great Britain, J. Hydrol., 48, 89-105, https://doi.org/10.1016/0022-1694(80)90068-2, 1980.

Gash, J. H., Lloyd, C., and Lachaud, G.: Estimating sparse forest rainfall interception with an analytical model, J. Hydrol., 170, 79-86, https://doi.org/10.1016/0022-1694(95)02697-N, 1995.

Gavazzi, M. J., Sun, G., McNulty, S. G., Treasure, E. A., and Wightman, M. G.: Canopy rainfall interception measured over ten years in a coastal plain loblolly pine (Pinus taeda L.) plantation, Transactions of the ASABE, 59, 601-610, 2016.

Gerrits, A. M. J., Pfister, L., and Savenije, H. H. G.: Spatial and temporal variability of canopy and forest floor interception in a beech forest, Hydrol. Process., 24, 3011-3025, https://doi.org/10.1002/hyp.7712, 2010.

Ghimire, C. P., Bruijnzeel, L. A., Lubczynski, M. W., and Bonell, M.: Rainfall interception by natural and planted forests in the Middle Mountains of Central Nepal, J. Hydrol., 475, 270-280, https://doi.org/10.1016/j.jhydrol.2012.09.051, 2012.

Ghimire, C. P., Bruijnzeel, L. A., Lubczynski, M. W., Ravelona, M., Zwartendijk, B. W., and van Meerveld, H. I.: Measurement and modeling of rainfall interception by two differently aged secondary forests in upland eastern Madagascar, J. Hydrol., 545, 212-225, https://doi.org/10.1016/j.jhydrol.2016.10.032, 2017.

Giacomin, A. and Trucchi, P.: Rainfall interception in a beech coppice (Acquerino, Italy), J. Hydrol., 137, 141-147, https://doi.org/10.1016/0022-1694(92)90052-W, 1992.

Gomez-Peralta, D., Oberbauer, S. F., McClain, M. E., and Philippi, T. E.: Rainfall and cloud-water interception in tropical montane forests in the eastern Andes of Central Peru, For. Ecol. Manage., 255, 1315-1325, https://doi.org/10.1016/j.foreco.2007.10.058, 2008.

Granier, A., Biron, P., and Lemoine, D.: Water balance, transpiration and canopy conductance in two beech stands, Agr Forest Meteorol, 100, 291-308, https://doi.org/10.1016/S0168-1923(99)00151-3, 2000.

Hassan, S. T., Ghimire, C. P., and Lubczynski, M. W.: Remote sensing upscaling of interception loss from isolated oaks: Sardon catchment case study, Spain, J. Hydrol., 555, 489-505, https://doi.org/10.1016/j.jhydrol.2017.08.016, 2017.

Herbst, M., Roberts, J. M., Rosier, P. T., and Gowing, D. J.: Measuring and modelling the rainfall interception loss by hedgerows in southern England, Agr Forest Meteorol, 141, 244-256, https://doi.org/10.1016/j.agrformet.2006.10.012, 2006.

Herbst, M., Rosier, P. T. W., McNeil, D. D., Harding, R. J., and Gowing, D. J.: Seasonal variability of interception evaporation from the canopy of a mixed deciduous forest, Agr Forest Meteorol, 148, 1655-1667, https://doi.org/10.1016/j.agrformet.2008.05.011, 2008.

Hölscher, D., Köhler, L., van Dijk, A. I. J. M., and Bruijnzeel, L. A.: The importance of epiphytes to total rainfall interception by a tropical montane rain forest in Costa Rica, J. Hydrol., 292, 308-322, https://doi.org/10.1016/j.jhydrol.2004.01.015, 2004.

Holwerda, F., Bruijnzeel, L., Scatena, F., Vugts, H., and Meesters, A.: Wet canopy evaporation from a Puerto Rican lower montane rain forest: The importance of realistically estimated aerodynamic conductance, J. Hydrol., 414, 1-15, https://doi.org/10.1016/j.jhydrol.2011.07.033, 2012.

Holwerda, F., Bruijnzeel, L. A., Muñoz-Villers, L. E., Equihua, M., and Asbjornsen, H.: Rainfall and cloud water interception in mature and secondary lower montane cloud forests of central Veracruz, Mexico, J. Hydrol., 384, 84-96, https://doi.org/10.1016/j.jhydrol.2010.01.012, 2010.

Hörmann, G., Branding, A., Clemen, T., Herbst, M., Hinrichs, A., and Thamm, F.: Calculation and simulation of wind controlled canopy interception of a beech forest in Northern Germany, Agr Forest Meteorol, 79, 131-148, https://doi.org/10.1016/0168-1923(95)02275-9, 1996.

Huber, A. and Iroumé, A.: Variability of annual rainfall partitioning for different sites and forest covers in Chile, J. Hydrol., 248, 78-92, https://doi.org/10.1016/S0022-1694(01)00394-8, 2001.

Hutjes, R., Wierda, A., and Veen, A.: Rainfall interception in the Tai Forest, Ivory Coast: application of two simulation models to a humid tropical system, J. Hydrol., 114, 259-275, https://doi.org/10.1016/0022-1694(90)90060-B, 1990.

Iida, S. i., Levia, D. F., Shimizu, A., Shimizu, T., Tamai, K., Nobuhiro, T., Kabeya, N., Noguchi, S., Sawano, S., and Araki, M.: Intrastorm scale rainfall interception dynamics in a mature coniferous forest stand, J. Hydrol., 548, 770-783, https://doi.org/10.1016/j.jhydrol.2017.03.009, 2017.

Jackson, I.: Relationships between rainfall parameters and interception by tropical forest, J. Hydrol., 24, 215-238, https://doi.org/10.1016/0022-1694(75)90082-7, 1975.

Jackson, N.: Measured and modelled rainfall interception loss from an agroforestry system in Kenya, Agr Forest Meteorol, 100, 323-336, https://doi.org/10.1016/S0168-1923(99)00145-8, 2000.

Ji, Y. and Cai, T.-j.: Canopy interception in original Korean pine forest: measurement and dividual simulation in Xiaoxing'an Mountains, northeastern China, Journal of Beijing Forestry University, 37, 41-49, 2015.

Jian, S.-Q., Zhao, C.-Y., Fang, S.-M., Yu, K., Wang, Y., Liu, Y.-Y., Zheng, X.-L., and Peng, S.-Z.: Characteristics of rainfall interception by Caragana korshinskii and Hippophae rhamnoides in Loess Plateau of Northwest China, Ying Yong Sheng tai xue bao= The Journal of Applied Ecology, 23, 2383-2389, 2012.

Jiang, H.-y., Zhao, Y.-s., Xin, X.-j., Ma, W.-h., Li, X.-p., Sun, C.-k., and Guo, X.-w.: Precipitation Distribution Laws of Different Forest Stand in Daxing'anling, J. Soil Water Conser, 22, 197-201, 2008.

Johnson, R.: The interception, throughfall and stemflow in a forest in highland Scotland and the comparison with other upland forests in the UK, J. Hydrol., 118, 281-287, https://doi.org/10.1016/0022-1694(90)90263-W, 1990.

Junior, J. A. J., de Mello, C. R., de Mello, J. M., Scolforo, H. F., Beskow, S., and McCarter, J.: Rainfall partitioning measurement and rainfall interception modelling in a tropical semi-deciduous Atlantic forest remnant, Agr Forest Meteorol, 275, 170-183, https://doi.org/10.1016/j.agrformet.2019.05.016, 2019.

Kelliher, F., Whitehead, D., and Pollock, D.: Rainfall interception by trees and slash in a young Pinus radiata D. Don stand, J. Hydrol., 131, 187-204, https://doi.org/10.1016/0022-1694(92)90217-J, 1992.

Kermavnar, J. and Vilhar, U.: Canopy precipitation interception in urban forests in relation to stand structure, Urban Ecosystems, 20, 1373-1387, https://doi.org/10.1007/s11252-017-0689-7, 2017.

Klaassen, W., Bosveld, F., and De Water, E.: Water storage and evaporation as constituents of rainfall interception, J. Hydrol., 212, 36-50, https://doi.org/10.1016/S0022-1694(98)00200-5, 1998.

Klingaman, N. P., Levia, D. F., and Frost, E. E.: A Comparison of Three Canopy Interception Models for a Leafless Mixed Deciduous Forest Stand in the Eastern United States, Journal of Hydrometeorology, 8, 825-836, https://doi.org/10.1175/JHM564.1, 2007.

Krämer, I. and Hölscher, D.: Rainfall partitioning along a tree diversity gradient in a deciduous old-growth forest in Central Germany, Ecohydrology, 2, 102-114, https://doi.org/10.1002/eco.44, 2009.

Lankreijer, H., Hendriks, M., and Klaassen, W.: A comparison of models simulating rainfall interception of forests, Agr Forest Meteorol, 64, 187-199, https://doi.org/10.1016/0168-1923(93)90028-G, 1993.

Lankreijer, H., Lundberg, A., Grelle, A., Lindroth, A., and Seibert, J.: Evaporation and storage of intercepted rain analysed by comparing two models applied to a boreal forest, Agr Forest Meteorol, 98, 595-604, https://doi.org/10.1016/S0168-1923(99)00126-4, 1999.

Leyton, L.: Rainfall interception in forest and moorland, International symposium on forest hydrology, 163-178,

Li, J. and Bai, G.: Crown interception of apple trees in loess hilly and gully region, Northwest China, Yingyong Shengtai Xuebao, 24, 379–387, 2013.

Li, Y., Cai, T., Man, X., Sheng, H., and Ju, C.: Canopy interception loss in a Pinus sylvestris var. mongolica forest of Northeast China, Journal of Arid Land, 7, 831-840, https://doi.org/10.1007/s40333-015-0013-4, 2015.

Liang, W. and Ding, G.: Simulation of rainfall interception in a Pinus tabulaeformis plantation in North China, Journal of Food, Agriculture and Environment, 11, 976-981, 2013.

Limousin, J.-M., Rambal, S., Ourcival, J.-M., and Joffre, R.: Modelling rainfall interception in a mediterranean Quercus ilex ecosystem: Lesson from a throughfall exclusion experiment, J. Hydrol., 357, 57-66, https://doi.org/10.1016/j.jhydrol.2008.05.001, 2008.

Link, T. E., Unsworth, M., and Marks, D.: The dynamics of rainfall interception by a seasonal temperate rainforest, Agr Forest Meteorol, 124, 171-191, https://doi.org/10.1016/j.agrformet.2004.01.010, 2004.

Liu, W., Liu, L., and Zheng, Z.: Preliminary study on hydrologic effect of evergreen broad-leaved forest and Pinus yunnanensis forest in central Yunnan [China], Acta Phytoecologica et Geobotanica Sinica (China), 1991.

Liu, Y. X., Li, H. J., Li, G. S., and Li, X. Y.: A Study on the Interception of Precipitation by the Different Kinds of Forest in the East Mountain Area, Liaoning, Journal of Shenyang Agricultural University, 24, 298–301, 1993.

Liu, Z., Wang, Y., Tian, A., Liu, Y., Webb, A. A., Wang, Y., Zuo, H., Yu, P., Xiong, W., and Xu, L.: Characteristics of canopy interception and its simulation with a revised Gash model for a larch plantation in the Liupan Mountains, China, J. For. Res., 29, 187-198, https://doi.org/10.1007/s11676-017-0407-6, 2018.

Llorens, P.: Rainfall interception by a Pinus sylvestris forest patch overgrown in a Mediterranean mountainous abandoned area II. Assessment of the applicability of Gash's analytical model, J. Hydrol., 199, 346-359, https://doi.org/10.1016/S0022-1694(96)03335-5, 1997.

Llorens, P., Poch, R., Latron, J., and Gallart, F.: Rainfall interception by a Pinus sylvestris forest patch overgrown in a Mediterranean mountainous abandoned area I. Monitoring design and results down to the event scale, J. Hydrol., 199, 331-345, https://doi.org/10.1016/S0022-1694(96)03334-3, 1997.

Lloyd, C. R., Gash, J. H., and Shuttleworth, W. J.: The measurement and modelling of rainfall interception by Amazonian rain forest, Agr Forest Meteorol, 43, 277-294, https://doi.org/10.1016/0168-1923(88)90055-X, 1988.

Loustau, D., Berbigier, P., and Granier, A.: Interception loss, throughfall and stemflow in a maritime pine stand. II. An application of Gash's analytical model of interception, J. Hydrol., 138, 469-485, https://doi.org/10.1016/0022-1694(92)90131-E, 1992.

Lundgren, L. and Lundgren, B.: Rainfall, interception and evaporation in the Mazumbai forest reserve, West Usambara Mts., Tanzania and their importance in the assessment of land potential, Geografiska Annaler: Series A, Physical Geography, 61, 157-178, https://doi.org/10.1080/04353676.1979.11879988, 1979.

Ma, C., Li, X., Luo, Y., Shao, M., and Jia, X.: The modelling of rainfall interception in growing and dormant seasons for a pine plantation and a black locust plantation in semi-arid Northwest China, J. Hydrol., 577, 123849, https://doi.org/10.1016/j.jhydrol.2019.06.021, 2019.

Manfroi, O. J., Kuraji, K., Suzuki, M., Tanaka, N., Kume, T., Nakagawa, M., Kumagai, T. o., and Nakashizuka, T.: Comparison of conventionally observed interception evaporation in a 100-m2 subplot with that estimated in a 4-ha area of the same Bornean lowland tropical forest, J. Hydrol., 329, 329-349, https://doi.org/10.1016/j.jhydrol.2006.02.020, 2006.

Marin, C. T., Bouten, W., and Sevink, J.: Gross rainfall and its partitioning into throughfall, stemflow and evaporation of intercepted water in four forest ecosystems in western Amazonia, J. Hydrol., 237, 40-57, https://doi.org/10.1016/S0022-1694(00)00301-2, 2000.

McJannet, D., Wallace, J., and Reddell, P.: Precipitation interception in Australian tropical rainforests: II. Altitudinal gradients of cloud interception, stemflow, throughfall and interception, Hydrol. Process., 21, 1703-1718, https://doi.org/10.1002/hyp.6346, 2007.

Medeiros, P. H. A., de Araujo, J. C., and Bronstert, A.: Interception measurements and assessment of Gash model performance for a tropical semi-arid region, Revista Ciência Agronômica, 40, 165-174, 2009.

Meng, G.-T., Lang, N.-J., Fang, X.-J., Li, G.-X., Yuan, C.-M., and Wen, S.-L.: Hydrological properties and water balance of Pinus armandii plantation in central Dian Plateau, Yunnan province, For. Res., 14, 18-84, 2001.

Michopoulos, P., Baloutsos, G., Nakos, G., and Economou, A.: Effects of bulk precipitation pH and growth period on cation enrichment in precipitation beneath the canopy of a beech (Fagus moesiaca) forest stand, Sci. Total Environ., 281, 79-85, https://doi.org/10.1016/S0048-9697(01)00837-3, 2001.

Molina, A. J. and del Campo, A. D.: The effects of experimental thinning on throughfall and stemflow: A contribution towards hydrology-oriented silviculture in Aleppo pine plantations, For. Ecol. Manage., 269, 206-213, https://doi.org/10.1016/j.foreco.2011.12.037, 2012.

MOSELLO, R., BRIZZIO, M. C., KOTZIAS, D., MARCHETTO, A., REMBGES, D., and TARTARI, G.: The chemistry of atmospheric deposition in Italy in the framework of the National Programme for Forest Ecosystems Control (CONECOFOR), J. Limnol., 61, 77-92, 2002.

Motahari, M., Attarod, P., Pypker, T., Etemad, V., and Shirvany, A.: Rainfall Interception in a Pinus eldarica Plantation in a Semiarid Climate Zone: An Application of the Gash Model, J. Agr. Sci. Tech., 15, 981-994, 2013.

Mużyło, A., Valente, F., Domingo, F., and Llorens, P.: Modelling rainfall partitioning with sparse Gash and Rutter models in a downy oak stand in leafed and leafless periods, Hydrol. Process., 26, 3161-3173, https://doi.org/10.1002/hyp.8401, 2012.

Návar, J.: The performance of the reformulated Gash's interception loss model in Mexico's northeastern temperate forests, Hydrol. Process., 27, 1626-1633, https://doi.org/10.1002/hyp.9309, 2013.

Návar, J. and Bryan, R. B.: Fitting the analytical model of rainfall interception of Gash to individual shrubs of semi-arid vegetation in northeastern Mexico, Agr Forest Meteorol, 68, 133-143, https://doi.org/10.1016/0168-1923(94)90032-9, 1994.

Návar, J., Carlyle-Moses, D. E., and Martinez, A.: Interception loss from the Tamaulipan matorral thornscrub of north-eastern Mexico: an application of the Gash analytical interception loss model, J. Arid Environ., 41, 1-10, https://doi.org/10.1006/jare.1998.0460, 1999.

Nazari, M., Sadeghi, S. M. M., Van Stan II, J. T., and Chaichi, M. R.: Rainfall interception and redistribution by maize farmland in central Iran, J Hydrol-Reg Stud, 27, 100656, https://doi.org/10.1016/j.ejrh.2019.100656, 2020.

Neal, C., Robson, A., Bhardwaj, C., Conway, T., Jeffery, H., Neal, M., Ryland, G., Smith, C., and Walls, J.: Relationships between precipitation, stemflow and throughfall for a lowland beech plantation, Black Wood, Hampshire, southern England: findings on interception at a forest edge and the effects of storm damage, J. Hydrol., 146, 221-233, https://doi.org/10.1016/0022-1694(93)90277-G, 1993.

Pereira, F. L., Gash, J. H. C., David, J. S., David, T. S., Monteiro, P. R., and Valente, F.: Modelling interception loss from evergreen oak Mediterranean savannas: Application of a tree-based modelling approach, Agr Forest Meteorol, 149, 680-688, https://doi.org/10.1016/j.agrformet.2008.10.014, 2009.

Pérez-Suárez, M., Arredondo-Moreno, J., Huber-Sannwald, E., and Serna-Pérez, A.: Forest structure, species traits and rain characteristics influences on horizontal and vertical rainfall partitioning in a semiarid pine–oak forest from Central Mexico, Ecohydrology, 7, 532-543, https://doi.org/10.1002/eco.1372, 2014.

Pitman, J. I.: Rainfall interception by bracken in open habitats—Relations between leaf area, canopy storage and drainage rate, J. Hydrol., 105, 317-334, https://doi.org/10.1016/0022-1694(89)90111-X, 1989.

Price, A., Dunham, K., Carleton, T., and Band, L.: Variability of water fluxes through the black spruce (Picea mariana) canopy and feather moss (Pleurozium schreberi) carpet in the boreal forest of Northern Manitoba, J. Hydrol., 196, 310-323, https://doi.org/10.1016/S0022-1694(96)03233-7, 1997.

Price, A. G. and Carlyle-Moses, D. E.: Measurement and modelling of growing-season canopy water fluxes in a mature mixed deciduous forest stand, southern Ontario, Canada, Agr Forest Meteorol, 119, 69-85, https://doi.org/10.1016/S0168-1923(03)00117-5, 2003.

Pypker, T. G., Bond, B. J., Link, T. E., Marks, D., and Unsworth, M. H.: The importance of canopy structure in controlling the interception loss of rainfall: Examples from a young and an old-growth Douglas-fir forest, Agr Forest Meteorol, 130, 113-129, https://doi.org/10.1016/j.agrformet.2005.03.003, 2005.

Reid, L. M. and Lewis, J.: Rates, timing, and mechanisms of rainfall interception loss in a coastal redwood forest, J. Hydrol., 375, 459-470, https://doi.org/10.1016/j.jhydrol.2009.06.048, 2009.

Ren, Y. and Xue, J.: Characteristics of precipitation in Castanopsis eyeri broad-leaved evergreen forest of Wuyi Mountain, Sci Silv Sin (In Chinese), 44, 23-27, 2008.

Ringgaard, R., Herbst, M., and Friborg, T.: Partitioning forest evapotranspiration: Interception evaporation and the impact of canopy structure, local and regional advection, J. Hydrol., 517, 677-690, https://doi.org/10.1016/j.jhydrol.2014.06.007, 2014.

Robson, A., Neal, C., Ryland, G., and Harrow, M.: Spatial variations in throughfall chemistry at the small plot scale, J. Hydrol., 158, 107-122, https://doi.org/10.1016/0022-1694(94)90048-5, 1994.

Rodrigues, A. F., de Mello, C. R., Nehren, U., de Coimbra Ribeiro, J. P., Mantovani, V. A., and de Mello, J. M.: Modeling canopy interception under drought conditions: The relevance of evaporation and extra sources of energy, J. Environ. Manage., 292, 112710, https://doi.org/10.1016/j.jenvman.2021.112710, 2021.

Rowe, L. K.: Rainfall interception by a beech-podocarp-hardwood forest near Reefton, north Westland, New Zealand, Journal of Hydrology (New Zealand), 18, 63-72, https://www.jstor.org/stable/43944448, 1979.

Rowe, L. K.: Rainfall interception by an evergreen beech forest, Nelson, New Zealand, J. Hydrol., 66, 143-158, https://doi.org/10.1016/0022-1694(83)90182-8, 1983.

Rutter, A., Morton, A., and Robins, P.: A predictive model of rainfall interception in forests. II. Generalization of the model and comparison with observations in some coniferous and hardwood stands, J. Appl. Ecol., 12, 367-380, https://www.jstor.org/stable/2401739, 1975.

Sadeghi, S., Attarod, P., and Pypker, T.: Differences in rainfall interception during the growing and non-growing seasons in a Fraxinus rotundifolia Mill. plantation located in a semiarid climate, Journal of Agricultural Science and Technology, 17, 145-156, http://hdl.handle.net/123456789/4274, 2015a.

Sadeghi, S. M. M., Attarod, P., Grant Pypker, T., and Dunkerley, D.: Is canopy interception increased in semiarid tree plantations? Evidence from a field investigation in Tehran, Iran, Turkish Journal of Agriculture and Forestry, 38, 792-806, 10.3906/tar-1312-53, 2014.

Sadeghi, S. M. M., Attarod, P., Van Stan, J. T., and Pypker, T. G.: The importance of considering rainfall partitioning in afforestation initiatives in semiarid climates: A comparison of common planted tree species in Tehran, Iran, Sci. Total Environ., 568, 845-855, https://doi.org/10.1016/j.scitotenv.2016.06.048, 2016.

Sadeghi, S. M. M., Attarod, P., Van Stan, J. T., Pypker, T. G., and Dunkerley, D.: Efficiency of the reformulated Gash's interception model in semiarid afforestations, Agr Forest Meteorol, 201, 76-85, https://doi.org/10.1016/j.agrformet.2014.10.006, 2015b.

Sadeghi, S. M. M., Van Stan, J. T., Pypker, T. G., Tamjidi, J., Friesen, J., and Farahnaklangroudi, M.: Importance of transitional leaf states in canopy rainfall partitioning dynamics, Eur J Forest Res, 137, 121-130, https://doi.org/10.1007/s10342-017-1098-4, 2018.

Saito, T., Matsuda, H., Komatsu, M., Xiang, Y., Takahashi, A., Shinohara, Y., and Otsuki, K.: Forest canopy interception loss exceeds wet canopy evaporation in Japanese cypress (Hinoki) and Japanese cedar (Sugi) plantations, J. Hydrol., 507, 287-299, https://doi.org/10.1016/j.jhydrol.2013.09.053, 2013.

Schellekens, J., Scatena, F., Bruijnzeel, L., and Wickel, A.: Modelling rainfall interception by a lowland tropical rain forest in northeastern Puerto Rico, J. Hydrol., 225, 168-184, https://doi.org/10.1016/S0022-1694(99)00157-2, 1999.

Schellekens, J., Bruijnzeel, L., Scatena, F., Bink, N., and Holwerda, F.: Evaporation from a tropical rain forest, Luquillo Experimental Forest, eastern Puerto Rico, Water Resour. Res., 36, 2183-2196, https://doi.org/10.1029/2000WR900074, 2000.

Seonghun, J., Otsuki, K., and Moein, F.: Relationship between stand structures and rainfall partitioning in dense unmanaged Japanese cypress plantations, Journal of Agricultural Meteorology, 75, 92-102, https://doi.org/10.2480/agrmet.D-18-00030, 2019.

Sheng, H. and Cai, T.: Influence of Rainfall on Canopy Interception in Mixed Broad-Leaved—Korean Pine Forest in Xiaoxing'an Mountains, Northeastern China, Forests, 10, 248, https://doi.org/10.3390/f10030248, 2019.

Sheng, H., Cai, T., Zhu, D., and SHI, F.-c.: Rainfall redistribution and hydrochemical characteristics in the Larch plantation, Journal of Soil and Water Conservation, 23, 79-83, 2009.

Sheng, X., Wang, S., Guan, D., Jin, C., Wang, A., Wu, J., and Yuan, F.: Canopy interception in larch plantations: Measurement and modeling in Eastern Liaoning Mountainous Region, Ying Yong Sheng tai xue bao= The Journal of Applied Ecology, 21, 3021-3028, 2010.

Shi, Z., Wang, Y., Xu, L., Xiong, W., Yu, P., Gao, J., and Zhang, L.: Fraction of incident rainfall within the canopy of a pure stand of Pinus armandii with revised Gash model in the Liupan Mountains of China, J. Hydrol., 385, 44-50, https://doi.org/10.1016/j.jhydrol.2010.02.003, 2010.

Shinohara, Y., Komatsu, H., Kuramoto, K., and Otsuki, K.: Characteristics of canopy interception loss in Moso bamboo forests of Japan, Hydrol. Process., 27, 2041-2047, https://doi.org/10.1002/hyp.9359, 2013.

Shinohara, Y., Levia, D. F., Komatsu, H., Nogata, M., and Otsuki, K.: Comparative modeling of the effects of intensive thinning on canopy interception loss in a Japanese cedar (Cryptomeria japonica D. Don) forest of western Japan, Agr Forest Meteorol, 214-215, 148-156, https://doi.org/10.1016/j.agrformet.2015.08.257, 2015.

Shuttleworth, W. J.: Evaporation from Amazonian rainforest, Proceedings of the Royal society of London. Series B. Biological sciences, 233, 321-346, https://doi.org/10.1098/rspb.1988.0024, 1988.

Siles, P., Vaast, P., Dreyer, E., and Harmand, J.-M.: Rainfall partitioning into throughfall, stemflow and interception loss in a coffee (Coffea arabica L.) monoculture compared to an agroforestry system with Inga densiflora, J. Hydrol., 395, 39-48, https://doi.org/10.1016/j.jhydrol.2010.10.005, 2010.

Silva, I. C. and Rodríguez, H. G.: Interception loss, throughfall and stemflow chemistry in pine and oak forests in northeastern Mexico, Tree Physiology, 21, 1009-1013, https://doi.org/10.1093/treephys/21.12-13.1009, 2001.

Sinun, W., Meng, W. W., Douglas, I., and Spencer, T.: Throughfall, stemflow, overland flow and throughflow in the Ulu Segama rain forest, Sabah, Malaysia, Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 335, 389-395, https://doi.org/10.1098/rstb.1992.0030, 1992.

Šraj, M., Brilly, M., and Mikoš, M.: Rainfall interception by two deciduous Mediterranean forests of contrasting stature in Slovenia, Agr Forest Meteorol, 148, 121-134, https://doi.org/10.1016/j.agrformet.2007.09.007, 2008.

Staelens, J., De Schrijver, A., Verheyen, K., and Verhoest, N. E. C.: Rainfall partitioning into throughfall, stemflow, and interception within a single beech (Fagus sylvatica L.) canopy: influence of foliation, rain event characteristics, and meteorology, Hydrol. Process., 22, 33-45, https://doi.org/10.1002/hyp.6610, 2008.

Steidle Neto, A. J., Ribeiro, A., Lopes, D. d. C., Sacramento Neto, O. B. d., Souza, W. G., and Santana, M. O.: Simulation of Rainfall Interception of Canopy and Litter in Eucalyptus Plantation in Tropical Climate, For. Sci., 58, 54-60, https://doi.org/10.5849/forsci.09-120, 2012.

Su, L., Zhao, C., Xu, W., and Xie, Z.: Modelling interception loss using the revised Gash model: a case study in a mixed evergreen and deciduous broadleaved forest in China, Ecohydrology, 9, 1580-1589, https://doi.org/10.1002/eco.1749, 2016.

Sun, X., Onda, Y., and Kato, H.: Incident rainfall partitioning and canopy interception modeling for an abandoned Japanese cypress stand, J. For. Res., 19, 317-328, https://doi.org/10.1007/s10310-013-0421-2, 2014.

Sun, X., Onda, Y., Kato, H., Gomi, T., and Komatsu, H.: Effect of strip thinning on rainfall interception in a Japanese cypress plantation, J. Hydrol., 525, 607-618, https://doi.org/10.1016/j.jhydrol.2015.04.023, 2015.

Sun, X., Wang, G., Lin, Y., Liu, L., and Gao, Y.: Intercepted rainfall in Abies fabri forest with different-aged stands in southwestern China, Turkish Journal of Agriculture and Forestry, 37, 495-504, 2013.

Tallaksen, L. M., Schunselaar, S., and van Veen, R.: Comparative model estimates of interception loss in a coniferous forest stand, Hydrology Research, 27, 143-160, https://doi.org/10.2166/nh.1996.0001, 1996.

Tarazona, T., Santa Regina, I., and Calvo, R.: Interception, throughfall and stemflow in two forests of the" Sierra de la Demanda" in the Province of Burgos, Pirineos, 27-40, http://dx.doi.org/10.3989/pirineos.1996.v147-148.135, 1996.

Teklehaimanot, Z. and Jarvis, P.: Direct measurement of evaporation of intercepted water from forest canopies, J. Appl. Ecol., 28, 603-618, https://doi.org/10.2307/2404571, 1991.

Teklehaimanot, Z., Jarvis, P., and Ledger, D.: Rainfall interception and boundary layer conductance in relation to tree spacing, J. Hydrol., 123, 261-278, https://doi.org/10.1016/0022-1694(91)90094-X, 1991.

Valente, F., David, J., and Gash, J.: Modelling interception loss for two sparse eucalypt and pine forests in central Portugal using reformulated Rutter and Gash analytical models, J. Hydrol., 190, 141-162, https://doi.org/10.1016/S0022-1694(96)03066-1, 1997.

Valente, F., Gash, J. H., Nóbrega, C., David, J. S., and Pereira, F. L.: Modelling rainfall interception by an olive-grove/pasture system with a sparse tree canopy, J. Hydrol., 581, 124417, https://doi.org/10.1016/j.jhydrol.2019.124417, 2020.

Van Dijk, A.: The Australian Water Resources Assessment System. Technical Report 3. Landscape Model (version 0.5) Technical Description., 2010.

van Dijk, A. and Bruijnzeel, L.: Modelling rainfall interception by vegetation of variable density using an adapted analytical model. Part 2. Model validation for a tropical upland mixed cropping system, J. Hydrol., 247, 239-262, https://doi.org/10.1016/S0022-1694(01)00393-6, 2001.

Van Stan, J. T., Levia, D. F., and Jenkins, R. B.: Forest Canopy Interception Loss Across Temporal Scales: Implications for Urban Greening Initiatives, The Professional Geographer, 67, 41-51, https://doi.org/10.1080/00330124.2014.888628, 2015.

Veneklaas, E. J. and Van Ek, R.: Rainfall interception in two tropical montane rain forests, Colombia, Hydrol. Process., 4, 311-326, https://doi.org/10.1002/hyp.3360040403, 1990.

Vernimmen, R. R. E., Bruijnzeel, L. A., Romdoni, A., and Proctor, J.: Rainfall interception in three contrasting lowland rain forest types in Central Kalimantan, Indonesia, J. Hydrol., 340, 217-232, https://doi.org/10.1016/j.jhydrol.2007.04.009, 2007.

Viville, D., Biron, P., Granier, A., Dambrine, E., and Probst, A.: Interception in a mountainous declining spruce stand in the Strengbach catchment (Vosges, France), J. Hydrol., 144, 273-282, https://doi.org/10.1016/0022-1694(93)90175-9, 1993.

Wallace, J. and McJannet, D.: On interception modelling of a lowland coastal rainforest in northern Queensland, Australia, J. Hydrol., 329, 477-488, https://doi.org/10.1016/j.jhydrol.2006.03.003, 2006.

Wallace, J. and McJannet, D.: Modelling interception in coastal and montane rainforests in northern Queensland, Australia, J. Hydrol., 348, 480-495, https://doi.org/10.1016/j.jhydrol.2007.10.019, 2008.

Wallace, J., Macfarlane, C., McJannet, D., Ellis, T., Grigg, A., and Van Dijk, A.: Evaluation of forest interception estimation in the continental scale Australian Water Resources Assessment–Landscape (AWRA-L) model, J. Hydrol., 499, 210-223, https://doi.org/10.1016/j.jhydrol.2013.06.036, 2013.

Wang, D. and Wang, L.: Rainfall partitioning and its effects on regional water balances: Evidence from the conversion of traditional cropland to apple orchards in a semi-humid region, Hydrol. Process., 34, 4628-4639, https://doi.org/10.1002/hyp.13891, 2020.

Wang, X., Zhang, Y., and Liu, W.: Modeling canopy rainfall interception of a tropical seasonal rain forest of Xishuangbanna, Southwest China, Acta Ecol. Sin, 26, 722-729, 2006.

Waterloo, M., Bruijnzeel, L., Vugts, H., and Rawaqa, T.: Evaporation from Pinus caribaea plantations on former grassland soils under maritime tropical conditions, Water Resour. Res., 35, 2133-2144, https://doi.org/10.1029/1999WR900006, 1999.

Waterloo, M. J.: Water and Nutrient Dynamics of Pinus caribaea Plantation Forests on degraded grassland soils in Southwest Viti Levu, Fiji, PHD thesis, 1994.

Whitworth-Hulse, J. I., Magliano, P. N., Zeballos, S. R., Gurvich, D. E., Spalazzi, F., and Kowaljow, E.: Advantages of rainfall partitioning by the global invader Ligustrum lucidum over the dominant native Lithraea molleoides in a dry forest, Agr Forest Meteorol, 290, https://doi.org/10.1016/j.agrformet.2020.108013, 2020.

Wu, X., Zhou, M., and Zhang, H.: The relationship between rainfall, rainfall intensity and interception by canopy of Larix gmelinii Rupr. forest in Daxinganling Mountains, Journal of Inner Mongolia Agricultural University, 27, 83-86, 2006.

Xiao, J. and Song, Y.: Preliminary study on hydrologic effect of evergreen broad-leaved forest in the Tian Tong National Forest Park, Zhe Jiang, China, Journal of Shanxi Teacher's University, Natural Science Edition E. E., 2, 1993.

Xiao, Q. and McPherson, E. G.: Surface water storage capacity of twenty tree species in Davis, California, J. Environ. Qual., 45, 188-198, https://doi.org/10.2134/jeq2015.02.0092, 2016.

Xiao, Q., McPherson, E. G., Ustin, S. L., Grismer, M. E., and Simpson, J. R.: Winter rainfall interception by two mature open-grown trees in Davis, California, Hydrol. Process., 14, 763-784, https://doi.org/10.1002/(SICI)1099-1085(200003)14:4<763::AID-HYP971>3.0.CO;2-7, 2000.

Xiao, Y., Dai, L., Niu, D., Tong, F., Chen, G., and Deng, H.-b.: Influence of canopy on precipitation and its nutrient elements in broad-leaved/Korean pine forest on the northern slope of Changbai Mountain, J. For. Res., 13, 201-204, https://doi.org/10.1007/BF02871697, 2002.

Xu, X., Wang, Q., and Hirata, E.: Precipitation partitioning and related nutrient fluxes in a subtropical forest in Okinawa, Japan, Annals of Forest Science, 62, 245-252, https://doi.org/10.1051/forest:2005016, 2005.

Yang, W.-q., Wang, Y.-p., and Zhang, Q.-f.: Canopy interception characteristics of apple trees in gully region of Loess Plateau, Bulletin of Soil and Water Conservation, 33, 93-96, 2013.

Zabret, K., Rakovec, J., Mikoš, M., and Šraj, M.: Influence of raindrop size distribution on throughfall dynamics under pine and birch trees at the rainfall event level, Atmosphere, 8, 240, https://doi.org/10.3390/atmos8120240, 2017.

Zeng, N., Shuttleworth, J. W., and Gash, J. H.: Influence of temporal variability of rainfall on interception loss. Part I. Point analysis, J. Hydrol., 228, 228-241, https://doi.org/10.1016/S0022-1694(00)00140-2, 2000.

Zhang, G., Zeng, G., Jiang, Y., Huang, G., Li, J., Yao, J., Tan, W., Xiang, R., and Zhang, X.: Modelling and measurement of two-layer-canopy interception losses in a subtropical evergreen forest of central-south China, Hydrol. Earth. Syst. Sci., 10, 65-77, https://doi.org/10.5194/hess-10-65-200610.5194/hess-10-65-2006, 2006.

Zhang, H. R. L., C.; Dong, X.B. : Influence of Forest Canopy in Low-Quality Stands in Lesser Xing'an Mountains on Rainfall Interception, Journal of Northeast Forestry University, 40, 90-91, 10.13759/j.cnki.dlxb.2012.04.028, 2012.

Zhang, J., Bruijnzeel, L. A., van Meerveld, H. J., Ghimire, C. P., Tripoli, R., Pasa, A., and Herbohn, J.: Typhoon-induced changes in rainfall interception loss from a tropical multi-species 'reforest', J. Hydrol., 568, 658-675, https://doi.org/10.1016/j.jhydrol.2018.11.024, 2019.

Zhang, S. Y., Li, X. Y., Jiang, Z. Y., Li, D. Q., and Lin, H.: Modelling of rainfall partitioning by a deciduous shrub using a variable parameters Gash model, Ecohydrology, 11, e2011, https://doi.org/10.1002/eco.2011, 2018.

Zhang, Y.-f., Wang, X.-p., Hu, R., Pan, Y.-x., and Paradeloc, M.: Rainfall partitioning into throughfall, stemflow and interception loss by two xerophytic shrubs within a rain-fed re-vegetated desert ecosystem, northwestern China, J. Hydrol., 527, 1084-1095, https://doi.org/10.1016/j.jhydrol.2015.05.060, 2015.

Zhang, Y., Li, X. Y., Li, W., Wu, X. C., Shi, F. Z., Fang, W. W., and Pei, T. T.: Modeling rainfall interception loss by two xerophytic shrubs in the Loess Plateau, Hydrol. Process., 31, 1926-1937, https://doi.org/10.1002/hyp.11157, 2017.

Zhang, Z. S., Zhao, Y., Li, X. R., Huang, L., and Tan, H. J.: Gross rainfall amount and maximum rainfall intensity in 60-minute influence on interception loss of shrubs: a 10-year observation in the Tengger Desert, Sci Rep, 6, 1-10, https://doi.org/10.1038/srep26030, 2016.

Zheng, C. and Jia, L.: Global canopy rainfall interception loss derived from satellite earth observations, Ecohydrology, 13, e2186, https://doi.org/10.1002/eco.2186, 2020.

Zheng, J., Fan, J., Zhang, F., Yan, S., and Xiang, Y.: Rainfall partitioning into throughfall, stemflow and interception loss by maize canopy on the semi-arid Loess Plateau of China, Agric. Water Manage., 195, 25-36, https://doi.org/10.1016/j.agwat.2017.09.013, 2018.

Zheng, J., Fan, J., Zhang, F., Yan, S., Wu, Y., Lu, J., Guo, J., Cheng, M., and Pei, Y.: Throughfall and stemflow heterogeneity under the maize canopy and its effect on soil water distribution at the row scale, Sci. Total Environ., 660, 1367-1382, https://doi.org/10.1016/j.scitotenv.2019.01.104, 2019.

Zhou, B., Han, H., Kang, F., Cheng, X., Song, Y., Liu, K., and Li, Y.: Characteristics of precipitation distribution in Pinus tabulaeformis plantations under different canopy coverage in Taiyue Mountain, Acta Ecol. Sin, 33, 1645-1653, 2013.

Ziegler, A., Giambelluca, T., Nullet, M., Sutherland, R., Tantasarin, C., Vogler, J., and Negishi, J.: Throughfall in an evergreen-dominated forest stand in northern Thailand: Comparison of mobile and stationary methods, Agr Forest Meteorol, 149, 373-384, https://doi.org/10.1016/j.agrformet.2008.09.002, 2009.