

### ***Supplementary materials***

**Table S1.** List of forest land types of WMNP

Forest land types	Area(hm <sup>2</sup> )	Proportion in land area (%)
Arbor woodland	82067.42	81.951
Shrub woodland	4216.24	4.210
Bamboo woodland	12374.31	12.357
Unforested land	57.33	0.057
Cut-over land	89.66	0.090
Suitable for woodland	366.42	0.366
Nursery field	2.07	0.002
Thinning woodland	0.54	0.001
Non-forestry land	967.53	0.966
Total	100141.52	100

**Table S2.** Contribution of different dominant tree species in the tree layer to the total carbon storage of WMNP

Dominant tree species	Area (hm <sup>2</sup> )	Biomass (10 <sup>3</sup> t)	Carbon storage (10 <sup>3</sup> t C)	Carbon density (t C·hm <sup>-2</sup> )	Percentage to total carbon storage (%)
<i>Pinus massoniana</i>	27404.32	2615.81	1307.9	47.73	26.96%
<i>Pinus taiwanensis</i>	179.87	13.79	6.89	38.32	0.14%
<i>Cunninghamia lanceolate</i>	5319.54	535.21	267.61	50.31	5.52%
Broad-leaved hardwood	49037.68	5620.62	2810.31	57.31	57.93%
Broad-leaved softwood	44.78	4.09	2.05	45.78	0.04%
Non-dominant tree species	15911.23	912.35	456.17	26.67	9.40%
Total	97897.42	9701.87	4850.93		100.00%

**Table S3.** Model parameters for biomass conversion and storage of main dominant tree species

Dominant tree species	<i>a</i>	<i>b</i>
<i>Pinus massoniana</i>	0.510	1.045
<i>Pinus taiwanensis</i>	0.517	33.238
<i>Cunninghamia lanceolata</i>	0.400	22.541
Broad-leaved hardwood	0.756	8.310
Broad-leaved softwood	0.475	30.603

**Table S4.** Correlation coefficient of influencing factors to the forest carbon storage in 2017

Effectors	Slope length( $x_1$ )	Site quality grade( $x_2$ )	Dominant tree species( $x_3$ )	Origin ( $x_4$ )	Age group ( $x_5$ )	Elevation ( $x_6$ )	Forest carbon storage ( $y$ )
$x_1$	1.0000						
$x_2$	-0.1682	1.0000					
$x_3$	-0.2396	-0.0458	1.0000				
$x_4$	-0.2779	0.0549	0.5175	1.0000			
$x_5$	-0.2851	0.0106	0.7896	0.3871	1.0000		
$x_6$	-0.4448	0.1077	0.3158	0.4646	0.3663	1.0000	
$y$	-0.2831	0.0970	0.7292	0.4869	0.6387	0.3555	1.0000

**Table S5.** Correlation coefficient of influencing factors to the forest carbon storage in 2020

Effectors	Aspect ( <i>z</i> <sub>1</sub> )	Dominant tree species ( <i>z</i> <sub>2</sub> )	Age group ( <i>z</i> <sub>3</sub> )	Elevation ( <i>z</i> <sub>4</sub> )	Forest carbon storage ( <i>y</i> )
<i>z</i> <sub>1</sub>	1.0000				
<i>z</i> <sub>2</sub>	-0.1265	1.0000			
<i>z</i> <sub>3</sub>	-0.0833	0.8694	1.0000		
<i>z</i> <sub>4</sub>	-0.1092	0.4554	0.4490	1.0000	
<i>y</i>	-0.0359	0.1797	0.1688	0.1160	1.0000

**Table S6.** Carbon stock of different ages group of forest stands in 2017 and 2020

Year	Age group	Area (hm <sup>2</sup> )	Biomass (10 <sup>3</sup> t)	Carbon storage (10 <sup>3</sup> t C)	Carbon density (t C·hm <sup>-2</sup> )
2017	Young forest	424.28	25.85	12.92	30.46
	Middle-age forest	3634.28	275.47	137.74	37.90
	Near-mature forest	5350.90	441.18	220.59	41.22
	Mature forest	32267.63	3312.74	1656.37	51.33
	Overmature forest	36066.96	4271.89	2135.95	59.22
	Total	77744.05	8327.14	4163.57	
2020	Young forest	670.27	53.01	26.51	39.55
	Middle-age forest	3913.34	362.94	181.47	46.37
	Near-mature forest	5306.22	509.40	254.70	48.00
	Mature forest	33343.20	3405.49	1702.74	51.07
	Overmature forest	38753.16	4458.68	2229.34	57.53
	Total	81986.19	8789.52	4394.76	