Kim M, Lee W, Kurz W, Kwak D, Morken S, Smyth C, Ryu D (2016). **Estimating carbon dynamics in forest carbon pools under IPCC standards in South Korea using CBM-CFS3.**
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Supplementary Material

Tab. S1 - The whole regression forms to estimate mean tree height, dominant tree height, site index, mean tree *dbh*, and volume

Uses of function	Code	List of regression forms			
		1	2	3	4
Mean tree height (m)	A	$hm_i = e^{a+b\cdot lndbh+c\cdot(lndbh)^3}$	$hm_i = 1.2 + a \cdot e^{\frac{b}{dbh}}$	$hm_i = 1.2 + \left(\frac{dbh}{a + b \cdot dbh}\right)^3$	$hm_i = a(1 - e^{-b\cdot dbh})$
Dominant tree height (m)	B	$ho_i = a \cdot hm^b$			
Site index	C	$SI = ho_i \cdot \left(\frac{1 - e^{-a\cdot Age_{SI}}}{1 - e^{-a\cdot Age_i}}\right)^b$	$SI = ho_i \cdot \left(\frac{age_{si}}{age_i}\right)^a \cdot e^{b\left(\frac{1}{age_{si}} - \frac{1}{age}\right)}$		
Mean tree *dbh* (cm)	D	$dbh_{i+1} = dbh_i \left(\frac{age_{i+1}^{\ b} \cdot ho_{i+1}^{\ c}}{age_i^{\ b} \cdot ho_i^{\ c}}\right)$	$dbh_{i+1} = dbh_i \left(\frac{age_{i+1}^{\ b} \cdot ho_{i+1}^{\ c} \cdot d^{ho_{i+1}}}{age_i^{\ b} \cdot ho_i^{\ c} \cdot d^{ho_i}}\right)$		
Volume (m^3 ha^{-1})	E	$V_i = a \cdot dbh_i^{\ b} \cdot hm_i^{\ c}$			

Tab. S2 - The optimal regression forms to estimate mean tree height, dominant tree height, site index, mean tree *dbh*, and volume by tree species.

Tree species	Equations				
	Mean tree height (m)	Dominant tree height (m)	Site index	Mean tree dbh (cm)	Volume (m^3 ha^{-1})
Pinus densiflora (in central region)	A1	B1	C1	D1	E1
Pinus densiflora (in Kangwon province)	A1		C1	D1	
Pinus koraiensis	A1		C1	D2	
Pinus rigida	A2		C2	D1	
Larix kaempferi	A3		C1	D2	
Chamaecyparis obtusa	A3		C1	D2	
Cryptomeria japonica	A3		C1	D2	
Abies holophylla	A4		C1	D2	
Other conifers	A1		C1	D1	
Quercus spp.	A2		C1	D1	
Castanea crenata	A4		C2	D1	
Other broad-leaved trees	A3		C2	D1	

Tab. S3 - Parameter estimates of the regression models for mean tree height (m) for each tree species.

Tree species	Coefficients			Pseudo-R^2
	a	b	c	
Pinus densiflora (in central region)	-0.4978	1.3105	-0.1145	0.49
Pinus densiflora (in Kangwon province)	-0.2947	1.1593	-0.0848	0.51
Pinus koraiensis	-0.6777	1.4768	-0.1429	0.67
Pinus rigida	20.2650	-12.6435		0.47
Larix kaempferi	1.6954	0.3236		0.55
Chamaecyparis obtusa	1.9080	0.3574		0.71
Cryptomeria japonica	1.7263	.3476		0.49
Abies holophylla	20.1203	0.0445	1.1436	0.47
Other conifers	-0.8574	1.5621	-0.1592	0.44
Quercus spp.	1.5805	0.3702		0.56
Castanea crenata	15.5018	0.0587	0.9284	0.49
Other broad-leaved trees	1.3684	0.3846		0.42

Tab. S4 - Site index model used in yield table (Korea Forest Service, 2009).

Model	Chapman-Richard	Schumacher
Dominant tree height	$h_o = a \cdot (1 - e^{-b \cdot age})^c$	$h_o = a \cdot age^b \cdot e^{c\frac{1}{age}}$
SI	$SI = h_o \cdot \left(\frac{1 - e^{-a \cdot age_{SI}}}{1 - e^{-a \cdot age}} \right)^b$	$SI = h_o \cdot \left(\frac{age_{SI}}{age} \right)^a \cdot e^{b\left(\frac{1}{age_{SI}} - \frac{1}{age}\right)}$

Tab. S5 - Coefficients for site index and dominant tree height equations by tree species developed by the Korea Forest Service (2009).

Tree species	Coefficients for site index			Coefficients for dominant tree height equations	
	a	b	c	a	b
Pinus densiflora (in central region)	13.5017	0.0694	2.2472	1.1737	1.0097
Pinus densiflora (in Kangwon province)	19.3040	0.0378	1.2225	1.0990	1.0271
Pinus koraiensis	23.0355	0.0302	1.2596	1.2646	0.9620
Pinus rigida	3.1258	-24.7006	-	1.0138	1.0241
Larix kaempferi	24.3269	0.0382	1.0974	1.1052	0.9995
Chamaecyparis obtusa	23.5614	0.0151	0.6689	1.1789	0.9915
Cryptomeria japonica	24.3269	0.0382	1.0974	1.1052	0.9995
Abies holophylla	24.3269	0.0382	1.0974	1.1052	0.9995
Other conifers	13.5017	0.0694	2.2472	1.1737	1.009
Quercus spp.	18.2353	0.00841	-13.4153	1.1737	1.009
Castanea crenata	3.0153	-15.8866	-	1.2526	0.9739
Other broad-leaved trees	3.0153	-15.8866	-	1.3445	0.9399

Tab. S6 - Coefficients for mean *dbh* equations by tree species developed by the Korea Forest Service (2009).

Tree species	Coefficients			
	a	b	c	d
Pinus densiflora (in central region)	0.6525	0.5253	0.5676	-
Pinus densiflora (in Kangwon province)	0.5127	0.5273	0.6491	-
Pinus koraiensis	0.5400	0.2461	1.2589	0.9652
Pinus rigida	0.9423	0.3376	0.6804	-
Larix kaempferi	0.1102	0.1901	1.8378	0.9586
Chamaecyparis obtusa	0.1102	0.1901	1.8378	0.9586
Cryptomeria japonica	0.1102	0.1901	1.8378	0.9586
Abies holophylla	0.1102	0.1901	1.8378	0.9586
Other conifers	0.6525	0.5253	0.5676	-
Quercus spp.	0.5896	0.5738	0.5166	-
Castanea crenata	0.4624	0.7395	0.3684	-
Other broad-leaved trees	0.4624	0.7395	0.3684	-

Tab. S7 - Coefficients for volume (V ha^{-1}) equations by tree species developed by the Korea Forest Service (2009).

Tree species	Coefficients		
	a	b	c
Pinus densiflora (in central region)	3.5779	0.000636	1.6012
Pinus densiflora (in Kangwon province)	4.5485	0.6731	0.6968
Pinus koraiensis	3.8152	0.1169	1.3398
Pinus rigida	7.2281	-0.3519	1.6693
Larix kaempferi	3.2545	0.2449	1.1682
Chamaecyparis obtusa	6.6452	-0.7429	2.1646
Cryptomeria japonica	3.2545	0.2449	1.1682
Abies holophylla	3.2545	0.2449	1.1682
Other conifers	3.5779	0.000636	1.6012
Quercus spp.	5.2972	0.4359	0.8689
Castanea crenata	7.4216	0.2318	0.9849
Other broad-leaved trees	7.4216	0.2318	0.9849