

Estimating China's population over 21st century under climate change: Spatially explicit scenarios consistent with the Shared Socioeconomic Pathways (SSPs)

Supplementary information

Figures

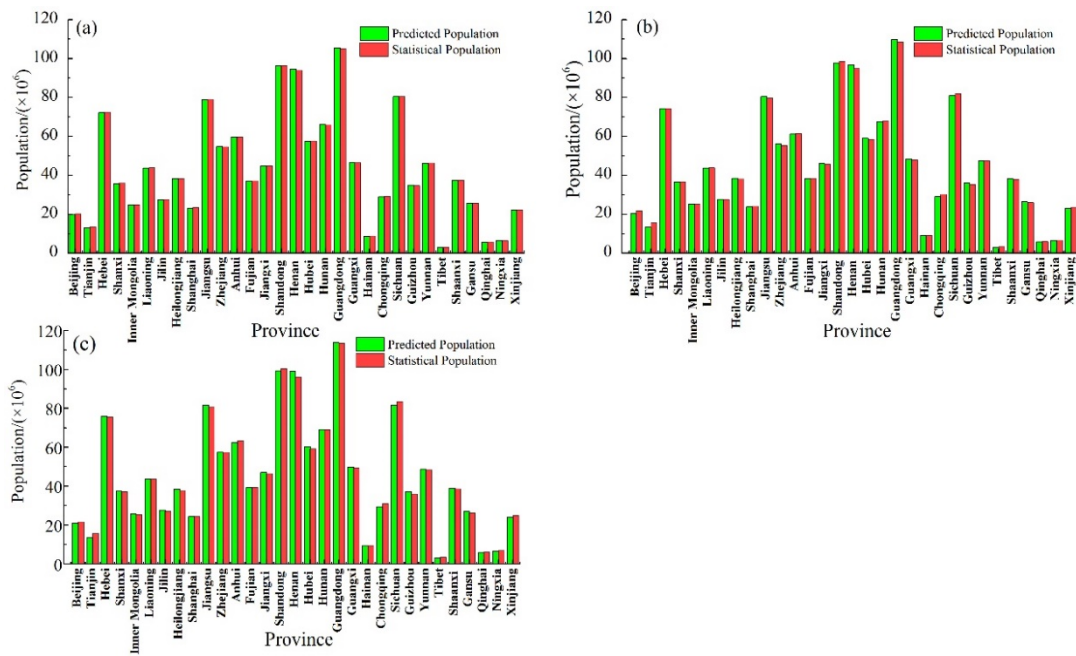


Figure S1 Comparison of the population projections for China in the SSP2 scenario and the statistical values of the total population: (a) 2011; (b) 2015; (c) 2018.

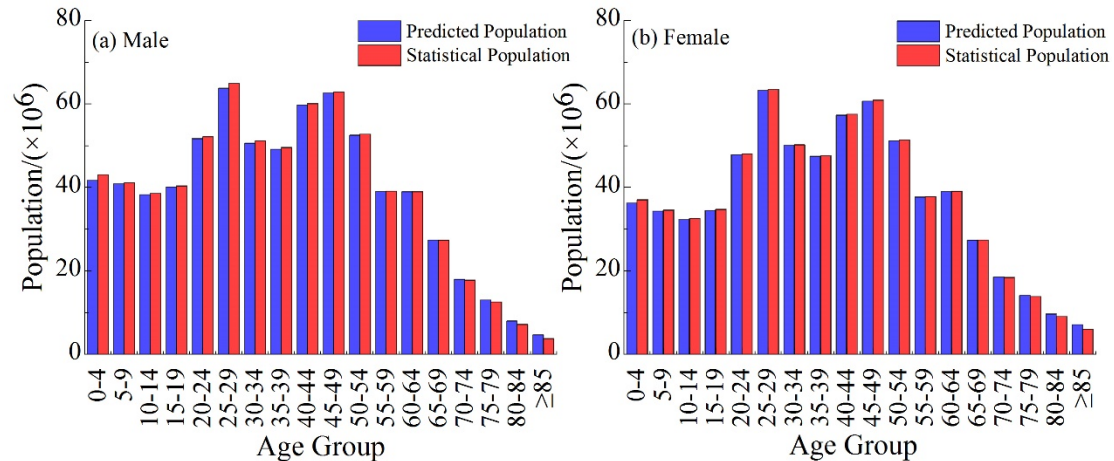


Figure S2 Comparison of population projections of 18 age groups in China in 2015 in the SSP2 scenario and in the statistical data: (a) men; (b) women.

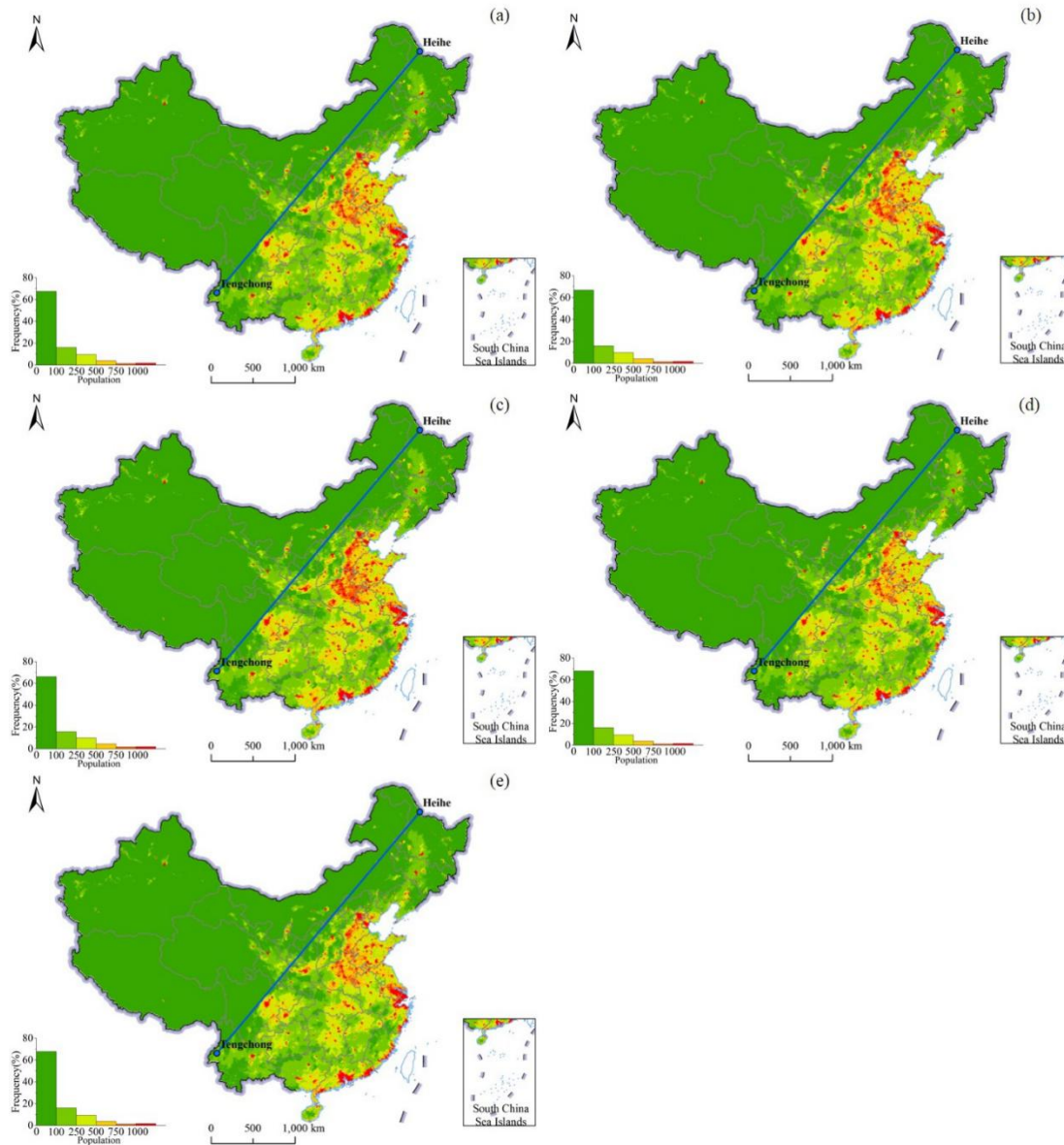


Figure S3 Spatial distribution of population projections for China in 2050 under the five shared socioeconomic pathways (SSPs): (a) SSP1; (b) SSP2; (c) SSP3; (d) SSP4; (e) SSP5 (Blue line is the Hu line, an imaginary line that diagonally divides the area of China into two parts, stretching from the city of Heihe in Heilongjiang Province to Tengchong in Yunnan Province, which is also called the “geo-demographic demarcation line”).

Tables

Table S1 Total fertility rate of China under different assumptions during 2011-2050

Fertility	Low	Medium	High
2011-2015	1248-1520	1264-1600	1280-1680
2016-2020	1550-1670	1675-1850	1752-2040
2021-2025	1642-1530	1840-1800	2046-2070
2026-2030	1512-1440	1800	2088-2160
2031-2035	1436-1420	1800	2164-2180
2036-2040	1416-1400	1800	2184-2200
2041-2045	1394-1370	1800	2206-2230
2046-2050	1366-1350	1800	2234-2250

Table S2 Low assumption: Fertility rate of women of childbearing age by age group (%)

Age group	15-19	20-24	25-29	30-34	35-39	40-44	45-49
2015	7.63	89.40	108.21	58.99	24.08	9.66	6.02
2020	8.38	98.23	118.88	64.81	26.45	10.62	6.62
2025	7.68	89.99	108.92	59.38	24.24	9.73	6.06
2030	7.23	84.70	102.51	55.89	22.81	9.16	5.71
2035	7.13	83.52	101.09	55.11	22.49	9.03	5.63
2040	7.03	82.35	99.66	54.34	22.18	8.90	5.55
2045	6.88	80.58	97.53	53.17	21.70	8.71	5.43
2050	6.78	79.40	96.10	52.40	21.39	8.58	5.35

Table S3 Medium assumption: Fertility rate of women of childbearing age by age group (%)

Age group (Years)	15-19	20-24	25-29	30-34	35-39	40-44	45-49
2015	8.03	94.11	113.90	62.10	25.35	10.17	6.34
2020	9.29	108.81	131.70	71.80	29.31	11.76	7.33
2025-2050	9.04	105.87	128.14	69.86	28.51	11.45	7.13

Table S4 High assumption: Fertility rate of women of childbearing age by age group (%)

Age group (Years)	15-19	20-24	25-29	30-34	35-39	40-44	45-49
2015	8.43	98.81	119.60	65.20	26.61	10.68	6.66
2020	10.24	119.99	145.22	79.18	32.32	12.97	8.08
2025	10.39	121.75	147.36	80.34	32.79	13.16	8.20
2030	10.84	127.05	153.77	83.83	34.22	13.73	8.56
2035	10.95	128.22	155.19	84.61	34.53	13.86	8.64
2040	11.05	129.40	156.61	85.38	34.85	13.99	8.72
2045	11.20	131.16	158.75	86.55	35.33	14.18	8.84
2050	11.30	132.34	160.17	87.33	35.64	14.31	8.92

Table S5 Provinces grouping with different educational attainment

Education attainment	Province
low	Chongqing, Xinjiang, Ningxia, Hainan, Qinghai, Jiangxi, Tibet, Yunnan, Gansu, Guizhou
medium	Hebei, Hubei, Heilongjiang, Henan, Hunan, Sichuan, Anhui, Guangxi, Shaanxi, Jilin, Shanxi
high	Shanghai, Beijing, Tianjin, Zhejiang, Jiangsu, Guangdong, Inner Mongolia, Shandong, Liaoning, Fujian

Table S6 Evaluation of total population errors during 2011–2019.

Year	Predicted pollution ($\times 10^6$)	Statistical pollution ($\times 10^6$)	Relative error (%)
2011	1339.65	1347.35	0.57
2012	1347.79	1354.04	0.46
2013	1353.96	1360.72	0.50
2014	1361.67	1367.82	0.45
2015	1370.86	1374.62	0.27
2016	1381.36	1382.71	0.10
2017	1393.14	1390.08	0.22
2018	1400.00	1395.38	0.33
2019	1408.30	1400.05	0.59

Table S7 Correlation between the statistical evaluation indicators of the predicted and statistical total populations during 2011–2019.

Year	R^2	$RMSE (\times 10^9)$	NSE	RSR	$PBIAS$
2011–2019	0.99	0.01	0.89	0.33	0.13

Table S8 Statistical evaluation indicators of provincial population in 2011, 2015, and 2018.

Year	R^2	$RMSE (\times 10^6)$	NSE	RSR	$PBIAS$
2011	1.00	0.20	1.00	0.01	0.06
2015	1.00	0.75	1.00	0.03	0.00
2018	1.00	0.97	1.00	0.03	−0.25

Table S9 Statistical evaluation indicators of 18 different age groups and two genders in the population of China in 2015.

Gender	R^2	$RMSE (\times 10^6)$	NSE	RSR	$PBIAS$
Men	1.00	0.59	1.00	0.03	0.46
Women	1.00	0.39	1.00	0.02	0.13

Table S10 Values of the statistical evaluation indicators at the county level following spatialization.

Year	R^2	$RMSE (\times 10^6)$	NSE	RSR	$PBIAS$
2015	0.90	0.14	0.90	0.32	0.08