# Supplementary Information

## Table S1. Biome assignment rules in BIOME4 (ajusted from Dallmeyer et al., 2017)

| NO. | BIOME | Domain PFT | Subpft | Additional Environment Limits | Mega-biomes |
|---|---|---|---|---|---|
| 1 | **Tropical evergreen forest** | Tropical evergreen trees | - | - | ***Tropical forest*** |
| | | Tropical deciduous trees | - | number of green days>300 | |
| 2 | **Tropical semi-deciduous forest** | Tropical deciduous trees | - | 250<number of green days<300 | |
| 3 | **Tropical deciduous forest/woodland** | Tropical deciduous trees | - | number of green days<250 | |
| 4 | **Temperate deciduous forest** | Temperate deciduous trees | No temperate broadleaved or boreal evergreen tree present | - | ***Temperate Forest*** |
| | | Temperate deciduous trees | Boreal evergreen trees present | Twm>21 | |
| | | Boreal evergreen trees | Temperate deciduous trees present | GDD5>900 and Tcm>-19, Twm>21 | |
| | | Boreal deciduous trees | Temperate deciduous trees | - | |
| 5 | **Temperate conifer forest** | Cool conifer | No temperate broadleaved trees present, no boreal deciduous trees subdominant | - | |
| | | Cool conifer | Temperate deciduous trees with nearly similar NPP | - | |
| 7 | **Cool mixed forest** | Temperate deciduous trees | Boreal evergreen trees present | Twm<21 and Tcm>-15 | |
| | | Boreal evergreen trees | Temperate deciduous trees present | GDD5>900 and Tcm>-19, Twm<21 | |
| 8 | **Cool conifer forest** | Boreal evergreen trees | No temperate deciduous trees present | GDD5>900 and Tcm>-19 | |
| 16 | **Temperate broadleaved savanna** | Shrubs | Temperate deciduous trees present | - | |
| 6 | **Warm mixed forest** | Temperate broadleaved trees | - | - | ***Warm mixed forest*** |
| | | Temperate deciduous trees | No boreal trees, but temperate broadleaved trees present | - | |
| | | Temperate deciduous trees | No boreal trees, but cool conifer present | Tcm>3 and GDD5>3000 | |
| | | Cool conifer | Temperate broadleaved trees present | - | |
| 9 | **Cold mixed forest** | Temperate deciduous trees | Boreal evergreen trees present | Twm<21 and Tcm<-15 | ***Boreal forest*** |
| | | Cool conifer | Boreal deciduous trees | - | |
| | | Boreal evergreen trees | Temperate deciduous trees present | GDD5<900 and Tcm<-19 | |
| | | Boreal deciduous trees | Cool conifer | - | |
| | | Boreal deciduous trees | - | GDD5>900 and Tcm>-19 | |
| 10 | **Evergreen taiga/montane forest** | Boreal evergreen trees | No temp deciduous trees present | GDD5<900 and Tcm<-19 and NPP>350 | |
| | | Boreal deciduous trees | Boreal evergreen trees | - | |
| 11 | **Deciduous taiga/montane forest** | Boreal deciduous trees | No temperate deciduous or cool conifer | GDD5<900 and Tcm<-19 | |
| 18 | **Boreal parkland** | Boreal evergreen tress | - | GDD5<900 and Tcm<-19 and NPP<350 | |
| | | Shrubs | Boreal trees present | Twm<21 | |
| | | Boreal deciduous trees | - | - | |
| 13 | **Tropical xerophytic shrubland** | Woody desert | - | grass LAI>1 and Tmin>0 | ***Grassland and*** |
| | | Shrubs | Tropical trees present | woody LAI<4 | |
| 14 | **Temperate sclerophyll woodland** | Shrubs | Temperate broadleaved trees present | - | |

| | | | | | |
|---|---|---|---|---|---|
| **19** | **Tropical grassland** | C4 tropical grass | - | - | ***dry shrubland*** |
| **20** | **Temperate grassland** | C3/C4 temperate grass | - | GDD0>800 | |
| **12** | **Tropical savannah** | Shrubs | Tropical trees present | woody LAI>4 | ***Savanna and dry woodland*** |
| **15** | **Temperate xerophytic shrubland** | Woody desert | - | grass LAI>1 and Tmin<0 | |
| **17** | **Open conifer woodland** | Shrubs | Cool conifer present | - | |
| **21** | **Desert** | Woody desert | - | grass LAI<1 | ***Desert*** |
| | | Temperate or Tropical trees or conifer | - | NPP<100 | |
| | | C3/C4 temperate grass | No boreal trees present | - | |
| **22** | **Steppe–tundra** | C3/C4 temperate grass | - | GDD0<800 | ***Tundra*** |
| | | Cold herbaceous | - | - | |
| **23** | **Shrub tundra** | Tundra shrub | - | GDD0>500 | |
| **24** | **Dwarf shrub tundra** | Tundra shrub | - | 200<GDD0<500 | |
| **25** | **Prostrate shrub tundra** | Tundra shrub | - | GDD0<200 | |
| **26** | **Cushion forb lichen moss tundra** | Lichen/forb | - | - | |

## Table S2. Transfer matrix from BIOME4 typology to the pollen biome scores

| BIOME4 type | Pollen biome type | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL DE | CL MX | CO CO | CO MX | DE SE | ST EP | TA IG | TE DE | TU ND | XE RO | HO DE | SA VA | TD FO | TR FO | TS FO | WA MX | TX WS |
| **TrEgFo** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 15 | 10 | 0 | 0 |
| **TrSeDeFo** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 15 | 0 | 5 |
| **TrDeFo** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 15 | 5 | 10 | 0 | 0 |
| **TdDeFo** | 0 | 5 | 5 | 10 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TeCoFo** | 0 | 0 | 15 | 10 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **WaMxFo** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 15 | 0 |
| **CoMxFo** | 0 | 0 | 10 | 15 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CoCoFo** | 0 | 0 | 15 | 10 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ClMxFo** | 10 | 15 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EgTaig** | 5 | 10 | 5 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **DeTaig** | 10 | 5 | 0 | 0 | 0 | 0 | 15 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TrSav** | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 15 | 5 | 0 | 0 | 0 | 10 |
| **TrXsSl** | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **TeXsSl** | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| **TeScWo** | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 15 | 0 | 5 | 0 | 0 | 0 | 10 | 0 |
| **TeBlSav** | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | 15 | 0 | 0 | 0 | 5 | 0 |
| **OpCoWo** | 0 | 0 | 10 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BoprKl** | 0 | 0 | 5 | 0 | 0 | 10 | 10 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TrGrl** | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 |
| **TeGrlc** | 0 | 0 | 0 | 0 | 5 | 15 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TeGrlw** | 0 | 0 | 0 | 0 | 5 | 15 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 0 |
| **HotDesert** | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Desert** | 0 | 0 | 0 | 0 | 15 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ShTund** | 5 | 0 | 0 | 0 | 0 | 14 | 5 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **DShTund** | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **PsShTund** | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **FoLimoss** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Barren** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **LIce** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

We divided temperate grassland into cool temperate grassland (TeGrlc) and warm temperate grassland (TeGrlw), and desert into cold desert (Desert) and hot desert (Hot Desert), based on the minimum temperature (22$^{o}$C) of the mean temperature of the warmest month (Prentice et al. 1992).

Pollen biome types: CLDE cold deciduous forest; CLMX cold mixed forest; COCO cool coniferous forest; COMX cool mixed forest; DESE desert; HODE hot desert; SAVA savanna; STEP steppe; TAIG taiga; TDFO tropical dry forest; TEDE temperate deciduous forest; TRFO tropical rain forest; TSFO tropical seasonal forest; TUND tundra; TXWS tropical xerophytic woods/scrub; WAMX broadleaved evergreen/warm mixed forest; XERO xerophytic woods/scrub.
BIOME4 types: Barren barren land; BoPrkl boreal parkland; ClMxFo cold mixed forest; CoCoFo cool evergreen needleleaf forest; CoMxFo cool mixed forest; Desert desert; DeTaig cold deciduous forest; DshTund erect dwarf-shrub tundra; EgTaig cold evergreen needleleaf forest; FoLiMoss cushion-forb lichen, and moss tundra; HotDesert hot desert; LIce land ice; OpCoWo temperate evergreen needleleaf open woodland; PsShTund prostrate dwarf-shrub tundra. ShTund low and high shrub tundra; TeBlSav temperate deciduous broadleaved savanna; TeCoFo temperate evergreen needleleaf forest; TeDeFo temperate deciduous broadleaf forest; TeGrlc cool temperate grassland, TeGrlw warm temperate grassland; TeScWo temperate sclerophyll woodland and shrubland; TeXsSl temperate xerophytic shrubland; TrDeFo tropical deciduous broadleaf forest and woodland; TrEgFo tropical evergreen broadleaf forest; TrGrl tropical grassland; TrSav tropical savanna; TrSeDeFo tropical semi-evergreen broadleaf forest; TrXsSl tropical xerophytic shrubland; WaMxFo warm-temperate evergreen broadleaf and mixed forest.

**Table S3. The ranges of input parameters for simulation at modern, mid-Holocene periods**

| *Parameter* | *Modern* | *Mid-Holocene* |
|---|---|---|
| $\Delta Tjan$ | [-10,10]℃ | [-10,10]℃ |
| $\Delta Tjul$ | [-10,10]℃ | [-10,10]℃ |
| $\Delta Pjan$ | [-90,100]% | [-90,100]% |
| $\Delta Pjul$ | [-90,100]% | [-90,100]% |
| $CO_2$ | 340ppmv | 270ppmv |
| *Iterative number* | 2000 | 3000 |

## Table S4. Climate change during mid-Holocene derived from IVM at each pollen site

| *Site* | *Biome* | *AnnT1* | *AnnT* | *AnnT2* | *AnnP1* | *AnnP* | *AnnP2* | *MTCO1* | *MTCO* | *MTCO2* | *MTWA1* | *MTWA* | *MTWA2* | *Pjan1* | *Pjan* | *Pjan2* | *Pjul1* | *Pjul* | *Pjul2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sujiawan** | COMX | -6 | -3.6 | -1.1 | -131 | 152 | 332 | -8.6 | -4 | 1.9 | -5.6 | -3.4 | -0.3 | -81 | 18.5 | 99.8 | -47 | 36.3 | 94 |
| **Xiaogou** | COMX | -5.5 | -2.8 | -1.2 | 3.1 | 169 | 358 | -7.8 | -1.4 | 2.7 | -5.5 | -3.7 | -1.2 | -79 | 20.4 | 91.8 | 1.5 | 44.7 | 96.3 |
| **Dadiwan** | STEP | -3.3 | -0.5 | 1.9 | -105 | 210 | 450 | -0.4 | 4.6 | 6.6 | -8.1 | -4 | 0.5 | -86 | 5.3 | 85 | -20 | 40.2 | 94.7 |
| **Sanjiaocheng** | DESE | -7.6 | -3 | -1 | 135 | -99 | 848 | -9.8 | 0.1 | -3 | -9.6 | -5.1 | 1.5 | -80 | 13.5 | 98 | 0 | -99 | 90.1 |
| **Chadianpo** | TEDE | -8.5 | -3.1 | -5.1 | -150 | 347 | 438 | -9.9 | -0.8 | -0 | -9.6 | -4.7 | -6.2 | -76 | 5.3 | 99.6 | -39 | 71.6 | 78.2 |
| **Qindeli** | COMX | -3.3 | 2.9 | 1 | -399 | 287 | 1361 | -5.5 | 7.5 | 1.7 | -2.8 | 0.3 | 2.8 | -77 | 18.8 | 80.6 | -30 | 47.4 | 97.1 |
| **Fuyuanchuangye** | TEDE | -9.1 | 6 | -2.1 | -181 | 312 | 296 | -9.7 | 6.9 | 1.1 | -9.8 | 5.5 | -2.7 | -86 | 1.4 | 97.4 | -62 | 54.2 | 98.8 |
| **Jingbo Lake** | TEDE | -6.8 | 4.2 | 1.2 | -26.3 | 362 | 397 | -9.9 | 6 | 7.3 | -6.1 | 3.1 | -1.5 | -178 | 25.8 | 198 | -32 | 73.1 | 191 |
| **Hani Lake** | TEDE | -7.6 | 4.7 | 1.4 | -139 | 295 | -26 | -7.9 | 5.8 | 8.2 | -9.8 | 4 | 0.3 | -164 | 26.6 | 199 | -179 | 39.9 | -17 |
| **Jinchuan** | TEDE | -7.2 | 4.4 | -0.3 | 237.5 | 361 | 441 | -9.9 | 5.3 | 6.2 | -9.5 | 3.8 | 0 | -56 | 16 | 96.2 | 44.1 | 53.1 | 98.2 |
| **Maar Lake** | TEDE | 2.2 | 4.7 | 4.4 | 0 | 388 | 622 | 5.6 | 6.6 | 9.6 | -1.3 | 3.5 | 2 | -59 | 17.2 | 90 | 0 | 53.6 | 99.9 |
| **Maar Lake** | TEDE | 3.1 | 4.6 | 8.8 | 156.5 | 387 | 486 | 4.1 | 6.6 | 8.2 | 1.4 | 3.5 | 9.1 | -75 | 13.3 | 99.6 | 32.1 | 53.3 | 98.6 |
| **Xie Lake SO4** | WAMX | 1.9 | -1 | 7.7 | 253.3 | 363 | 491 | 2 | -1.6 | 9.6 | -0.2 | -0.7 | 8.7 | -53 | 10.9 | 93.9 | 51.4 | 64.3 | 99.6 |
| **Nanhuiheming Core** | WAMX | 1.3 | 1.8 | 7.1 | -98.9 | 472 | 651 | 2.2 | 1.3 | 8.5 | 0 | 2.2 | 6.5 | -89 | -0.6 | 89.6 | -18 | 43.5 | 95.2 |
| **Toushe** | WAMX | 1.1 | -2.1 | 7.2 | 17.9 | 963 | 560 | 2.5 | -3.9 | 8.4 | -0.4 | -1.1 | 7.5 | -86 | -6.5 | 97 | 13.9 | 13.7 | 86.3 |
| **Dongyuan Lake** | WAMX | 2.4 | 3.1 | 7.3 | 66.9 | -159 | 692 | 4.8 | 4.1 | 9 | 0 | 2.5 | 6.9 | -85 | 8.7 | 89.6 | 4.9 | -8.4 | 89.9 |
| **YonglongCY** | WAMX | 2.3 | 1 | 7.3 | 68.7 | 353 | 690 | 4.7 | 2.3 | 9 | -0.1 | 0.2 | 6.9 | -72 | 9.2 | 92.5 | 5.2 | 38.4 | 91.6 |
| **Hangzhou HZ3** | TEDE | -4.4 | -4.4 | 2.5 | 209.4 | 487 | 549 | -8.3 | -7.7 | 6.6 | -5.5 | -2.6 | 3.1 | -81 | 6.6 | 99.2 | 39.9 | 43.7 | 92.2 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Xinhua XH1** | WAMX | -2.8 | 1.7 | 6.1 | -14.2 | 408 | 1054 | -3.4 | 4.4 | 7.5 | -3.2 | 0 | 7.9 | -75 | 20.2 | 97.7 | -18 | 59.3 | 98.6 |
| **ZK01** | WAMX | -5.4 | 2.5 | 2.2 | -437 | 428 | 2847 | -6.9 | 2.2 | 0 | -6.8 | 2.6 | 6.4 | -78 | 17.8 | 96 | -43 | 46.5 | 89.7 |
| **Chifeng** | TEDE | -0.4 | 1 | 5.6 | -1704 | -67 | 2642 | -0.1 | 7.5 | 6 | -1.3 | -2.8 | 5.3 | -48 | 25 | 77.9 | -63 | -20 | 67.6 |
| **SZK1** | WAMX | -3.1 | -2.3 | 4.3 | -50.2 | 396 | 770 | -1.6 | -2.8 | 7.1 | -4.6 | -2 | 5.1 | -84 | 11.4 | 97.6 | -14 | 32.9 | 91 |
| **Gucheng** | WAMX | -9.3 | 1.8 | 0.3 | 36.5 | 530 | 1126 | -9.7 | 2.4 | -4 | -9.7 | 1.5 | 3.4 | -82 | 12.8 | 95.7 | -14 | 50.4 | 97.4 |
| **Lulong** | TEDE | -1.6 | -1.3 | 4.2 | 174.1 | 361 | 613 | 0 | 1.1 | 8.3 | -3.9 | -2.7 | 6 | -83 | -4 | 95.5 | 0 | 68.7 | 89.1 |
| **Hulun Lake** | STEP | -1 | 6.6 | 6 | -199 | 128 | 990 | -1.4 | 5.8 | 4.9 | -3.9 | 7.1 | 7.9 | -90 | 13 | 97.2 | -43 | 51.5 | 97.7 |
| **CH-1** | WAMX | 1 | 1.9 | 1 | -67 | 430 | -67 | 7.5 | 2.5 | 7.5 | -2.8 | 1.6 | -2.8 | -2.1 | -2.1 | -2.1 | -20 | 46.8 | -20 |
| **Sanyi profile** | STEP | -5.8 | 5.5 | 1 | -211 | 184 | 1260 | -9.5 | 1.9 | 2.5 | -5.4 | 7.6 | 1.6 | -87 | 8.2 | 97.8 | -34 | 64 | 93.3 |
| **Xiaoniuchang** | COMX | -2.9 | 1.8 | 6.5 | 0 | 203 | 927 | -1.7 | 6.3 | 5.4 | -4.4 | -0.9 | 7.7 | -83 | 22 | 90.6 | 7.2 | 56.3 | 98.3 |
| **Haoluku** | COMX | -4.6 | 1.8 | 1.1 | 75.7 | 138 | 457 | -4.5 | 6.6 | 7.3 | -4.5 | -1 | 0.7 | -88 | 0.8 | 80.4 | 10.3 | 39.6 | 91.5 |
| **Liuzhouwan** | COMX | 2.9 | 2.5 | 9 | 0 | 195 | 214 | 2 | 5.7 | 9.4 | 3.4 | 0.7 | 9.9 | -79 | 26.1 | 95.9 | 0 | 53.9 | 89.3 |
| **Poyang Lake 103B** | WAMX | -2.9 | 1.9 | 6.2 | -57.6 | 303 | 928 | -1.8 | 0.8 | 8.7 | -4.5 | 2.5 | 7.6 | -88 | 6.4 | 99.5 | -21 | 20.9 | 97.5 |
| **Baiyangdian** | TEDE | 1.5 | -2 | 7.5 | 39.7 | 262 | 273 | -3.2 | 0.4 | 8.4 | 4.6 | -3.4 | 9.1 | -90 | -0.1 | 84.7 | 10 | 41.9 | 98 |
| **Bayanchagan** | TEDE | 1.3 | 2.9 | 2.6 | 92.6 | 176 | 320 | 4.3 | 4.5 | 9.1 | -1.9 | 1.9 | -0.1 | -79 | 16.7 | 90.1 | 16.1 | 45.4 | 99.6 |
| **Huangjiapu** | STEP | 0 | 2.8 | 2.5 | -58.4 | 101 | 210 | 2.5 | -0.7 | 8.7 | -1.8 | 4.8 | 0 | -43 | 31.4 | 79.4 | -25 | 21.2 | 65.3 |
| **Dingnan** | TSFO | 0 | 4.6 | 3.2 | 94.7 | 500 | 289 | 3.4 | 5.4 | 7.4 | -1.9 | 4.2 | 1.7 | -40 | 33.5 | 99.6 | 28.3 | 34 | 84.6 |
| **Guang1** | STEP | -0.5 | 2.5 | 4.6 | -597 | 126 | 1300 | -5.8 | 1.9 | 4.7 | -1.9 | 2.8 | 5.9 | -73 | 14.2 | 99.3 | -71 | 27.3 | 100 |
| **Anguliano** | COMX | -4.5 | 0.3 | 0.7 | 3.8 | 180 | 528 | -5.7 | 4 | 8.5 | -4.9 | -1.9 | -0.7 | -84 | 5.9 | 90.8 | 3.1 | 54.6 | 91.8 |
| **Yangyuanxipu** | STEP | 2.9 | 1.6 | 2.9 | 175.5 | 132 | 176 | 4.5 | -1.8 | 4.5 | 1.9 | 3.6 | 1.9 | 21.1 | 21.1 | 21.1 | 45.4 | 34.1 | 45.4 |
| **Shenzhen Sx07** | WAMX | -1 | -2.6 | 6.1 | -4 | 550 | 262 | -5.7 | -5.3 | 5.4 | -0.4 | -1 | 9.5 | -76 | 5.7 | 96.4 | -5.5 | 29.5 | 50.1 |
| **GZ-2** | TSFO | 2 | 3 | 8.2 | -32.4 | 437 | 1075 | 0.5 | 3.6 | 9.2 | 0 | 2.6 | 8.5 | -60 | 18.1 | 69.2 | -28 | 36.6 | 95.2 |
| **Daihai99** | COMX | -2.7 | -0.7 | 6.5 | -97.2 | 212 | 384 | -5.5 | 3.9 | 9.7 | -3.9 | -3.5 | 9.4 | -86 | 5.3 | 98.2 | -26 | 67 | 88.7 |

| a | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Daihai** | COMX | -1 | -1.1 | 2.5 | 86.1 | 161 | 333 | 1 | 3.9 | 7.5 | -3.5 | -4.2 | 0.5 | -79 | -5.7 | 91.2 | 25.4 | 50.1 | 99 |
| **Sihenan profile** | STEP | -2 | 1.1 | 5.6 | -45.2 | 81.9 | 243 | -7.3 | 1.9 | 6.1 | 0 | 0.6 | 6.6 | -81 | 1.5 | 89.7 | -13 | 19.9 | 65.9 |
| **Diaojiaohaizi** | COMX | -6 | 2.5 | 2.3 | -495 | 225 | 1686 | -9.8 | 4.7 | 0 | -7.2 | 1.2 | 5.7 | -58 | 28.6 | 99.4 | -47 | 67.1 | 96.4 |
| **Ganhaizi** | TEDE | 0 | 4.6 | 6.2 | -194 | 399 | 902 | -0.9 | 3.8 | 8.8 | -1.7 | 5.1 | 8.2 | -76 | -30.9 | 17 | -12 | 79.3 | 75.8 |
| **Jiangling profile** | WAMX | -2.6 | 1.1 | 1.5 | 93.6 | 413 | 289 | -0.7 | 3.8 | 7.8 | -5 | -0.7 | -1.2 | -87 | 7.4 | 92.1 | 27.7 | 43.9 | 91.4 |
| **Helingeer** | DESE | -2.7 | -2.2 | 0.8 | -135 | -220 | 313 | 0 | -0.4 | 8.4 | -5 | -3.2 | -3.4 | -84 | 12 | 96.3 | -46 | -76 | 91.6 |
| **Shennongjia2** | WAMX | -2.5 | 1.3 | 4.9 | -88.6 | 558 | 257 | -3.7 | -2 | 6.6 | -4 | 3.1 | 5.8 | -83 | -4.5 | 92.1 | -27 | 31.3 | 63.9 |
| **Huguangyan Maar Lake B** | TSFO | 1.1 | 0.2 | 4.4 | 103.9 | 969 | 326 | 0 | 0.5 | 8.7 | -0.1 | 0.1 | 2.7 | -80 | 6.7 | 94.8 | 21.8 | 56.8 | 97 |
| **Yaoxian** | STEP | 2.8 | -0.1 | 7.1 | 318.1 | -338 | 484 | -2.1 | 1.1 | 9.6 | 2.6 | -1 | 9.2 | -83 | 13.2 | 84.6 | 59.2 | -51 | 95.9 |
| **Jixian** | STEP | -3.2 | 2.8 | 5.2 | 35.9 | -38 | 795 | -0.7 | 0.3 | 8.3 | -7.4 | 4.2 | 5.2 | -82 | 11.9 | 95.4 | -14 | -7 | 98.3 |
| **Shennongjia Dajiu Lake** | TEDE | -7.8 | 1.2 | 1.7 | -274 | 365 | -177 | -8.3 | 0.2 | 8 | -7.6 | 1.7 | 1 | -88 | -6.7 | 95.6 | -90 | 18.8 | -56 |
| **Qigainur** | DESE | -1.7 | -1.5 | 4.8 | -725 | -217 | 1782 | -9.8 | 2.4 | 6.5 | -2 | -4 | 9.7 | -89 | 10.1 | 97.8 | -52 | -76 | 99.6 |
| **Beizhuangcun** | STEP | -4 | 1 | 3.3 | 108.2 | -44 | 1636 | -4.2 | -1 | 5.7 | -4.3 | 2.1 | 4.6 | -9.6 | 48.5 | 93.5 | 0 | -6.7 | 98.1 |
| **Lantian** | STEP | -3.7 | 3.2 | 2.6 | -442 | -95 | -146 | -8.8 | 3.6 | 7.7 | -4.5 | 3 | 2 | -85 | 14.3 | 88.2 | -70 | -17 | -15 |
| **Bahanniao** | COMX | -2.4 | -1.2 | 5.9 | -209 | -10 | 59.3 | -7.8 | 3.1 | 6.2 | 0 | -4 | 9 | -77 | 3.4 | 98.1 | -51 | -4 | 21.1 |
| **Midiwan** | STEP | -2.6 | 3 | 5 | -776 | 109 | 1847 | -6.1 | -0.5 | 5.7 | -5.3 | 5 | 7.3 | -88 | 10.9 | 96.5 | -49 | 28.8 | 99.5 |
| **Jinbian** | STEP | -6.7 | 1 | 1.7 | -263 | -141 | -144 | -3.1 | 1.3 | 7.1 | -9.6 | 0.8 | 0.6 | -86 | -8.7 | 78.6 | -89 | -28 | -56 |
| **Xindian** | STEP | -4.3 | 1.9 | 4.9 | -164 | 58.8 | 96 | -7 | -1.4 | 6.8 | -3.2 | 3.8 | 8.4 | -90 | -5.3 | 97.1 | -43 | 11.7 | 24.6 |
| **Nanguanzhuang** | STEP | -1.3 | 3.4 | 6.1 | -319 | 32.4 | 91.9 | -1.2 | 4 | 9.7 | -2.7 | 3 | 7.8 | -82 | 7.5 | 99.7 | -66 | 6.1 | 31.7 |
| **Xifeng** | TEDE | -4.1 | 2.1 | 1.2 | -158 | 380 | 258 | -3.3 | 4.7 | 8 | -6.2 | 0.4 | -2 | -87 | 1.9 | 87.1 | -69 | 65.1 | 94.3 |
| **Jiyuan** | DESE | -0.9 | 1.4 | 5.8 | -3.3 | -445 | 181 | -8.9 | 2.4 | 7.2 | 1.3 | 0.8 | 7.6 | -84 | -21.3 | 66.7 | -4.9 | -81 | 47.5 |
| **Jiacunyuan** | STEP | -2.3 | 4.6 | 3.1 | -256 | -252 | 35.6 | -7.5 | 3.8 | 7.2 | -2 | 5 | 2.9 | -84 | -2 | 86.9 | -66 | -31 | 6.7 |
| **Dadiwan** | STEP | -3.5 | 0.6 | 6.8 | -119 | 354 | 226 | -9.6 | 1.3 | 5.1 | -2.7 | 0.1 | 9.5 | -87 | -0.2 | 95.2 | -34 | 67.7 | 48.8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maying** | COMX | -1.5 | -2.9 | 6.9 | -179 | 118 | 174 | -2.3 | -2.9 | 8.8 | -2.3 | -2.9 | 7.5 | -83 | 1.7 | 99.3 | -42 | 25.4 | 42.6 |
| **Huiningxiaogou** | COMX | -2.2 | -3.4 | 7 | 71.9 | 84.3 | 594 | 3.3 | -2.2 | 6.4 | -6 | -4.2 | 8.3 | -69 | 11 | 92.3 | 14.7 | 22.8 | 99.3 |
| **Sujiawan** | COMX | -2.3 | -3.6 | 4.1 | -500 | 178 | -334 | -6.6 | -3.4 | 8.7 | -1.6 | -3.8 | 2.7 | -86 | -43.6 | 62.1 | -90 | 44.5 | -64 |
| **QTH02** | STEP | 0.7 | -1.7 | 7.8 | -408 | 186 | -86 | -1.6 | -1.9 | 9.6 | 0 | -1.6 | 9.6 | -88 | -20 | 66.7 | -77 | 145 | -13 |
| **Laotanfang** | STEP | -2.2 | 4.1 | 3.3 | 139 | 125 | 526 | -6.9 | -1.1 | 8.2 | -4.2 | 7 | 4 | -88 | 9.2 | 93.7 | 21.7 | 123 | 94.4 |
| **Hongshui River2** | STEP | -5.9 | 0.6 | -0.1 | -300 | 223 | 418 | -8.4 | 2 | 2.6 | -4.9 | -0.2 | 0 | -88 | 11.6 | 96.6 | -78 | 138 | 100 |
| **Ruoergai** | STEP | -5 | 4.7 | -1.4 | -223 | 106 | 332 | -5.9 | 1.9 | 3.9 | -5.7 | 6.3 | -2.2 | -87 | 7.4 | 95.9 | -72 | 26.1 | 98.3 |
| **Hongyuan** | TAIG | -6.1 | -3 | -0.7 | 16.6 | -31 | 386 | -8.5 | -2.6 | 2.3 | -6.3 | -3.3 | -1.1 | -87 | 9.5 | 99.1 | 0.8 | -8.9 | 96.2 |
| **Dahaizi** | TEDE | -4 | 3.4 | 1.1 | 72.1 | 261 | 257 | -5.7 | 6.1 | 2.4 | -4.3 | 1.9 | 0.6 | -150 | 6.9 | 200 | 65.7 | 73.5 | 194 |
| **Shayema Lake** | TEDE | 0.2 | -0.5 | 6.6 | 62.6 | 331 | 178 | -9 | 1.5 | 6.5 | 5.1 | -1.7 | 9.9 | -174 | -1.8 | 151 | 62.8 | 69 | 189 |
| **Luanhaizi** | COMX | -1.5 | 2.8 | 2.3 | 105.6 | 276 | 281 | -4.9 | 4 | 7.5 | -3.4 | 2 | 1.2 | -141 | 59.1 | 195 | 64.4 | 132 | 190 |
| **Lugu Lake** | WAMX | 0.5 | 1 | 7.6 | -65.8 | 380 | 269 | -5.4 | 1 | 8.6 | 2.8 | 0.9 | 8.8 | -88 | 9.3 | 95 | -33 | 67.9 | 68.5 |
| **Qinghai Lake** | STEP | -6.2 | 5.6 | -0.1 | -262 | 207 | 267 | -9.6 | 3.6 | 3.8 | -6 | 6.7 | -1.6 | -88 | 5.9 | 94.3 | -67 | 103 | 66.8 |
| **Dalianhai** | STEP | 1.2 | 3.3 | 3.9 | 115.9 | 98 | 318 | 1.8 | 3.2 | 7.7 | 0.6 | 3.3 | 2.6 | -74 | 37.8 | 97.6 | 20.9 | 44 | 94.5 |
| **Erhai ES Core** | WAMX | -2.5 | 4 | 0.9 | 112.9 | 540 | 438 | -1.9 | 3.9 | 4.2 | -4.1 | 4 | 0 | -23 | 18.4 | 94.6 | 16.9 | 39.7 | 97.8 |
| **Xianmachi profile** | TEDE | 0.1 | 4.8 | 4.5 | -6.1 | 350 | 424 | -3.3 | 5.6 | 8.4 | 0.4 | 4.4 | 4 | -146 | 53.7 | 199 | -12 | 70.4 | 194 |
| **TCK1** | COMX | -1.6 | 1.9 | 3.8 | 158.1 | 226 | 557 | -7.2 | -4.6 | 7.1 | -2.7 | 5.6 | 6.8 | -89 | -2.1 | 84.1 | 25.4 | 49 | 98.2 |
| **Yidun Lake** | COMX | 3.4 | 3.6 | 7.4 | 137.2 | 214 | 319 | -1.7 | 0.5 | 9 | 3.4 | 5.4 | 8.6 | -178 | -41.5 | 136 | 65.1 | 53 | 169 |
| **Kuhai lake** | STEP | 0.4 | 5.2 | 6 | -6.7 | 124 | 179 | -3.6 | 2.1 | 8.6 | -0.3 | 7.1 | 6.9 | -88 | -4.2 | 83.4 | -7.5 | 40.7 | 82.2 |
| **Koucha lake** | TUND | 0.6 | -3.2 | 6.2 | -123 | 77.2 | 1221 | 0 | -2.4 | 8.8 | 0 | -3.6 | 9 | -61 | 24.4 | 98.6 | -14 | 19.6 | 99.6 |
| **Hurleg** | STEP | 2.4 | 1.6 | 6.1 | 153.4 | 173 | 515 | 0.5 | 3.9 | 8.2 | 1.8 | 0.2 | 7.8 | -76 | 28.4 | 99.3 | 16.2 | 131 | 100 |
| **Basu** | COMX | 0 | 3.6 | 4.1 | 0 | 20.6 | 420 | -7.1 | 0.1 | 0.6 | 3.7 | 5.6 | 8 | -88 | 8.6 | 89.7 | -1.6 | 5.8 | 84.5 |
| **Tuolekule** | STEP | 0.7 | 2.6 | 5.1 | 16.1 | 169 | 313 | -5.5 | 4.1 | 5.2 | 2.8 | 1.7 | 8.3 | -81 | 12.4 | 91 | 8.1 | 138 | 92 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Balikun** | STEP | 2.1 | 1.3 | 7.5 | 5.4 | 167 | 264 | -3.4 | 2.7 | 9.5 | 2.9 | 0.4 | 9.4 | -77 | 4.5 | 93.3 | -1.4 | 132 | 85 |
| **Cuona** | TUND | -5.5 | -4.4 | -0.3 | -205 | 236 | 353 | -8.6 | -3.5 | 3.3 | -4.9 | -4.9 | -2.7 | -83 | 3.1 | 96.5 | -61 | 56.9 | 90.3 |
| **Dongdaohaizi2** | DESE | 0 | -3.5 | 3 | 17.3 | -67 | 243 | 0 | 0 | 7.4 | -0.5 | -5.7 | 1.4 | -150 | 7.4 | 199 | 0.7 | -82 | 178 |
| **Bositeng Lake** | STEP | 1.2 | 0.5 | 5.8 | -264 | 176 | 285 | -4.3 | 5.2 | 5.5 | 3.3 | -2.3 | 8.2 | -86 | -3.7 | 99.4 | -67 | 82.1 | 70.3 |
| **Cuoqin** | TUND | 1.1 | -3.9 | 4.3 | 88 | 1589 | 238 | 0.1 | -1.3 | 7.8 | -1.2 | -5.5 | 3.8 | -139 | 34.3 | 177 | 44.5 | 106 | 199 |
| **Yili** | STEP | -1 | -0.9 | 3.7 | 107 | 152 | 220 | -3.2 | 3.5 | 7.2 | -2.7 | -3.5 | 3.7 | -132 | 37.4 | 198 | 75.5 | 95.6 | 180 |
| **Bangong Lake** | STEP | -4.7 | 3.1 | -4.1 | 78 | 472 | 281 | -4.5 | -3 | -3 | -5 | 6.6 | -4.7 | 0 | 31.8 | 65.7 | 9.1 | 158 | 70.5 |
| **Shengli** | TEDE | -7.2 | 6.3 | 0.2 | -115 | 314 | 29.1 | -7.9 | 7.3 | 7.2 | -9.8 | 5.8 | -1.7 | -179 | -5.5 | 200 | -179 | 53 | 40.4 |
| **Qingdeli** | WAMX | -0.9 | 6.9 | 2 | 38 | 313 | 340 | 1.5 | 8.1 | 8.3 | -4 | 6.2 | -0.3 | -147 | 16 | 187 | 13.6 | 53.1 | 160 |
| **Changbaishan** | TEDE | -5.5 | 3.3 | -1.6 | 1490 | 344 | 1690 | -5.5 | 5 | 4.3 | -6.3 | 2.3 | -4.3 | 50.5 | 126 | 194 | 23.7 | 48.8 | 188 |
| **Liuhe** | COMX | -4 | 4.5 | 1.6 | 46.6 | 333 | 260 | -1.6 | 6.2 | 7.5 | -6.7 | 3.5 | 0 | -163 | -1.1 | 198 | 4.9 | 44.4 | 166 |
| **Shuangyang** | TEDE | 1.5 | 3.7 | 3.9 | 422.7 | 387 | 508 | -4.6 | 5.1 | 0 | 4.3 | 2.8 | 7.6 | 597 | 717 | 782 | 32.7 | 63.2 | 303 |
| **Xiaonan** | WAMX | 4.2 | 3.6 | 8.4 | -13.1 | 364 | 501 | 3.4 | 5.1 | 9.6 | 3.4 | 2.6 | 9 | -59 | 13.6 | 76.5 | -6 | 59.8 | 88.5 |
| **Tailai** | STEP | 4.1 | 2.8 | 8.1 | 27.6 | 162 | 466 | 4.6 | -0.7 | 9.4 | 2.8 | 4.8 | 9 | -87 | 13.9 | 96 | -1.1 | 40.9 | 89.5 |
| **Sheli** | STEP | 0.2 | 2.6 | 5.4 | 0 | 133 | 656 | 0.2 | -0.8 | 9.7 | -0.2 | 4.6 | 6.3 | -85 | -1.4 | 89.3 | -3.9 | 34.7 | 95.4 |
| **Tongtu** | STEP | 1.5 | 1.3 | 6.5 | 0.4 | 149 | 632 | 4.6 | -1.2 | 9.8 | 0 | 2.8 | 6.9 | -66 | 24.4 | 93.3 | 0 | 37.8 | 92.3 |
| **Yueyawan** | TEDE | 0 | -1.6 | 5.8 | 187.8 | 352 | 581 | 0.7 | -0.2 | 9.6 | -1.7 | -2.4 | 7.3 | -72 | 24.4 | 99.2 | 20.4 | 63.4 | 92 |
| **Beiwangxu** | TEDE | 0 | -1.9 | 7.2 | 91.9 | 354 | 594 | 0.2 | -1.3 | 8.8 | -1.4 | -2.3 | 6.8 | -84 | 12.6 | 99.7 | 17.1 | 64.9 | 99.1 |
| **East Tai Lake1** | WAMX | -1.2 | 2.9 | 6.9 | -67.5 | 475 | 402 | -7.7 | 0.6 | 9 | 0.8 | 4.1 | 8.2 | -88 | 8.4 | 99.2 | -24 | 47.5 | 98.3 |
| **Suzhou** | WAMX | -1.6 | -0.8 | 5.9 | -109 | 178 | 371 | -9.8 | 0.2 | 7.7 | 0.2 | -1.4 | 9.1 | -89 | 4.7 | 98.1 | -30 | 15.8 | 91.3 |
| **Sun-Moon Lake** | WAMX | -2.9 | -0.9 | 4.8 | -28 | 1008 | 318 | -9.8 | -2.7 | 6.7 | 0 | 0.1 | 4.8 | -76 | 19.5 | 95.9 | -15 | 28.8 | 78.4 |
| **West Tai Lake** | WAMX | -4.3 | 2.7 | 1 | 190.5 | 603 | 596 | -6.7 | 1.2 | 7 | -5.5 | 3.6 | 1.1 | -75 | 25.8 | 99.3 | 22.4 | 57.9 | 99.6 |
| **Changzhou** | WAMX | -6.1 | 1.6 | 1.5 | 165.3 | 315 | 578 | -9 | 2 | 8.1 | -5.6 | 1.4 | 1.5 | -75 | 15 | 98 | 24 | 30.7 | 99.4 |
| **Dazeyin** | TEDE | 0 | -0.6 | 5.7 | 10.9 | 370 | 992 | -1.7 | 1.4 | 3.5 | 0.5 | -1.8 | 7.7 | -81 | 15.2 | 89.4 | -5.3 | 73.2 | 95.2 |

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| **Hailaer** | STEP | -3.3 | 5.8 | 5.1 | -151 | 156 | 742 | -2.9 | 3.7 | 3.3 | -4.4 | 7 | 6.7 | -76 | 12.2 | 95.2 | -23 | 48.6 | 99.9 |
| **Cangumiao** | TEDE | -4.3 | -0.3 | 3.7 | -73.3 | 384 | 2336 | -5.5 | 2.6 | 0.5 | -5 | -2 | 6.2 | -75 | 19.3 | 93.9 | -33 | 70.4 | 94.3 |
| **Qianhuzhuang** | COMX | 0.1 | -3.5 | 4.9 | 203.9 | 296 | 1079 | -2.7 | 2.3 | 4.7 | 0 | -7 | 7.1 | -77 | 25.8 | 99.4 | -4.6 | 55.7 | 95.5 |
| **Reshuitang** | STEP | -3.4 | 2.3 | 5.9 | -155 | 78.5 | 909 | -2.1 | 4.4 | 6.2 | -6.1 | 1.1 | 8.7 | -87 | 13.9 | 88.9 | -31 | 29.3 | 97 |
| **Yangerzhuang** | TEDE | -3.7 | -1.8 | 1.9 | 84.4 | 381 | 524 | -5.1 | 0.8 | 8 | -4.4 | -3.4 | 1 | -70 | 13.7 | 96.5 | 10.2 | 67.7 | 99.6 |
| **Mengcun** | COMX | 3.4 | -2.9 | 7.9 | 2.3 | 283 | 296 | -2 | -0.3 | 8.4 | 5.3 | -4.5 | 7.9 | -87 | 29.5 | 73.3 | 0 | 53.1 | 97.7 |
| **Hanjiang-CH2** | WAMX | -3.2 | -3.6 | 2.9 | 105.2 | 294 | 558 | -4 | -4.9 | 7.6 | -4.3 | -2.8 | 2.5 | -88 | 19.3 | 97.1 | 18.2 | 18.7 | 99.7 |
| **Hanjiang-SH6** | TRFO | -6 | 3.7 | -1.3 | 147.4 | 934 | 464 | -4.4 | 3.6 | 7.4 | -9.3 | 3.8 | -4.9 | -90 | 4 | 96 | 24.1 | 57.4 | 86.8 |
| **Hanjiang-SH5** | WAMX | 0.6 | -4 | 4.3 | -18.6 | 346 | 179 | -3.3 | -4.6 | 9.1 | -0.9 | -3.6 | 3 | -84 | -5.2 | 69.5 | -14 | 20.9 | 69 |
| **Hulun Lake** | STEP | -5.6 | 4.9 | 1 | 131.2 | 266 | 528 | -7.4 | 1.6 | 7.2 | -5.9 | 6.9 | -0.1 | -89 | 25.3 | 95.3 | 17.2 | 115 | 99.1 |
| **Heitutang** | STEP | -5.4 | 3.2 | -1.3 | 103.9 | 112 | 492 | -6.8 | 0.7 | 5.7 | -8.1 | 4.6 | -0.8 | -88 | -5.5 | 97.7 | 22.3 | 31.9 | 92.8 |
| **Zhujiang delta PK16** | WAMX | -6.4 | -4 | 0.2 | -905 | 410 | 1589 | -9.8 | -5.4 | -0 | -7.5 | -3.2 | 1.9 | -75 | 11.4 | 97.1 | -82 | 23.1 | 99.9 |
| **Angulitun** | TAIG | 0 | -5 | 6.1 | 416.6 | 116 | 1285 | -1 | -2 | 8.6 | -0.2 | -6.9 | 7.8 | -16 | 38 | 84.7 | 20.7 | 36.1 | 97.4 |
| **Bataigou** | STEP | -6.2 | 4.1 | -2.2 | -450 | 138 | 1281 | -7.9 | 0 | -2 | -7.3 | 6.5 | 0 | -84 | 17 | 89.8 | -56 | 42.4 | 95 |
| **Dahewan** | STEP | 2.6 | 3.3 | 7.3 | 88 | 139 | 421 | -3.6 | -0.9 | 8.7 | 4.5 | 5.7 | 9 | -165 | 5.3 | 164 | 33.4 | 42.2 | 186 |
| **Yutubao** | STEP | -0.8 | 3 | 6.6 | -50.5 | 173 | 318 | -9.8 | 0.3 | 9.1 | 0.6 | 4.6 | 9.5 | -88 | -3.2 | 84.1 | -17 | 54.5 | 96.5 |
| **Zhujiang delta K5** | WAMX | -6.2 | -2.8 | -0.5 | -687 | 409 | 1410 | -9.8 | -5.4 | -1 | -7.6 | -1.2 | 0.7 | -62 | 17.9 | 95.2 | -55 | 27.9 | 95.5 |
| **Da-7** | DESE | -7.1 | -0.8 | -3.2 | -80.4 | -246 | 295 | -7.7 | -0.8 | 2.4 | -8.6 | -0.8 | -4 | -85 | 3 | 96.2 | -26 | -78 | 95.8 |
| **Hahai-1** | STEP | 0.6 | 3.3 | 6.9 | 44.7 | 183 | 223 | -8.1 | 1.4 | 8.7 | 3.3 | 4.4 | 9.4 | -77 | -6.7 | 88.4 | 8 | 57 | 75.3 |
| **Wajianggou** | STEP | 0.7 | 1.7 | 6.2 | 0 | 84.5 | 314 | -7.1 | 1.9 | 6.9 | 2.6 | 1.6 | 8.9 | -80 | -0.9 | 92.1 | -1.9 | 25.9 | 93 |
| **Shuidong Core A1** | TRFO | -0.8 | 1.6 | 6.1 | 47.2 | 784 | 256 | -7.1 | 0.9 | 7.3 | 1.8 | 2 | 7.6 | -88 | 17.7 | 85.8 | 10.3 | 41.5 | 93.2 |
| **Dajahu** | TEDE | -6.4 | 1.2 | 1 | -441 | 536 | 1540 | -7 | 0.1 | -3 | -8.4 | 1.8 | 4.6 | -82 | -0.7 | 89.8 | -31 | 29.1 | 98.6 |

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| **Tianshuigou** | STEP | -6.2 | 2.3 | 2.5 | -280 | 81.6 | -193 | -9.9 | 1.2 | 8.2 | -4.1 | 2.9 | 1 | -85 | -6.3 | 91.5 | -90 | 17.2 | -64 |
| **Mengjiawan** | DESE | 0.5 | -1.3 | 7 | 77.2 | -266 | 295 | -4.9 | 1.1 | 9 | 0.9 | -2.8 | 8.3 | -85 | -7 | 97.6 | 19 | -79 | 97.1 |
| **Fuping BK13** | TEDE | -1.7 | -3 | 4.5 | -92 | 335 | 277 | -7.1 | -3 | 7.6 | -0.2 | -3 | 3 | -88 | 1.5 | 96.5 | -27 | 65 | 95.9 |
| **Yaocun** | STEP | -2.9 | 1.8 | 4.5 | 0 | 36.5 | 1473 | -3.5 | 0.9 | 5.1 | -3.7 | 2.4 | 7.6 | -34 | 46 | 90 | -11 | 3.9 | 97 |
| **Jinbian** | STEP | -2.4 | -0.4 | 4.8 | -721 | -51 | 1682 | -8 | 1.3 | 5.7 | -5 | -1.5 | 8.7 | -89 | 12.6 | 95.7 | -54 | -12 | 93.3 |
| **Dishaogou** | DESE | -2.5 | -2.1 | 5.3 | -135 | -305 | 272 | -5.2 | 1.1 | 7.9 | -3 | -4.3 | 7 | -86 | -0.9 | 92.4 | -38 | -80 | 61.2 |
| **Shuidonggou** | DESE | -4.2 | -2.7 | 1.7 | -285 | -221 | -221 | -4.6 | 0 | 8.2 | -6.9 | -4.5 | 0 | -45 | -15.8 | 63.5 | -85 | -77 | -73 |
| **Jiuzhoutai** | TAIG | -6.2 | -5.1 | 0.8 | 189.2 | 105 | 476 | -8.8 | -1 | 4.7 | -6.7 | -7.8 | 1 | -76 | 12.3 | 98.6 | 30.7 | 26.5 | 97.3 |
| **Luojishan** | WAMX | -2.7 | 3.7 | 6.5 | -71 | 268 | 163 | -4 | 6 | 5 | -2.9 | 2.4 | 9.5 | -52 | 18.8 | 86.7 | -27 | 77.9 | 40.7 |
| **RM-F** | COMX | -3.5 | 1.3 | 4 | -172 | 192 | 130 | -7 | -1.4 | 9.1 | -5.2 | 2.8 | 1.6 | -74 | 0.3 | 99.6 | -58 | 50.3 | 24.5 |
| **Hongyuan** | TUND | -5.4 | -5.8 | 1.3 | -340 | 7.7 | -268 | -6.8 | -3.8 | 6.2 | -7.7 | -7 | 0.2 | -89 | -38.8 | 30.8 | -90 | 2.1 | -59 |
| **Wasong** | COCO | -7.1 | -1 | 1.5 | -256 | 156 | -172 | -7.7 | -4.7 | 6.9 | -9.6 | 1.1 | 0.4 | -82 | -14.4 | 64.6 | -90 | 35.8 | -59 |
| **Guhu Core 28** | COMX | -7.9 | -1 | -1.6 | -146 | 253 | 367 | -6.8 | -5.8 | 4.5 | -9.9 | 1.8 | -5.8 | -87 | 12.2 | 100 | -52 | 46.5 | 95 |
| **Napahai Core 34** | COMX | 3.2 | 0.8 | 4.1 | 227.9 | 311 | 281 | 3.2 | -4 | 8.3 | 1.1 | 3.6 | 2.8 | -37 | 24.3 | 63.6 | 73.8 | 59.3 | 81 |
| **Lop Nur** | DESE | -1.5 | -3 | 3.8 | -78.2 | -162 | 405 | -7.5 | 1.6 | 3.6 | 0.4 | -5.9 | 5.8 | -76 | -4.4 | 96 | -19 | -117 | 99.7 |
| **Chaiwobao1** | DESE | -7.8 | -3.7 | -2.6 | -168 | -210 | 268 | -9.3 | -2.1 | 3.7 | -7.9 | -4.8 | -5.9 | -66 | -0.9 | 99.2 | -49 | -140 | 60.4 |
| **Chaiwobao2** | DESE | -2.7 | -3.2 | 1.5 | -92.6 | -208 | 438 | -9.8 | -1 | 4.7 | -0.7 | -4.5 | 4.4 | -71 | 27.8 | 99.1 | -30 | -143 | 99.1 |
| **Manasi** | DESE | -3.4 | -1.4 | 1.1 | -89.4 | -108 | 542 | -9.1 | 3 | -3 | -0.2 | -4 | 4.9 | -87 | 4.9 | 90 | -18 | -77 | 99.2 |
| **Wuqia** | DESE | -1.5 | -3.8 | 3 | 0 | -109 | 479 | -7.7 | 0.3 | 0.1 | 0.3 | -6.4 | 6.2 | -73 | 36.2 | 94 | 0 | -146 | 97.6 |
| **Madagou** | STEP | -5.9 | -3.5 | 0 | -194 | 239 | -106 | -3.8 | -1.2 | 6 | -9.7 | -4.9 | -2.2 | -175 | -9.5 | 188 | -178 | 225 | -44 |
| **Tongyu** | STEP | -9.1 | 3.7 | 0.8 | -214 | 103 | -195 | -9.6 | 2.4 | 7.2 | -9.8 | 4.5 | 0.9 | -170 | -72.7 | 46.4 | -176 | 29.6 | -102 |
| **Nanjing** | TEDE | -6.9 | -4.3 | 2.1 | -210 | 430 | -200 | -7.4 | -5.7 | 7.2 | -8.1 | -3.5 | 0.5 | -180 | -91.3 | 31.8 | -169 | 50 | -105 |
| **Banpo** | COMX | -3.7 | -7.1 | 0.7 | -178 | 190 | -0.4 | -1.8 | -5.1 | 7.3 | -6.2 | -8.2 | -1.2 | -169 | -36.3 | 193 | -172 | 33.6 | 24.5 |
| **QL-1** | COMX | -7.3 | -1 | -0.4 | -110 | 559 | -99 | -6 | -3 | 6.7 | -9.9 | 0.1 | -1.9 | -178 | -31.2 | 107 | -178 | 36.7 | -101 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dalainu** | TAIG | -5.2 | -5.4 | -1.3 | 156.7 | 65.7 | 300 | -5.2 | -4 | 2.9 | -7.1 | -6.2 | -1.7 | -588 | 228 | 687 | -160 | 22 | 771 |
| **Qinghai** | TAIG | 1 | -3 | 5.9 | -33.2 | 192 | 188 | -7.7 | -1.6 | 8.7 | 2.1 | -4 | 6.9 | -78 | 6.5 | 80.8 | -4.9 | 90 | 58.5 |

In this table, we give the biome type at 6 ka for each pollen site used in our study. From third column, all the climate values (AnnT, AnnP, MTCO, MTWA, Pjan and Pjul) represent the climate changes during mid-Holocene (MH), compared to preindustrial (PI). The units for temperature and precipitation anomaly (MH-PI) are K and mm, respectively. Besides the median values (AnnT, AnnP, MTCO, MTWA, Pjan and Pjul), we also show the values bias on data reconstruction by giving the median value (for instance, column named MTCO) and values indicating the 2.5% (MTCO1)-97.5% (MTCO2) uncertainty bands.

**Table S5. Vegetation setting for the mid-Holocene among models in PMIP3**

| *Model* | *L A I* | *Stomatal Resistance Function Of* | *Vegetation Time Variation* |
|---|---|---|---|
| ***CCSM4*** | Prognostic | CO2 \| Light \| Temperature \| Water availability | Prescribed (varying from files) |
| ***MIROC-ESM*** | Prescribed | CO2 \| Light \| Temperature \| Water availability | Prescribed (varying from files) |
| ***BCC-CSM1.1*** | Prognostic | CO2 \| Light \| Temperature \| Water availability | Prescribed (varying from files) |
| ***CNRM-CM5*** | Prescribed | Light \| Temperature \| Water availability | Fixed (not varying) |
| ***CSIRO-MK3.6.0*** | Prescribed | Light \| Temperature \| Water availability | Prescribed (varying from files) |
| ***GISS-E2-R*** | Prescribed | CO2 \| Light \| Temperature \| Water availability | Fixed (not varying) |
| ***IPSL-CM5A-LR*** | Prognostic | CO2 \| Light \| Temperature \| Water availability | Prescribed (varying from files) |
| ***MPI-ESM-P*** | Prognostic | CO2 \| Water availability | Fixed (not varying) |
| ***MRI-CGCM3*** | Prescribed | CO2 \| Light \| Water availability | Prescribed (varying from files) |
| ***HadGEM2-ES*** | Prognostic | CO2 \| Light \| Temperature \| Water availability | Dynamical (varying from simulation) |
| ***HadGEM2-CC*** | Prognostic | CO2 \| Light \| Temperature \| Water availability | Dynamical (varying from simulation) |
| ***FGOALS-g2*** | Prescribed | no data | Prescribed (varying from files) |
| ***FGOALS-s2*** | Prescribed | no data | Prescribed (varying from files) |

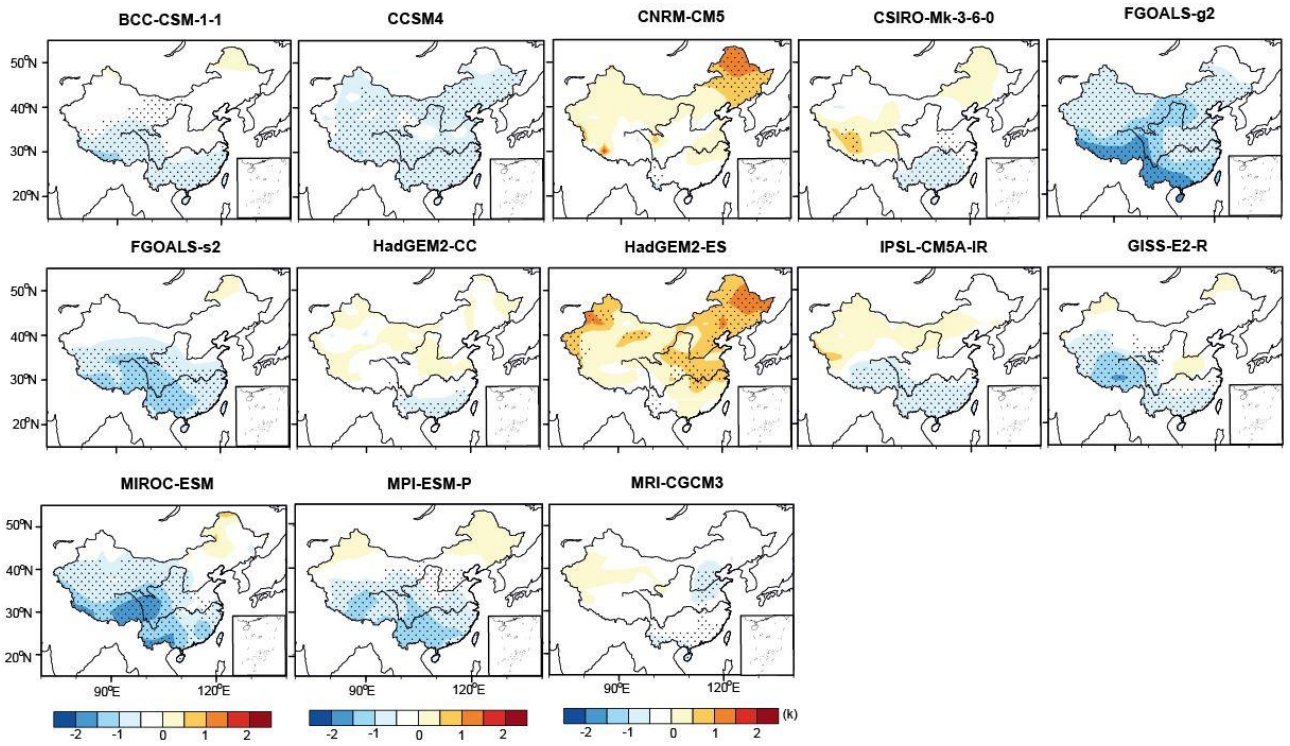


Fig. S1. Annual temperature anomaly (MH-PI) calculated as the last 30-year means of each model, the area with points pass the t-test (for 95% confidence interval)

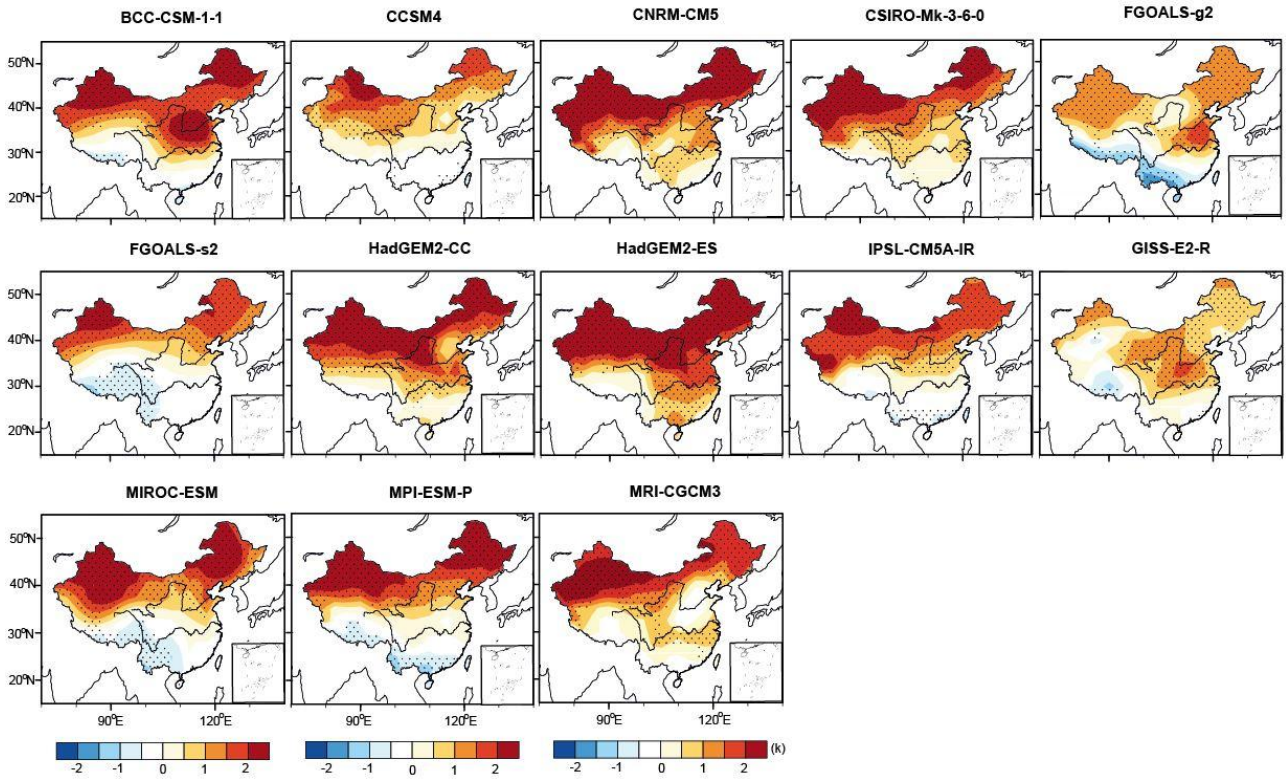


Fig. S2. MTWA temperature anomaly (MH-PI) calculated as the last 30-year means of each model, the area with points pass the t-test (for 95% confidence interval)

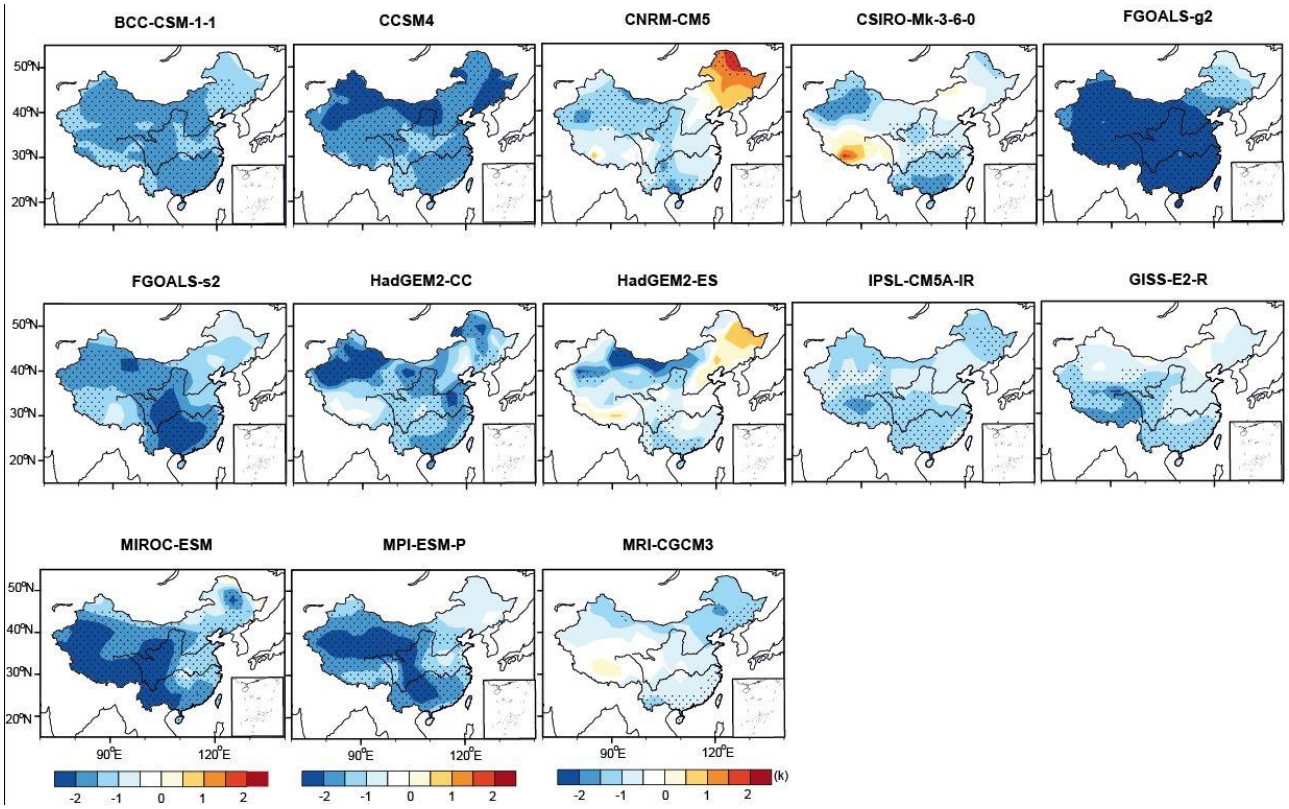


Fig. S3. MTCO temperature anomaly (MH-PI) calculated as the last 30-year means of each model, the area with points pass the t-test (for 95% confidence interval)

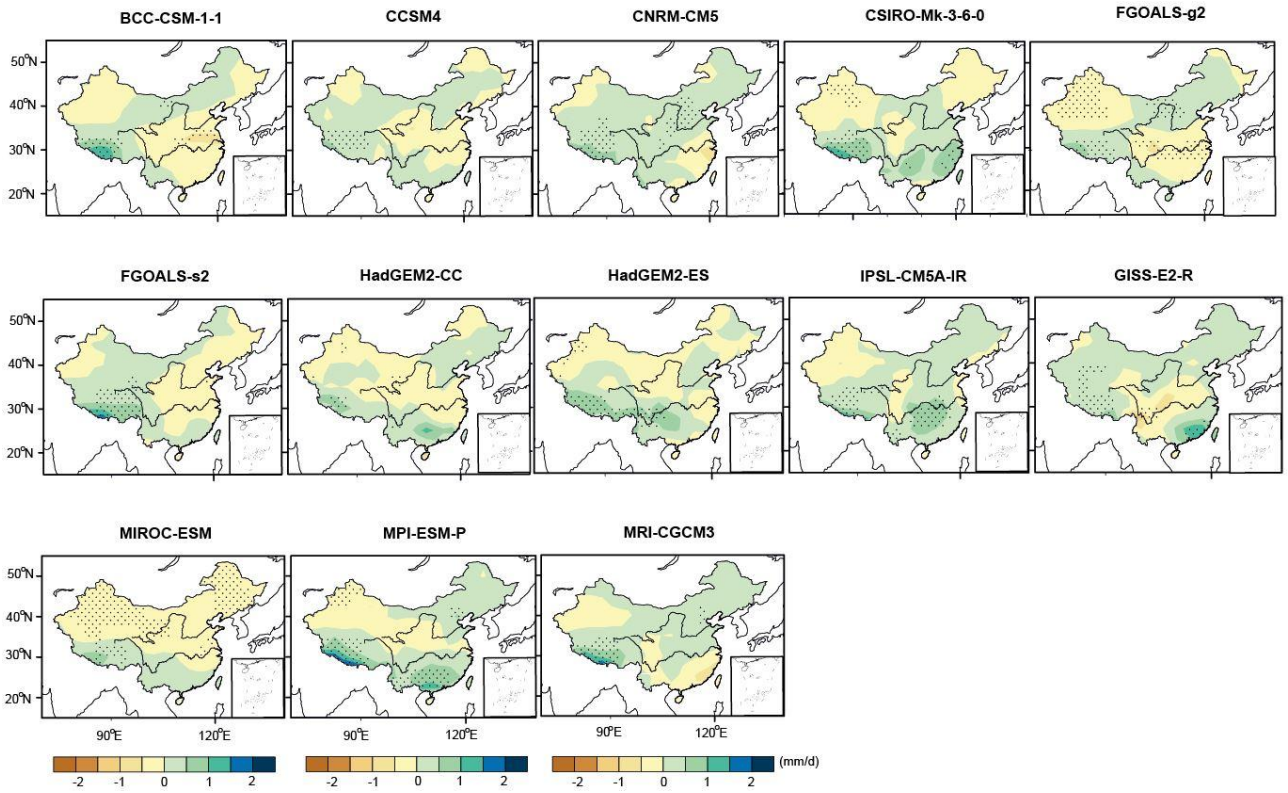


Fig. S4. Annual precipitation anomaly (MH-PI) calculated as the last 30-year means of each model, the area with points pass the t-test (for 95% confidence interval).

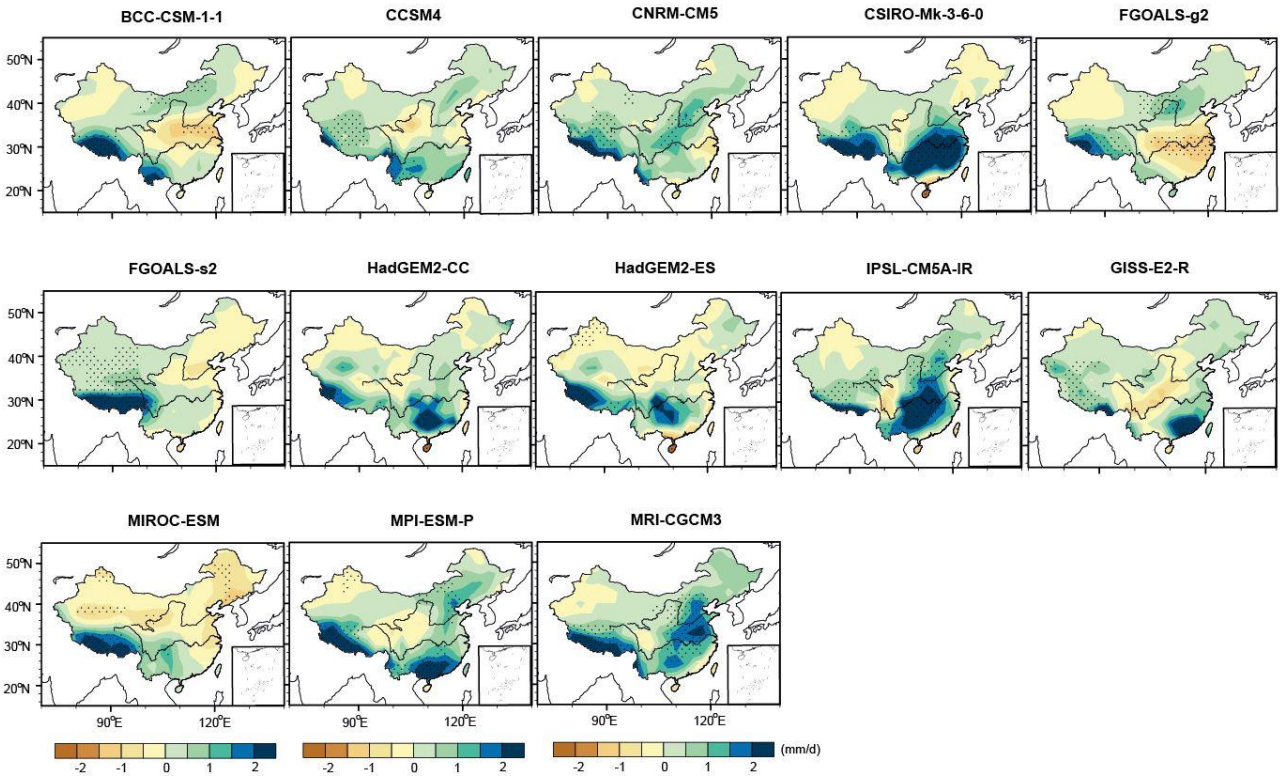


Fig. S5. Summer (JJA) precipitation anomaly (MH-PI) calculated as the last 30-year means of each model, the area with points pass the t-test (for 95% confidence interval).

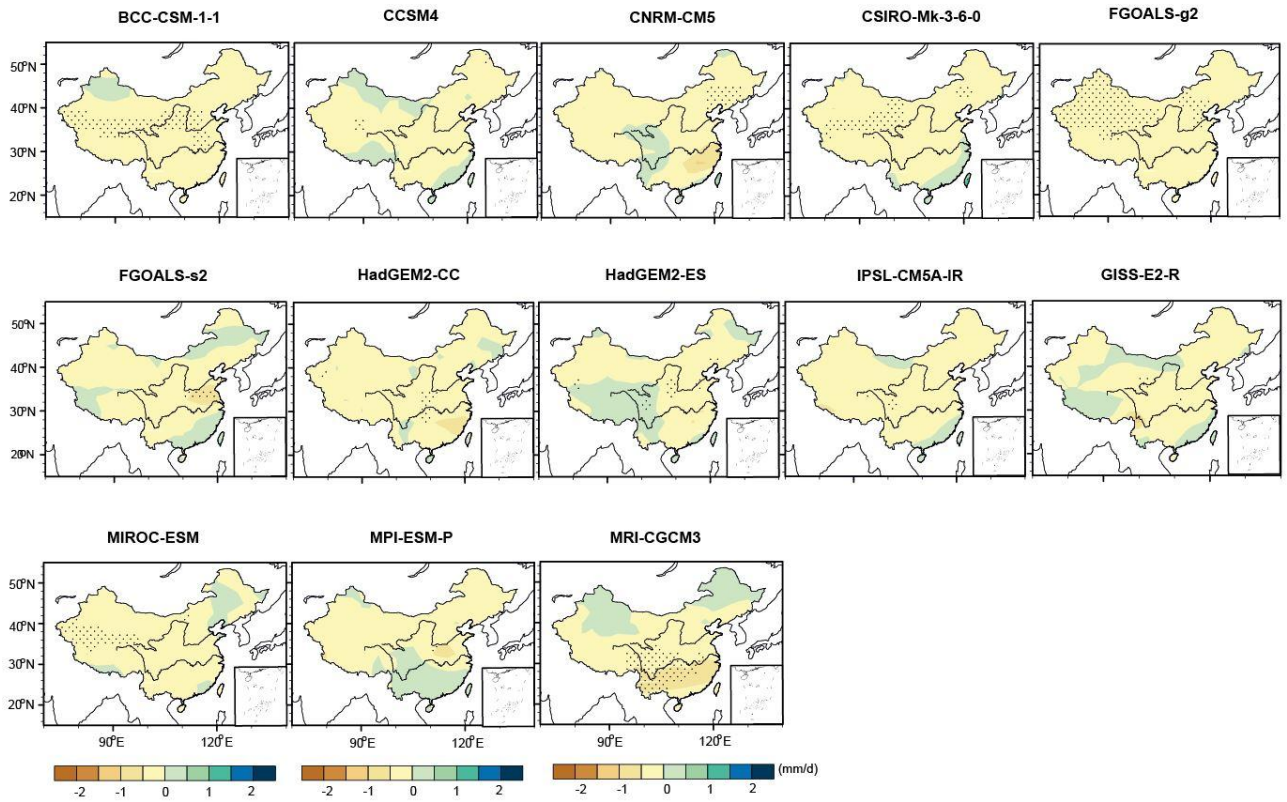


Fig. S6. Winter (DJF) precipitation anomaly (MH-PI) calculated as the last 30-year means of each model, the area with points pass the t-test (for 95% confidence interval).

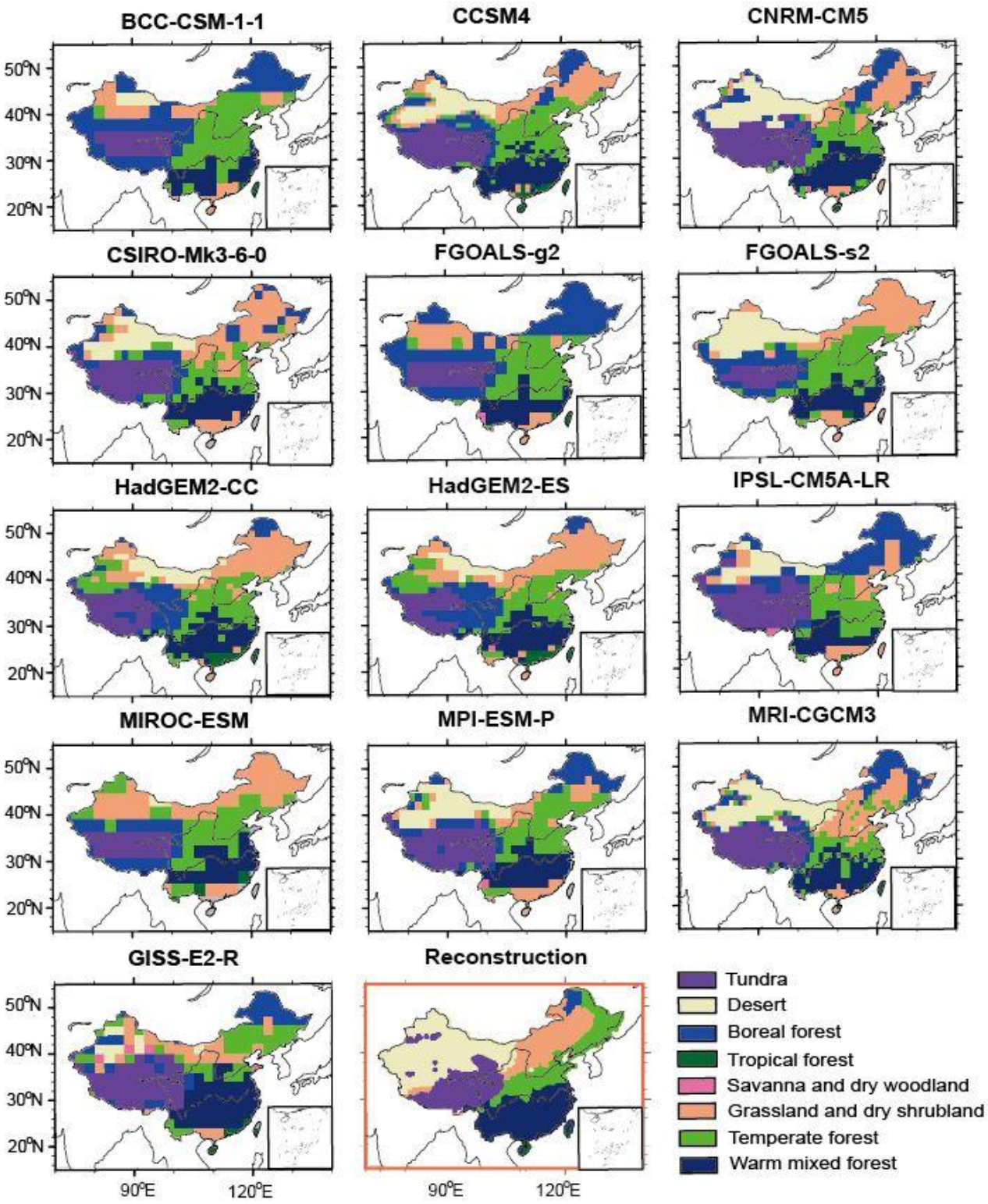


Fig. S7. Comparison of interpolated megabiomes distribution (plot in red rectangle) with the simulated spatial pattern from BIOME4 of each model for pre-Industrial.

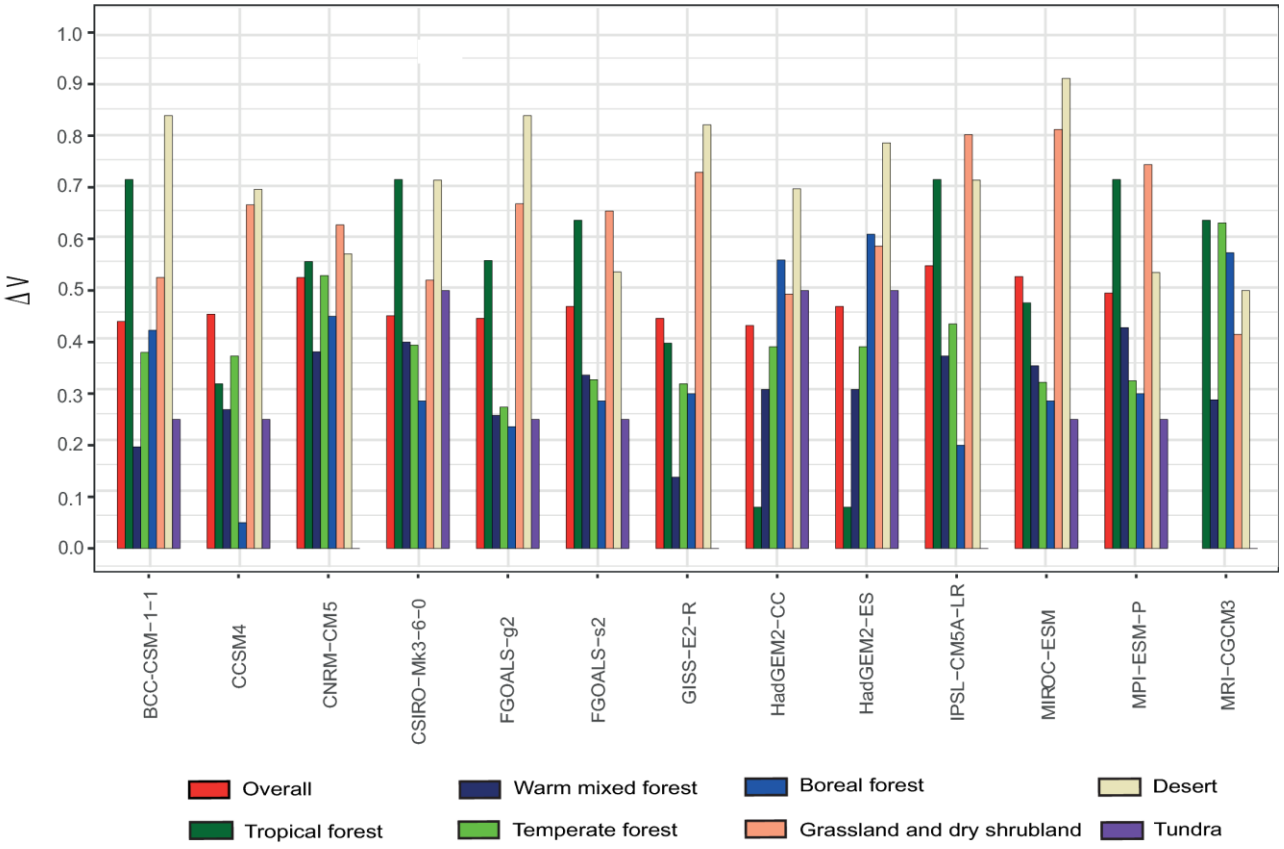


Fig. S8. The ΔV values of overall and each megabiomes for all 13 models during mid-Holocene, compared to the reconstruction.

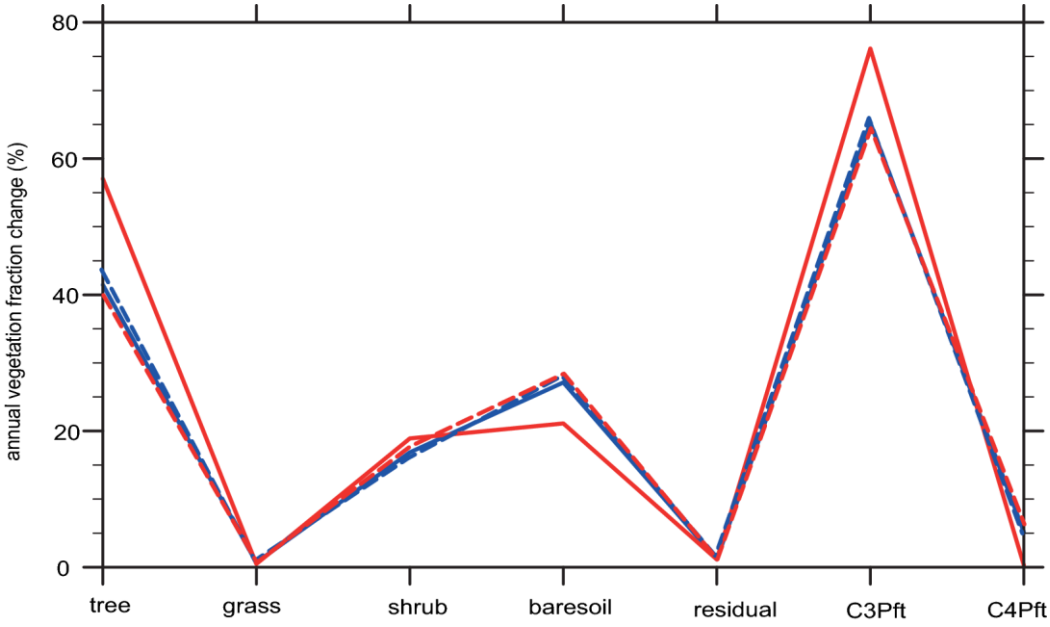


Fig. S9. Annual vegetation fraction change (PI: blue line; MH: red line) calculated as the last 30-year means of HadGEM2-ES (PI: blue solid line; MH: red solid line) and HaGEM2-CC (PI: blue dash line; MH: red dash line).