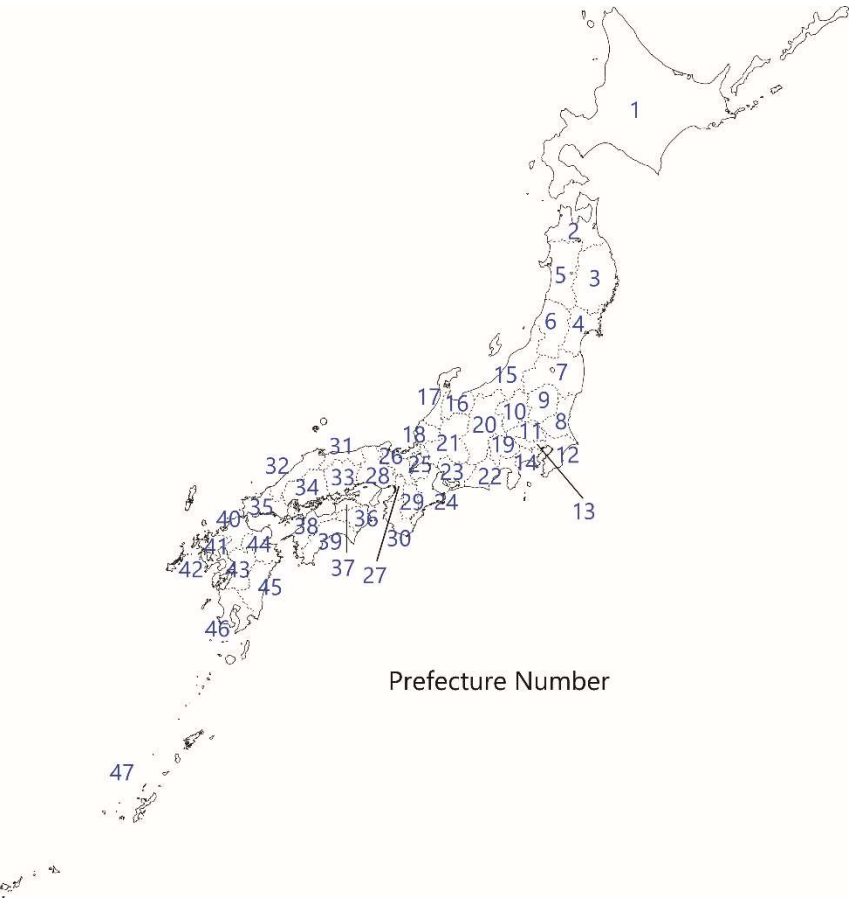


Supplementary Materials:

Table S1. Sample size of forest floor mass and nutrients in the prefecture of Japan

No.	Element Forest type ¹⁾ Prefecture	mass								Nitrogen								Phosphorus							
		All	cedar	cypress	larch	pine	subalp	decid	evergr	All	cedar	cypress	larch	pine	subalp	decid	evergr	All	cedar	cypress	larch	pine	subalp	decid	evergr
1	Hokkaido	365	14		150	7	37	28		65	3	1	8		16	8		43					10	5	
2	Aomori	38	27			6		1		6	2			2				1							
3	Iwate	44	31	12	4	5		3		5	2	1	1			1		3		1				1	
4	Miyagi	24	22			2				3	2			1											
5	Akita	43	39		1	1		2		10	10							8	8						
6	Yamagata	24	23					1		1	1														
7	Fukushima	38	25		3	5		4		4	2					2		1						1	
8	Ibaraki	41	23	4	1	4		8	1	8	2			3		3		10	5			2		3	
9	Tochigi	58	32	10	2	4	2	8		6	3	1	1	1				12	7	3		1			
10	Gunma	21	8	3	5	1		2	1	2			1			1		1						1	
11	Saitama	14	12				1	1		6	5				1			4	3				1		
12	Chiba	27	19					1	7	6	3						3	5	1						4
13	Tokyo	9	8					1		2	2														
14	Kanagawa	14	13							4	4							2	2						
15	Niigata	78	42			9	3	18		20	3			5		9		12	1			5		3	
16	Toyama	16	16							2	2														
17	Ishikawa	16	16							3	3														
18	Fukui	19	19							3	3														
19	Yamanashi	18	5		6	4	1	1		4	1		1	1	1			1					1		
20	Nagano	89	8	10	19	11	8	14		27	1		4	6	5	6		11				2	1		
21	Gifu	26	8	1	1			2		2		2													
22	Shizuoka	32	13	9		1			1	11	6	3					1	9	6	2					1
23	Aichi	16	1	10		1		3	1	2		2													
24	Mie	25	9	11		1			3	5	1	1					3								
25	Shiga	18	8	6				1		5		4						2		1					
26	Kyoto	43	10	12		4		17		18		4		1		13		14		3		1		10	
27	Osaka	6	5	1						3	2	1													
28	Hyogo	31	20	7		4				2	2							3	3						
29	Nara	19	12	1				1	5	4	4							1	1						
30	Wakayama	17	15	2						4	3														
31	Tottori	15	10	2		1		2		2	2														
32	Shimane	31	15					13		9	3					5		6						5	
33	Okayama	22	2	11		8		1		2		2													
34	Hiroshima	29	5	9		9		4	2	2	1	1													
35	Yamaguchi	21	10	4		4		3		2	2														
36	Tokushima	16	13	3						3	3														
37	Kagawa	9	5	2		6				3				2											
38	Ehime	19	8	10						3		3													
39	Kochi	80	10	64			2	1	1	22	5	14			2	1		19	5	11			2	1	
40	Fukuoka	18	9	9						3	1	2													
41	Saga	7	2	5						1		1													
42	Nagasaki	18	6	12						4	1	3													
43	Kumamoto	34	18			2			14	14	1			2			11	9				2			7
44	Oita	18	12	5						4	3							1	1						
45	Miyazaki	24	23							3	2	1													
46	Kagoshima	38	24	8		1		1	4	3	2						1	1							1
47	Okinawa	17	2	1		2		3	12	3							3	1							1



Note: All Tofo fir samples were collected from Hokkaido prefecture

1) All: all tree speceis, subaip: subalpine conifers, decid: deciduous broad-leaved forests: evergr: evergreen broad-leaved forests

	Element Forest type Prefecture	Potassium									Calcium									Magnesium							
		All	cedar	cypress	larch	pine	subalp	decid	evergr		All	cedar	cypress	larch	pine	subalp	decid	evergr		All	cedar	cypress	larch	pine	subalp	decid	evergr
1	Hokkaido	55	3			8		10	7		53	3			8		9	7		25	3			8			7
2	Aomori	4	2					1			4	2					1			4	2				1		
3	Iwate	5	2		1	1			1		5	2		1	1			1		2	2						
4	Miyagi	3	2					1			3	2					1			3	2				1		
5	Akita	10	10								10	10								9	9						
6	Yamagata	1	1								1	1								1	1						
7	Fukushima	3	2						1		3	2						1		3	2					1	
8	Ibaraki	7	2					2	3		7	2				2		3		7	2			2		3	
9	Tochigi	5	2		1	1					5	2		1	1	1			5	2		1	1	1			
10	Gunma	2				1			1		2				1			1		2				1		1	
11	Saitama	6	5					1			6	5					1		6	5							
12	Chiba	7	3							4	7	3							7	3						4	
13	Tokyo	2	2								2	2							2	2							
14	Kanagawa	4	4								4	4							4	4							
15	Niigata	14	3					5	3		14	3				5		3	14	3				5		3	
16	Toyama	2	2								2	2							2	2							
17	Ishikawa	3	3								3	3							3	3							
18	Fukui	3	3								3	3		2					3	3							
19	Yamanashi	4	1			1	1	1			4	1			1	1	1		4	1			1	1			
20	Nagano	8	1			4	2	1			8	1			4	2	1		8	1			4	2			
21	Gifu	2			2						2			2					2			2					
22	Shizuoka	11	6		3				1		11	6		3				1	6	3		1				1	
23	Aichi	2			2						2			2					2			2					
24	Mie	2	1		1						2	1		1					2	1		1					
25	Shiga	5			4						5			4					5			4					
26	Kyoto	16			4			1			16			4			1		16			4			1		11
27	Osaka	3	2		1						3	2		1					3	2		1					
28	Hyogo	2	2								2	2							2	2							
29	Nara	4	4					1			4	4							4	4							
30	Wakayama	4	3		1						4	3		1					4	3		1					
31	Tottori	2	2								2	2							2	2							
32	Shimane	9	3						5		9	3						5	9	3						5	
33	Okayama	2			2						2			2					2			2					
34	Hiroshima	2	1		1						2	1		1					2	1		1					
35	Yamaguchi	2	2								2	2							2	2							
36	Tokushima	3	3								3	3							3	3							
37	Kagawa	3						2			3					2			3					2			
38	Ehime	3			3						3			3					3			3					
39	Kochi	22		5	14				2	1	20		5	12			2	1	20		5	12				1	
40	Fukuoka	3	1		2						3	1							3	1		2					
41	Saga	1			1						1			1					1			1					
42	Nagasaki	4	1		3						4	1		3					4	1		3					
43	Kumamoto	10	1					2		11	7		1			2			10	1				2		7	
44	Oita	4	3								4	3							4	3							
45	Miyazaki	1	1								1	1							1	1							
46	Kagoshima	3	2							1	3	2						1	3	2						1	
47	Okinawa	3									3							3	3							3	

Supplementary Materials

Table S2. Statistics of dry weight (Mg ha⁻¹) of the forest floor mass by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	9.30 <i>d</i>	6.20	13.4	7.20	10.6	6.71	683
Cypress	Pl	6.60 <i>e</i>	4.18	12.4	8.22	9.96	8.98	263
Cypress ⁶⁾	Na	44.8 ⁷⁾	21.1	62.8	41.7	46.8	26.4	16
Larch	Pl	12.1 <i>bc</i>	6.55	17.8	11.2	13.2	8.10	192
Pine	Pl and Na	13.3 <i>bc</i>	7.42	21.9	14.5	16.1	10.8	105
Todo fir	Pl	14.5 <i>b</i>	9.50	19.5	10.0	15.0	6.80	95
Todo fir	Na	32.5 ⁷⁾	27.0	42.9	15.9	34.9	12.4	17
Subalpine coniferous	Na	37.0 <i>a</i>	20.5	53.2	32.8	39.0	24.0	65
Broad-leaved								
Deciduous	Na	12.2 <i>bc</i>	8.12	21.3	13.0	17.7	16.7	161
Evergreen	Na	9.20 <i>cd</i>	6.63	12.5	5.9	11.4	7.33	56
Oak	Na	14.6 ⁷⁾	8.83	18.9	10.1	15.4	8.36	61
<i>Castanopsis</i>	Na	8.09 ⁷⁾	6.46	11.5	5.1	9.66	7.90	23
Beech	Na	18.9 ⁷⁾	9.26	28.1	18.8	23.0	17.6	46
Total								
Coniferous	Pl and Na	10.3	6.20	16.3	10.1	13.2	11.2	1487
Broad-leaved	Na	11.5	7.93	19.0	11.1	16.2	14.9	228

1) Pl is plantation and Na is natural (semi-natural) forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile (25th percentile). 4) Q3 is the third quartile (75th percentile). 5) IQR is the interquartile range. 6) Data on natural cypress forests were collected only from Nagano Prefecture. 7) data is not included in the multiple comparison test.

Table S3. Statistics of N storage (kg ha⁻¹) in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	111 <i>ce</i>	72.7	186	113	140	95.5	98
Cypress	Pl	89.0 <i>ce</i>	41.0	154	113	121	113	47
Larch	Pl	205 <i>ab</i>	149	250	101	200	91.4	16
Pine	Pl and Na	96.2 <i>bcde</i>	61.9	268	206	162	131	21
Todo fir	Pl	261 <i>ab</i>	237	298	61	260	48.7	24
Subalpine coniferous	Na	533 <i>a</i>	224	903	679	611	480	26
Broad-leaved								
Deciduous	Na	149 <i>abcd</i>	109	390	281	393	577	49
Evergreen	Na	123 <i>cde</i>	91.5	150	58.8	166	145	22
Oak	Na	149 ⁶⁾	102	290	188	211	163	16
Beech	Na	450 ⁶⁾	117	1058	941	692	595	15
Total								
Coniferous	Pl and Na	140	81.5	270	189	215	236	253
Broad-leaved	Na	138	106	289	183	321	493	72

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile. 5) IQR is the interquartile range. 6) data is not included in the multiple comparison test.

Table S4. Statistics of P storage (kg ha⁻¹) in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	5.66 <i>cde</i>	4.36	10.9	6.52	7.90	5.17	43
Cypress	Pl	3.10 <i>df</i>	1.30	4.25	2.95	4.51	6.24	19
Pine	Pl and Na	5.93 <i>cd</i>	4.95	16.1	11.2	9.83	8.30	10
Todo fir	Pl	22.0 <i>b</i>	18.7	24.4	5.75	21.4	3.74	24
Subalpine coniferous	Na	35.6 <i>a</i>	15.1	72.4	57.2	41.6	32.6	19
Broad-leaved								
Deciduous	Na	8.75 <i>c</i>	6.48	13.2	6.72	12.7	10.4	30
Evergreen	Na	6.55 <i>cd</i>	4.59	11.4	6.85	10.0	9.51	14
Total								
Coniferous	Pl and Na	11.2	5.25	21.6	16.4	16.1	18.0	134
Broad-leaved	Na	8.27	5.92	12.8	6.83	11.8	10.1	44

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile.

5) IQR is the interquartile range

Table S5. Statistics of K storage (kg ha⁻¹) in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	11.2 <i>cd</i>	6.8	20.1	13.3	18.5	29.0	96
Cypress	Pl	10.9 <i>cd</i>	5.7	23.4	17.7	18.8	21.7	46
Larch	Pl	19.2 <i>a</i>	13.3	25.9	12.5	28.0	29.7	16
Pine	Pl and Na	13.0 <i>cd</i>	9.5	34.6	25.1	19.2	13.9	15
Todo fir	Pl	35.7 <i>ab</i>	29.3	39.4	10.1	35.7	7.2	23
Subalpine coniferous	Na	51.6 <i>a</i>	38.8	63.3	24.5	56.3	32.5	14
Broad-leaved								
Deciduous	Na	10.9 <i>cd</i>	6.7	29.2	22.4	17.2	15.2	33
Evergreen	Na	16.4 <i>cd</i>	10.4	22.2	11.8	18.5	13.3	16
Total								
Coniferous	Pl and Na	15.9	8.3	34.6	26.3	24.5	27.2	226
Broad-leaved	Na	13.5	8.3	26.4	18.1	17.9	14.5	50

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile.

5) IQR is the interquartile range

Table S6. Statistics of Ca storage (kg ha⁻¹) in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	147 <i>ab</i>	113	226	113	182	109	96
Cypress	Pl	57.3 <i>e</i>	26.9	85	58.1	78.4	93.1	44
Larch	Pl	102 <i>abcde</i>	73.8	121	47.0	119	86.1	16
Pine	Pl and Na	48.3 <i>bde</i>	40.0	105	64.9	77.9	57.7	15
Todo fir	Pl	146 <i>bcd</i>	114	169	35.0	144	51.1	22
Subalpine coniferous	Na	233 <i>a</i>	148	454	305	264	158	13
Broad-leaved								
Deciduous	Na	94.5 <i>e</i>	63.4	133	69.6	93.8	47.4	32
Evergreen	Na	156 <i>ab</i>	108	185	76.3	158	75.3	16
Total								
Coniferous	Pl and Na	120	66.5	200	134	152	124	222
Broad-leaved	Na	116	69.3	154	84.7	113	65.3	50

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile.

5) IQR is the interquartile range

Table S7. Statistics of Mg storage (kg ha⁻¹) in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	17.9	10.2	26.6	16.4	23.5	22.7	92
Cypress	Pl	9.1	4.9	21.3	16.4	14.7	14.2	41
Larch	Pl	23.5	14.3	26.6	12.3	28.0	24.8	15
Pine	Pl and Na	18.1	10.3	26.4	16.1	19.6	11.8	15
Broad-leaved								
Deciduous	Na	18.8	11.6	28.2	16.6	19.9	12.3	31
Evergreen	Na	22.7	16.5	28.1	11.6	26.9	19.4	16
Total								
Coniferous	Pl and Na	18.0	9.3	27.3	18.0	23.2	22.1	186
Broad-leaved	Na	19.7	13.0	28.5	15.6	22.0	15.3	49

1) Pl is plantation and Na is natural and semi-natural forest. 2) No significant difference among forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile. 5) IQR is the interquartile range

Table S8. Statistics of C:N ratio in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	49.8 <i>a</i>	40.0	60.3	20.4	51.2	16.5	98
Cypress	Pl	47.2 <i>ab</i>	37.0	56.1	19.1	49.3	18.0	47
Larch	Pl	35.4 <i>cd</i>	28.5	40.2	11.8	35.3	8.4	16
Pine	Pl and Na	40.7 <i>abc</i>	33.0	47.9	14.9	41.0	10.1	21
Todo fir	Pl	31.3 <i>d</i>	29.4	33.2	3.8	33.2	8.8	24
Subalpine coniferous	Na	32.4 <i>d</i>	27.6	35.7	8.1	39.4	33.6	26
Broad-leaved								
Deciduous	Na	28.2 <i>d</i>	23.2	33.2	10.0	32.9	16.5	49
Evergreen	Na	36.3 <i>bcd</i>	28.2	45.4	17.3	36.3	10.8	22
Total								
Coniferous	Pl and Na	40.5	32.2	53.5	21.3	45.1	18.8	253
Broad-leaved	Na	29.5	24.2	38.2	14.0	34.2	14.9	72

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile. 5) IQR is the interquartile range

Table S9. Statistics of C:P ratio in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	957 <i>a</i>	631	1331	699	983	405	43
Cypress	Pl	914 <i>ab</i>	600	1174	574	939	418	19
Pine	Pl and Na	562 <i>abc</i>	470	724	254	580	130	10
Todo fir	Pl	394 <i>d</i>	361	422	61	397	59.3	24
Subalpine coniferous	Na	486 <i>cd</i>	393	570	177	587	507	19
Broad-leaved								
Deciduous	Na	617 <i>bcd</i>	434	748	314	685	406	30
Evergreen	Na	862 <i>abc</i>	534	976	442	800	258	14
Total								
Coniferous	Pl and Na	575	429	957	528	731	414	134
Broad-leaved	Na	646	441	876	435	722	367	44

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile. 5) IQR is the interquartile range

Table S10. Statistics of N:P ratio in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	20.2 <i>a</i>	15.1	24.0	8.9	19.9	5.6	28
Cypress	Pl	19.3 <i>a</i>	16.6	22.4	5.8	20.3	8.4	19
Pine	Pl and Na	11.8 <i>b</i>	10.7	17.6	6.9	13.6	5.0	10
Todo fir	Pl	12.2 <i>b</i>	11.2	13.8	2.6	12.2	2.0	23
Subalpine coniferous	Na	13.7 <i>ab</i>	12.5	15.8	3.3	14.3	5.4	19
Broad-leaved								
Deciduous	Na	18.2 <i>a</i>	13.6	22.8	9.2	19.0	6.7	30
Evergreen	Na	20.3 <i>a</i>	18.9	22.4	3.5	21.9	7.3	13
Total								
Coniferous	Pl and Na	15.5	12.2	19.6	7.4	16.4	6.3	118
Broad-leaved	Na	19.2	14.4	22.5	8.2	19.9	6.9	43

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile.

5) IQR is the interquartile range

Table S11. Statistics of C:Ca ratio in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	34.8 <i>c</i>	27.1	43.3	16.2	37.9	15.5	96
Cypress	Pl	72.6 <i>a</i>	49.1	112	63.2	80.3	39.0	44
Larch	Pl	62.1 <i>ab</i>	47.6	81.8	34.2	69.7	37.9	16
Pine	Pl and Na	63.8 <i>ab</i>	55.1	96.2	41.0	82.2	55.7	15
Todo fir	Pl	59.9 <i>ab</i>	51.9	72.4	20.5	65.2	22.5	22
Subalpine coniferous	Na	60.7 <i>ab</i>	38.2	139	101	93.8	70.0	13
Broad-leaved								
Deciduous	Na	72.1 <i>ab</i>	39.1	172	133	130	132	32
Evergreen	Na	38.6 <i>bc</i>	26.9	66.1	39.2	49.7	36.5	16
Total								
Coniferous	Pl and Na	49.1	34.1	72.9	38.8	62.1	47.0	222
Broad-leaved	Na	58.8	32.8	123	90.5	108	122	50

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile.

5) IQR is the interquartile range

Table S12. Statistics of C:Mg ratio in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	366	258	482	224	380	193	92
Cypress	Pl	444	254	809	556	512	327	41
Larch	Pl	267	193	381	188	308	158	15
Pine	Pl and Na	323	214	394	180	305	119	15
Broad-leaved								
Deciduous	Na	363	246	589	343	680	837	31
Evergreen	Na	283	172	393	221	291	144	16
Total								
Coniferous	Pl and Na	363	240	505	265	412	252	186
Broad-leaved	Na	304	226	535	309	624	900	49

1) Pl is plantation and Na is natural and semi-natural forest. 2) No significant difference among forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile. 5) IQR is the interquartile range

Table S13. Statistics of C:K ratio in the forest floor by forest type group.

Forest type	Pl/Na ¹⁾	Median ²⁾	Q1 ³⁾	Q3 ⁴⁾	IQR ⁵⁾	Mean	SD	n
Coniferous								
Cedar	Pl	510 <i>a</i>	378	638	260	520	251	96
Cypress	Pl	321 <i>abcde</i>	198	571	373	433	327	46
Larch	Pl	341 <i>bc</i>	204	448	244	340	150	16
Pine	Pl and Na	299 <i>abcde</i>	211	461	250	325	125	15
Todo fir	Pl	233 <i>ce</i>	216	286	70	241	41	23
Subalpine coniferous	Na	329 <i>abcd</i>	268	388	120	366	175	14
Broad-leaved								
Deciduous	Na	473 <i>ab</i>	256	995	739	1088	1507	32
Evergreen	Na	354 <i>ab</i>	298	464	165	374	107	16
Total								
Coniferous	Pl and Na	370	234	563	329	432	258	226
Broad-leaved	Na	426	281	576	295	966	1547	50

1) Pl is plantation and Na is natural and semi-natural forest. 2) Values with different letters indicate significant differences between forest types at $p < 0.05$ based on the Steel-Dwass test. 3) Q1 is the first quartile. 4) Q3 is the third quartile.

5) IQR is the interquartile range