**Supplementary Materials for**

# Important role of precipitation in controlling a more uniform spring phenology in the Qinba Mountains, China

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**Table S1.** The slope of SOS along EG in the QB from 2001 to 2018.

| Year | Slope of SOS along EG | $R^2$ |
|---|---|---|
| 2001 | S = 0.02038 ± 8.58018E-4 | 0.95*** |
| 2002 | S = 0.01989 ± 7.37398E-4 | 0.96*** |
| 2003 | S = 0.01621 ± 6.35332E-4 | 0.96*** |
| 2004 | S = 0.01974 ± 7.11802E-4 | 0.96*** |
| 2005 | S = 0.01359 ± 4.16969E-4 | 0.97*** |
| 2006 | S = 0.01738 ± 3.81774E-4 | 0.99*** |
| 2007 | S = 0.01698 ± 5.54988E-4 | 0.97*** |
| 2008 | S = 0.01177 ± 4.50813E-4 | 0.96*** |
| 2009 | S = 0.01351 ± 7.45447E-4 | 0.92*** |
| 2010 | S = 0.013 ± 5.94711E-4 | 0.94*** |
| 2011 | S = 0.01245 ± 8.44703E-4 | 0.89*** |
| 2012 | S = 0.01161 ± 5.96086E-4 | 0.93*** |
| 2013 | S = 0.01403 ± 5.14453E-4 | 0.96*** |
| 2014 | S = 0.01637 ± 9.63645E-4 | 0.91*** |
| 2015 | S = 0.01205 ± 0.00103 | 0.82*** |
| 2016 | S = 0.0185 ± 5.73025E-4 | 0.97*** |
| 2017 | S = 0.01746 ± 4.2414E-4 | 0.98*** |
| 2018 | S = 0.01226 ± 6.82392E-4 | 0.91*** |

**Table S2.** Comparison of our results with previous studies in related regions in China.

| Area | SOS/d | Data form | Time scale | Reference |
|---|---|---|---|---|
| Temperate China | 50 - 180 | SPOT | 1999 - 2009 | Cong et al., 2020 |
| Subtropical China | 50 - 140 | SIF | 2002 - 2017 | Li et al., 2021 |
| Yangtze River Basin | 70 - 160 | GIMMS | 1982 - 2015 | Yuan et al., 2019 |
| QB Mountains | 60 - 110 | AVHRR, MODIS, VIIRS | 1981 - 2016 | Li et al., 2020 |
| Qinling-Huanghuai Plain | 67 - 116 | MOD09Q1 | 2002 - 2020 | Wang et al., 2022 |
| Qinling Mountains | 83 - 121 | MOD13A2 | 2001 - 2019 | Guo et al., 2021 |
| Qinling Mountains | 73 - 113 | MOD13Q1 | 2001 - 2018 | Li et al., 2021 |
| Xian station | 97 | Ground station | 1985 - 2015 | Deng et al., 2017 |
| Xingangshan, Jiangxi Province, China | 71 - 113 | Ground station | 2009 - 2010 | Du et al., 2020 |
| QB mountains | 73 - 105 | MOD13Q1 | 2001 - 2018 | This study |

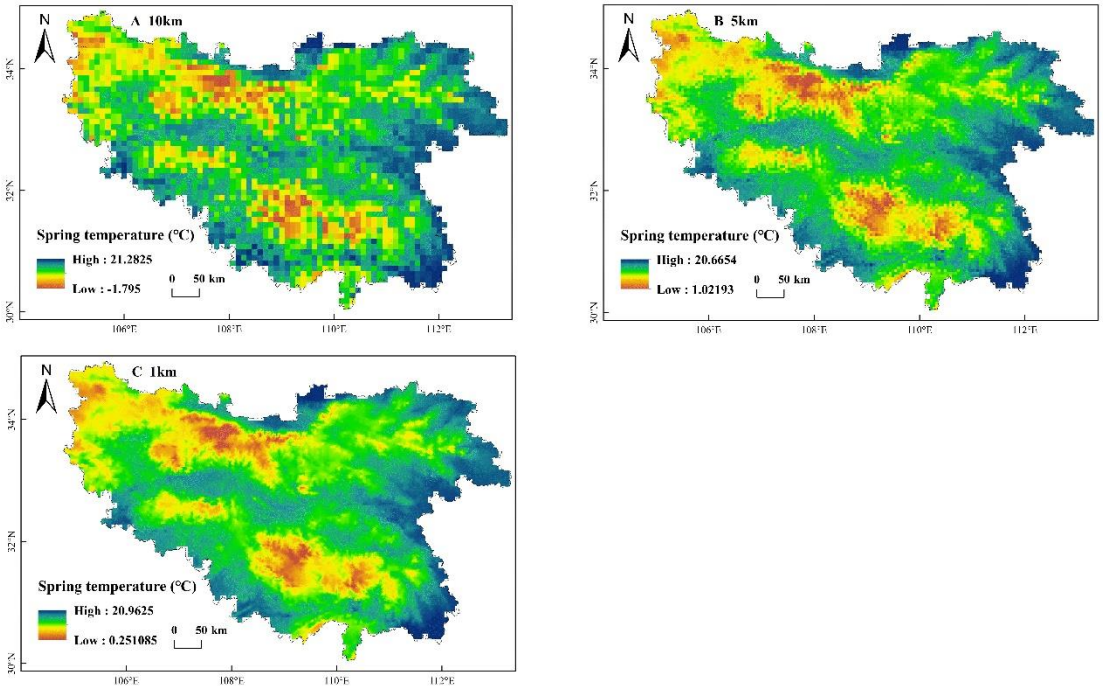


**Fig. S1.** Spatial downscaling of climate data using geographically weighted regression in three levels.

The spring temperature of 2001 was used as an example.

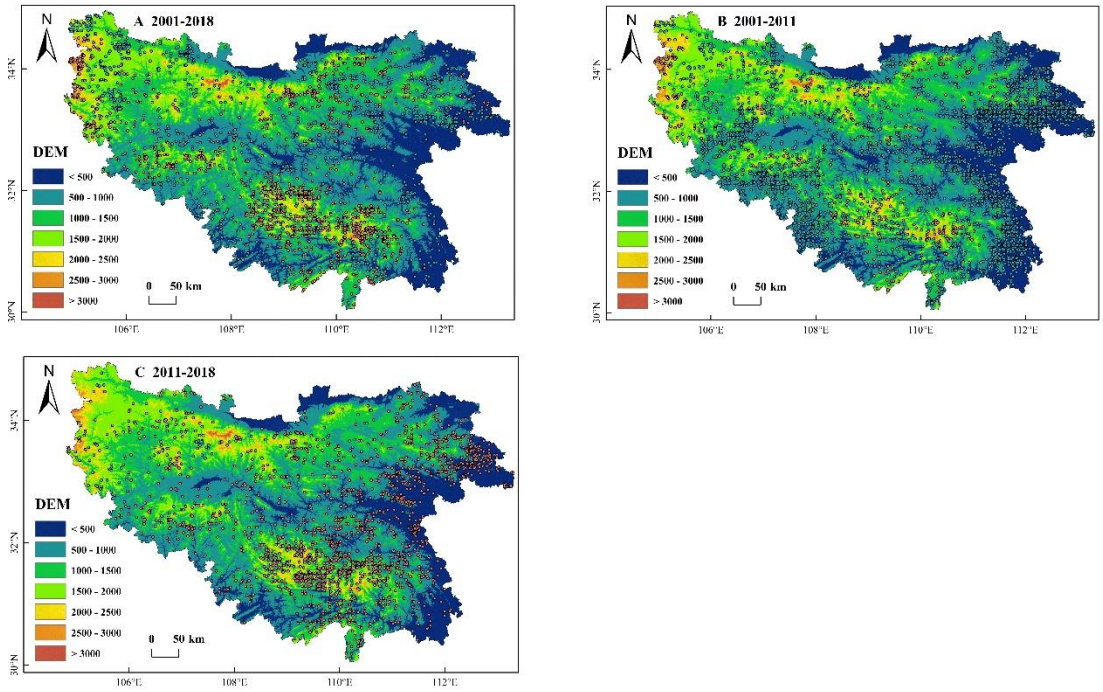


**Fig. S2.** Temporal trends in SOS passing significance tests ($P < 0.05$). The red and blue dots indicate significantly advanced and delay , respectively.

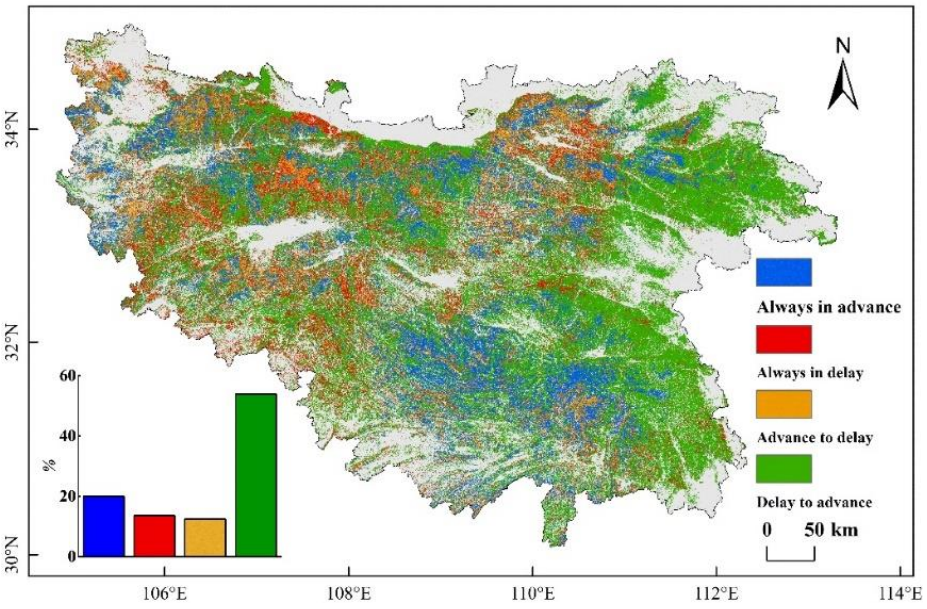


**Fig. S3.** Changes in temporal trends in SOS after 2011.

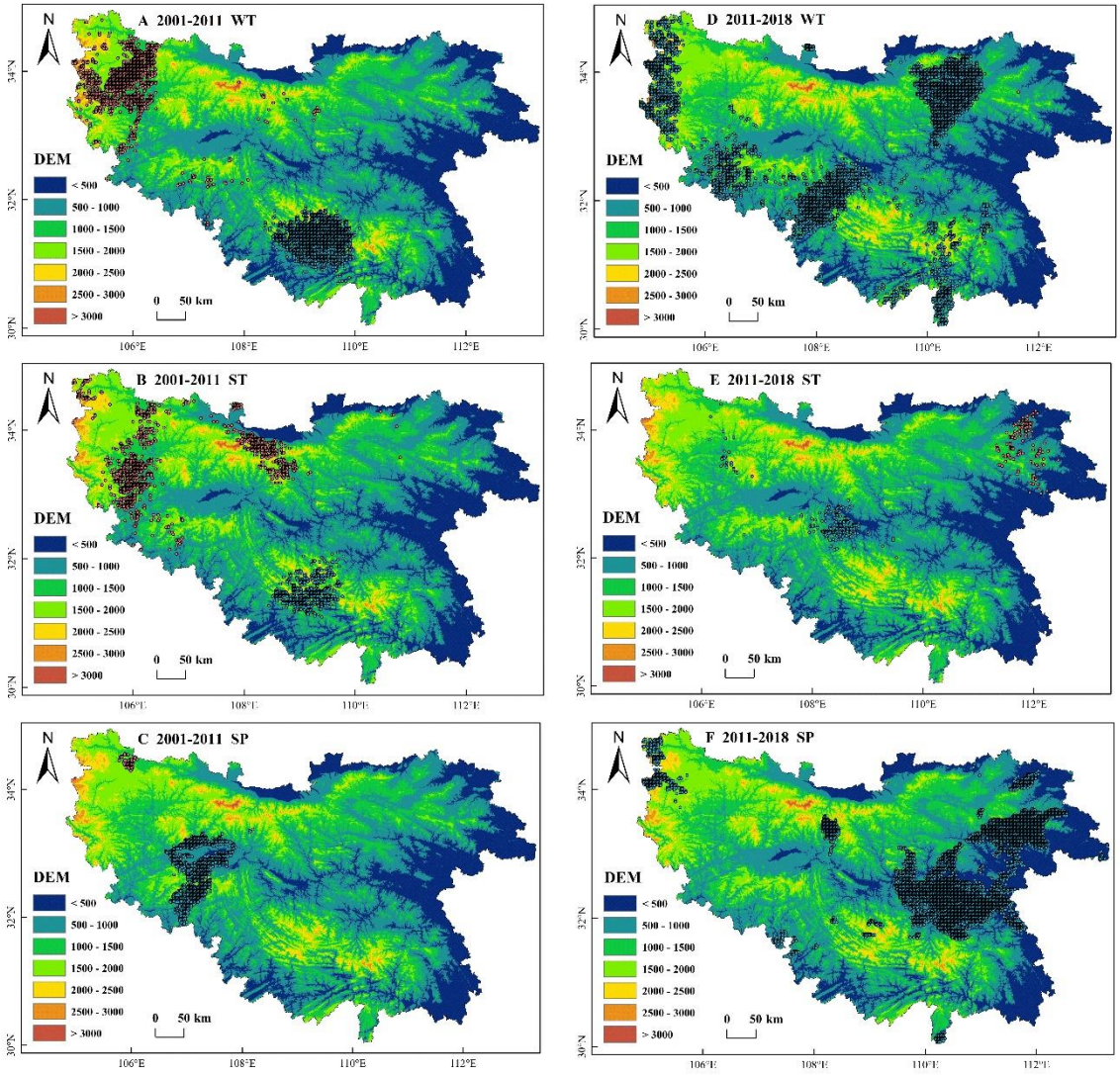


**Fig. S4.** Temporal trends in WT、ST and SP passing significance tests ($P < 0.05$). The red and blue dots indicate significantly decreased and increased , respectively.

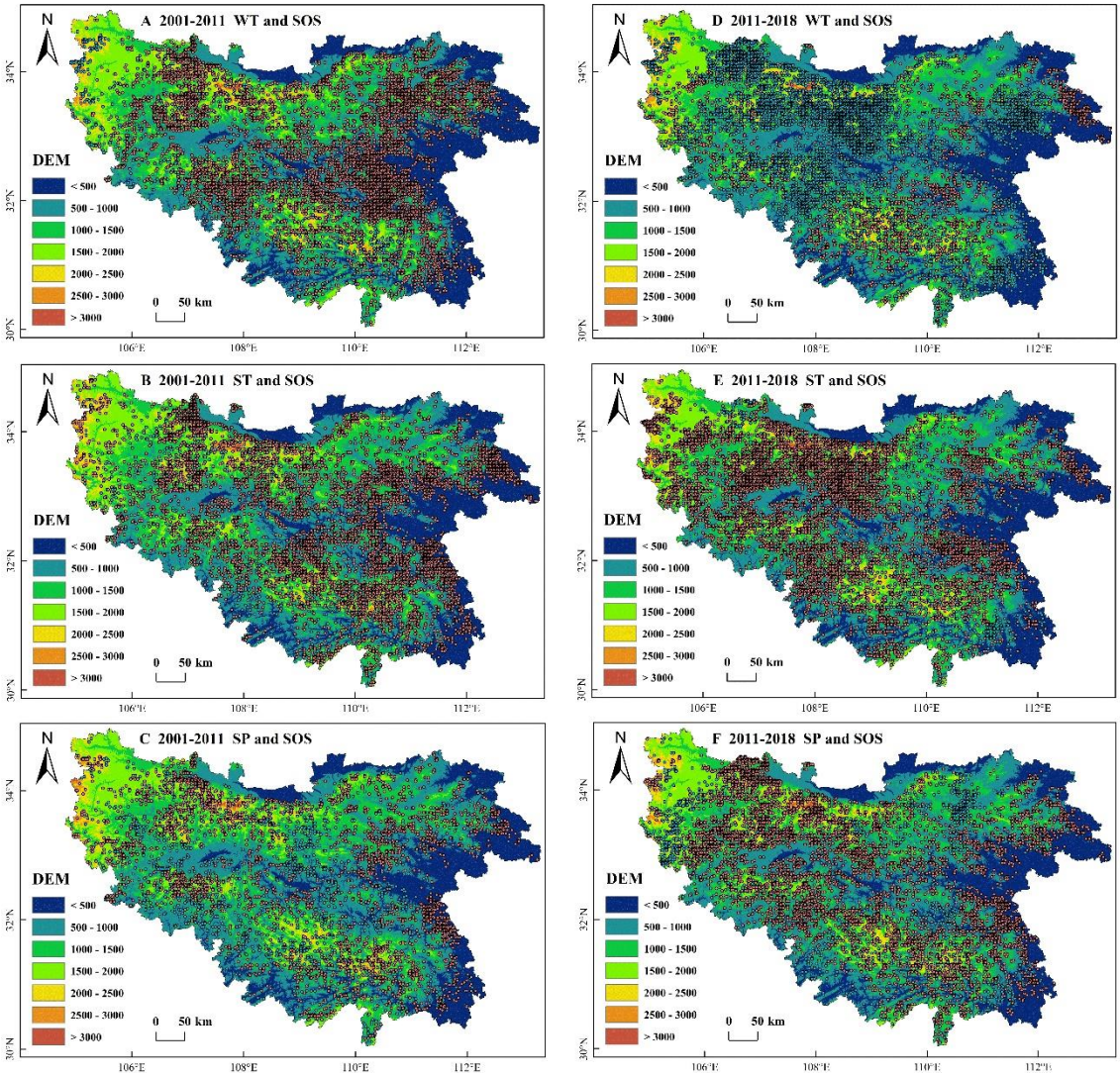


**Fig. S5.** Partial correlation coefficient between WT、ST and SP and SOS passing significance tests ($P <$ 0.05). The red and blue dots indicate significantly negative and positive correlations , respectively.

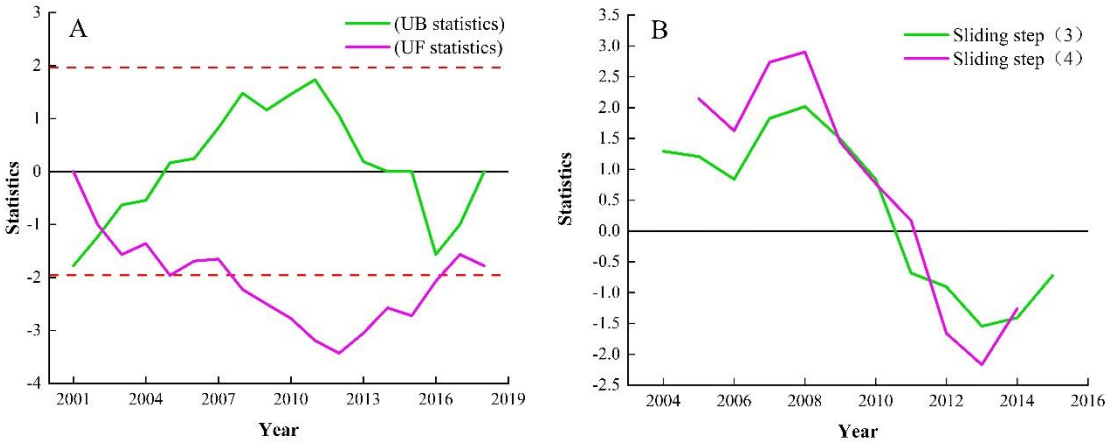


**Fig. S6.** Abrupt point test for slope of SOS along EG. A and B are based on the MK test and the sliding t-test. , respectively.