

Supplementary Materials: Spatiotemporal Variability of Land Surface Phenology in China from 2001–2014

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Table S1. Table 1 Unchanged percentage of different vegetation types in China over 2001–2009.

Vegetation types	Percentage
evergreen needle-leaf forest	52.977%
evergreen broadleaf forest	70.183%
deciduous needle-leaf forest	54.324%
deciduous broadleaf forest	51.966%
shrubs	86.670%
grassland	85.375%
cropland	77.736%

Table S2. Root mean square error (RMSE), Akaike's Information Criterion (AIC), and Bayesian Information Criterion (BIC) values for the four methods of analyzing the Moderate Resolution Imaging Spectroradiometer (MODIS) enhanced vegetation index (EVI) time-series data from 2001 to 2014 in China (best-smoothing method shown in bold).

Evaluation Index	Year	Smoothing Methods			
		A-G	S-G	D-L	Hants
RMSE	2001	0.01497	0.01453	0.01468	0.03316
	2002	0.01535	0.01457	0.01531	0.03344
	2003	0.01462	0.01435	0.01448	0.03339
	2004	0.01468	0.01451	0.01454	0.03275
	2005	0.01583	0.01567	0.01562	0.03641
	2006	0.01564	0.01530	0.01542	0.03510
	2007	0.01546	0.01476	0.01537	0.03469
	2008	0.01361	0.01321	0.01353	0.02971
	2009	0.01464	0.01385	0.01429	0.03208
	2010	0.01559	0.01524	0.01527	0.03570
	2011	0.01456	0.01450	0.01440	0.03278
	2012	0.01666	0.01611	0.01654	0.03736
	2013	0.01443	0.01395	0.01444	0.03218
	2014	0.01493	0.01451	0.01494	0.03347
AIC	2001	-59.97231	-65.75618	-61.78319	-45.44935
	2002	-60.14601	-66.00254	-61.50678	-45.94937
	2003	-61.01521	-66.44745	-62.42126	-46.00001
	2004	-60.84501	-66.26640	-62.34097	-46.24644
	2005	-59.58613	-64.96276	-61.24939	-44.53405
	2006	-60.12305	-65.99494	-61.90066	-45.83191
	2007	-60.66158	-66.34991	-62.06553	-45.75368
	2008	-62.73012	-68.22153	-64.07727	-48.47549
	2009	-61.41260	-67.51369	-63.24194	-47.00806
	2010	-60.17340	-65.76036	-61.77470	-45.15521
	2011	-61.29270	-66.45265	-62.80475	-46.60453
	2012	-58.61699	-64.24331	-60.14653	-43.99736
	2013	-61.63055	-67.29479	-62.88673	-47.22275
	2014	-61.19189	-66.63817	-62.38403	-46.50962
BIC	2001	-56.01748	-64.62623	-56.83325	-42.62447
	2002	-56.19113	-64.87257	-56.55676	-43.12445

2003	-57.05572	-65.31616	-57.46547	-43.17180
2004	-56.88487	-65.13492	-57.38436	-43.41776
2005	-55.62552	-63.83116	-56.29220	-41.70504
2006	-56.16499	-64.86407	-56.94668	-43.00473
2007	-56.70167	-65.21851	-57.10923	-42.92517
2008	-58.76845	-67.08962	-59.11876	-45.64572
2009	-57.45605	-66.38324	-58.28983	-44.18195
2010	-56.21133	-64.62834	-56.81569	-42.32516
2011	-57.33046	-65.32058	-57.84552	-43.77436
2012	-54.65370	-63.11094	-55.18600	-41.16644
2013	-57.66846	-66.16277	-57.92769	-44.39268
2014	-57.23034	-65.50630	-57.42567	-43.67994

Table S1. Site characteristics of field observations that validate remote sensing estimation.

Site Name	Region	Longitude (°)	Latitude (°)	Vegetation Type	SOS (DOY)	EOS (DOY)	Year	Reference
Hohhot	Northern China	111.75	40.84	grassland	113.0	277.0	2000–2009	[1]
Songyuan	Northern China	124.82	45.14	grassland	125.0	-	2000–2007	[2]
Qianguo	Northern China	124.83	45.11	grassland	113.0	282.0	2000–2007	[2]
Yushu	Northern China	126.53	44.84	grassland	110.0	282.0	2000–2007	[2]
Dunhua	Northern China	128.23	43.37	grassland	121.0	-	2000–2007	[2]
Huadian	Northern China	126.74	42.97	grassland	116.0	-	2000–2007	[2]
Kongtong	Northern China	106.66	35.43	forest	101.0	-	2000–2008	[3]
Qumalai	The Tibetan Plateau	95.80	34.13	grassland	139.0	-	2000–2010	[4]
Hunan	Northern China	101.06	34.73	grassland	120.0	-	2000–2010	[4]
Wushenzhao	Northern China	109.03	39.10	grassland	112.3	-	2000–2009	[5]
Wuchuang	Northern China	111.45	41.09	forest	130.0	-	2000–2007	[6]
Qinghai	The Tibetan Plateau	95.78	34.13	grassland	115.4	-	2000–2007	[7]
Qinghai	The Tibetan Plateau	101.23	36.68	grassland	-	287.4	2001–2007	[7]
Qinghai	The Tibetan Plateau	101.62	37.78	grassland	-	289.9	2001–2007	[7]
Laiyang	Northern China	120.71	36.98	forest	91.7	-	2000–2009	[8]
Liaochen	Northern China	115.98	36.46	forest	97.8	-	2000–2009	[8]
Changlin	Northern China	123.96	44.27	grassland	-	287.0	2000–2007	[2]
Yanji	Northern China	129.50	42.89	grassland	-	276.0	2000–2007	[2]
Zhalangtun	Northern China	122.75	47.98	forest	-	295.0	2000–2006	[9]
Bayaertu	Northern China	108.57	41.52	forest	-	294.0	2000–2007	[9]
Tuquan	Northern China	121.55	45.39	forest	-	290.0	2000–2008	[9]
Wengniuteqi	Northern China	118.91	42.61	forest	-	307.0	2000–2009	[9]
Taipusiqi	Northern China	115.28	41.90	forest	-	291.0	2000–2010	[9]
Chayouzhongqi	Northern China	112.62	41.27	forest	-	293.0	2000–2011	[9]
Wuchuang	Northern China	111.45	41.09	forest	-	293.0	2000–2007	[7]
Guyang	Northern China	110.06	41.02	forest	-	298.0	2000–2006	[9]
Zhunge'erqi	Northern China	111.22	39.87	forest	-	299.0	2000–2006	[9]
Wulateqianqi	Northern China	109.22	40.64	forest	-	298.0	2000–2006	[9]

Xilingol	Northern China	108.52	40.77	forest	-	297.0	2000–2006	[9]
Weifang	Northern China	119.16	36.71	forest	86.9	-	2000–2009	[8]
Wendeng	Northern China	122.00	37.15	forest	88.7	-	2000–2009	[8]
Shanqiu	Northern China	115.65	34.42	forest	102.5	303.0	2000–2005	[10]
Zhumadian	Northern China	114.02	32.98	forest	93.0	313.0	2000–2005	[10]
Yongcheng	Northern China	116.44	33.93	forest	-	301.0	2000–2006	[10]
Tangshan	Northern China	118.02	39.63	forest	-	299.0	2000–2006	[11]
Zhangbei	Northern China	114.70	41.15	forest	129.0	-	2000–2006	[11]
Sanhe	Northern China	117.06	39.97	forest	96.0	-	2000–2006	[11]
Weixian	Northern China	114.53	39.83	forest	113.0	-	2000–2006	[11]
Tanghai	Northern China	118.45	39.27	forest	111.0	286.0	2000–2006	[11]
Fuping	Northern China	114.83	38.85	forest	100.0	288.0	2000–2006	[11]
Huanghua	Northern China	117.35	38.37	forest	108.0	286.0	2000–2006	[11]
Luancheng	Northern China	114.64	38.87	forest	88.0	280.0	2000–2006	[11]
Shexian	Northern China	114.28	36.59	forest	93.0	279.0	2000–2006	[11]
Ferxiang	Northern China	114.80	36.55	forest	113.0	280.0	2000–2006	[11]
Minghe	The Tibetan Plateau	102.83	36.32	forest	111.0	293.0	2000–2003	[12]
Menyuan	The Tibetan Plateau	101.62	37.38	forest	148.0	283.0	2000–2003	[12]
Delingha	The Tibetan Plateau	97.36	37.37	forest	129.0	278.0	2000–2003	[12]
Eergunayouqi	Northern China	121.18	50.25	grassland	124.1	261.0	2000–2003	[13]
Ewenkiqi	Northern China	119.75	49.15	grassland	120.4	269.9	2000–2003	[13]
Bayaertuhushuo	Northern China	120.33	45.07	grassland	113.3	-	2000–2003	[13]
Xilinhot	Northern China	116.07	43.95	grassland	108.1	277.6	2000–2003	[13]
Xianghuangqi	Northern China	113.83	42.23	grassland	108.2	-	2000–2003	[13]
Chahar	Northern China	113.18	41.45	grassland	122.2	265.8	2000–2003	[13]
Linfen	Northern China	111.50	36.07	grassland	116.0	310.0	2000–2004	[14]
Jincheng	Northern China	112.83	35.52	forest	106.5	312.0	2000–2004	[14]
Yuncheng	Northern China	110.97	35.03	forest	-	326.0	2000–2004	[14]
Harbin	Northern China	126.53	45.80	forest	129.5	283.5	2000–2008	[15]
Changchun	Northern China	125.35	43.88	forest	121.0	-	2003–2010	[16]
Mutankiang	Northern China	129.63	44.55	forest	122.0	272.0	2000–2009	[1]
Panjin	Northern China	122.07	41.12	forest	108.0	284.0	2000–2009	[17]

Weiwu	Northern China	102.64	37.93	forest	120.0	301.5	2000–2004	[18]
Guyuan	Northern China	106.28	36.01	forest	102.5	314.0	2001–2006	[19]
Bachu	Northern China	78.55	39.78	forest	-	292.5	2000–2010	[20]
Zhengzhou	Northern China	112.45	34.62	forest	87.6	-	2000–2004	[21]
Luoyang	Northern China	112.45	34.62	forest	97.0	304.0	2000–2009	[1]
Guiyang	Southern China	106.63	36.65	forest	80.0	308.0	2000–2009	[1]
Cengong	Southern China	108.77	27.73	forest	93.0	303.0	2000–2005	[22]
Jiangkou	Southern China	108.85	27.70	forest	96.0	316.0	2000–2005	[22]
Liping	Southern China	110.29	25.28	forest	89.0	317.0	2000–2005	[22]
Guilin	Southern China	110.28	25.28	forest	88.0	-	2000–2012	[23]
Gaoyao	Southern China	112.45	23.03	forest	84.0	-	2000–2009	[24]
Guangzhou	Southern China	113.27	23.13	forest	66.0	-	2000–2009	[1]
Beijing	Northern China	116.40	39.90	forest	104.0	299.0	2000–2009	[1]
Xi'an	Northern China	108.94	34.34	forest	95.0	298.0	2000–2009	[1]
Tunxi	Northern China	118.31	29.70	forest	94.0	301.0	2000–2009	[1]

- represents no date

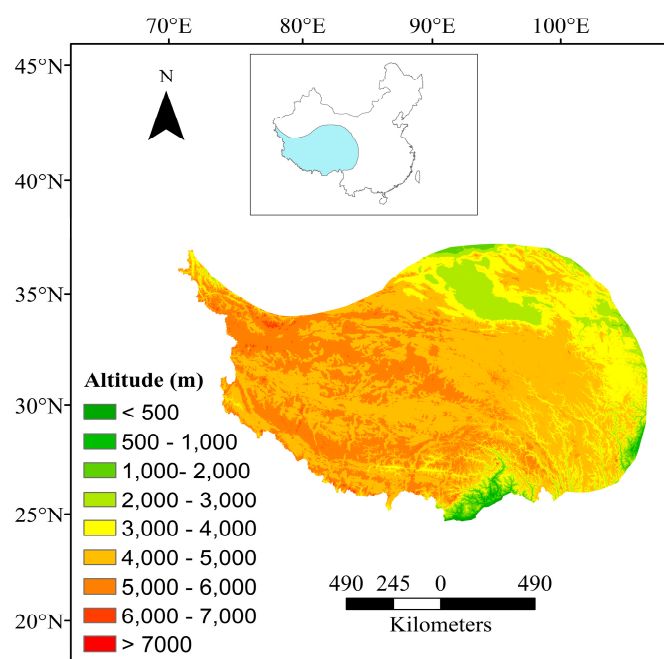


Figure S1. The map of altitude for the Tibetan Plateau.

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