Fig. S1. The geolocation of seven in-situ ground phenology stations.
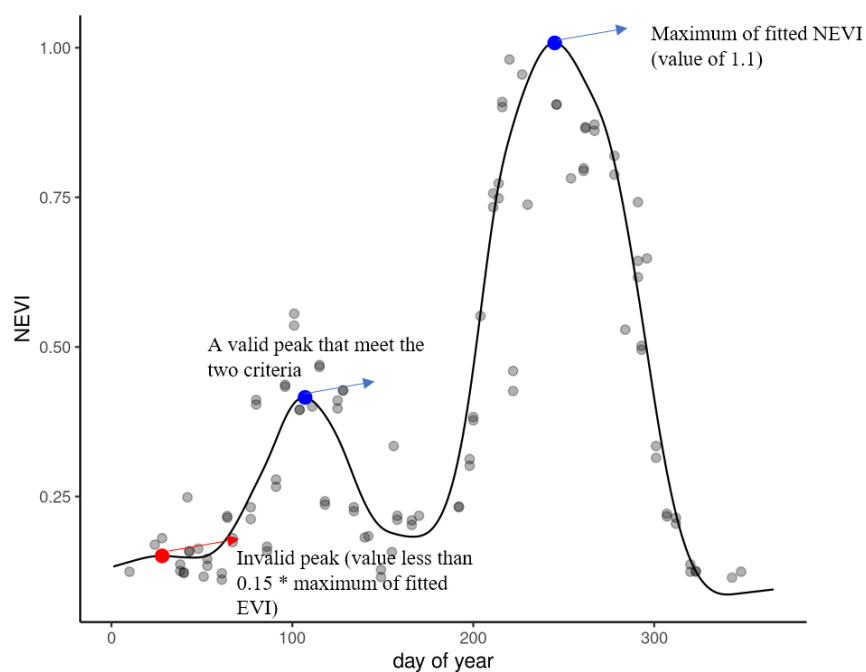
Fig. S2. Example of removing invalid peaks.

Table. S1. The number of clear images and number of records for the seven in-situ ground phenology stations. Note that there were missing records in the ground observations.

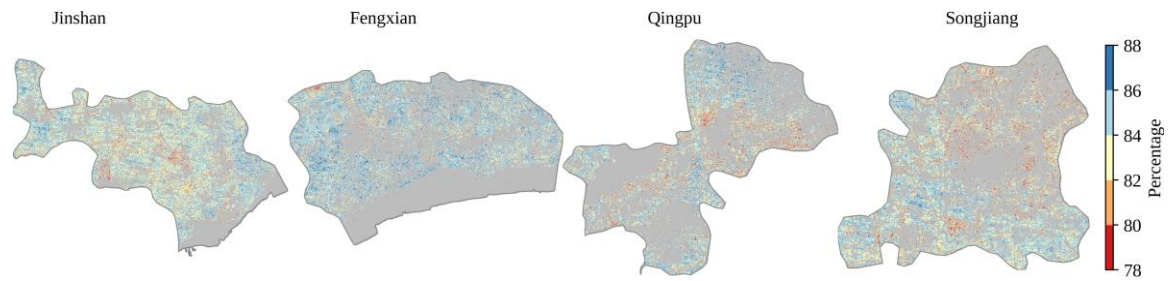| Station Name	Start year	End year	Number of Clear (clouds and shadows free) Landsat scenes from 1993 to 2009
Xuzhou	1993	2004	691
Huaiyin	2003	2009	208
Jianhu	1993	1997	333
Shouxian	1993	2009	612
Tianchang	1993	2009	226
Xinghua	1993	2009	358
Songjiang	1994	2000	538

Fig. S3. Maps of degree of fitness (DOF) in the four counties of Shanghai to evaluate the performance of LDCP in fitting the normalized EVI time series. Each column in the figure indicates one of the four counties. Gray regions represent missing data and non-crop areas.
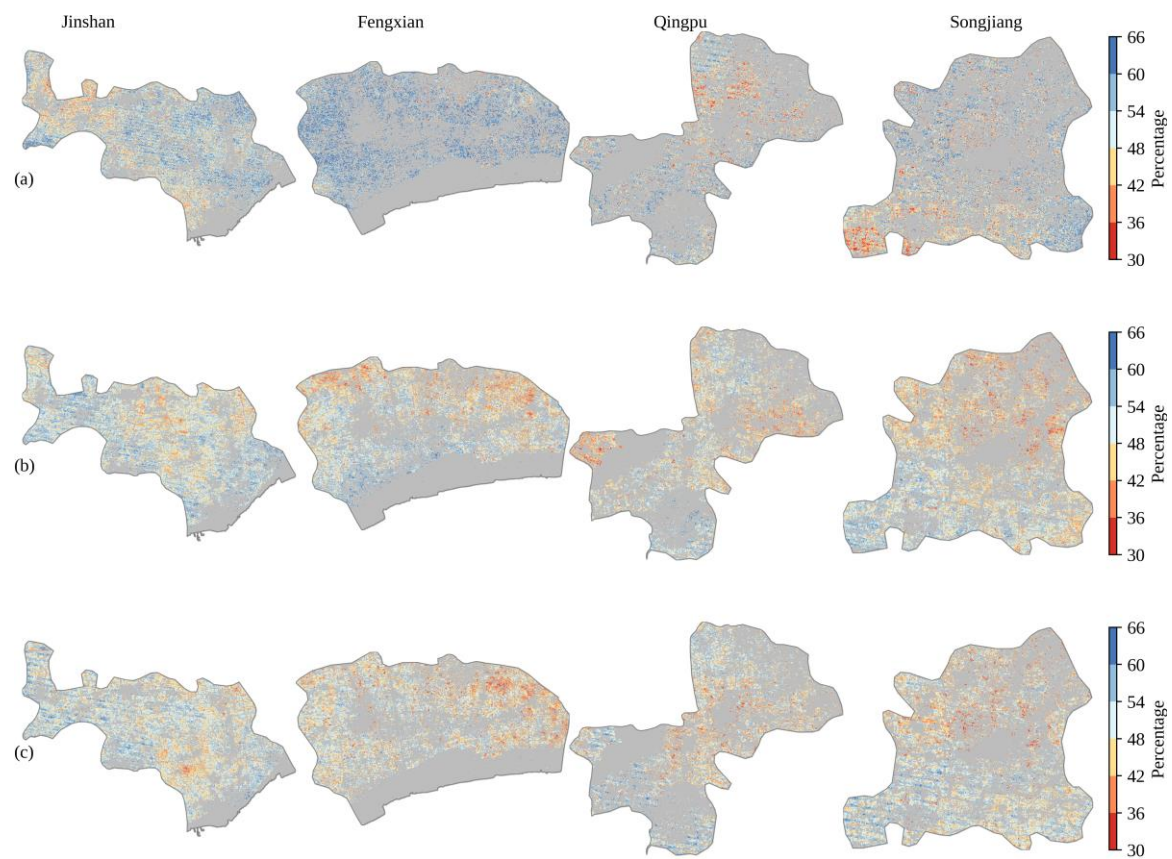

Fig. S4. Maps of proportion of good quality data (PGQ) in the four counties of Shanghai for different phenological metrics. Each column in the figure indicates one of the four counties. (a) PGQ calculated using the interval from POS1 to SOS2, corresponding to POS1. (b) PGQ calculated using the interval from SOS2 to POS2, corresponding to SOS2. (c) PGQ calculated using the interval from SOS2 to DOY 366, corresponding to POS2. Gray regions represent missing data and non-crop areas.
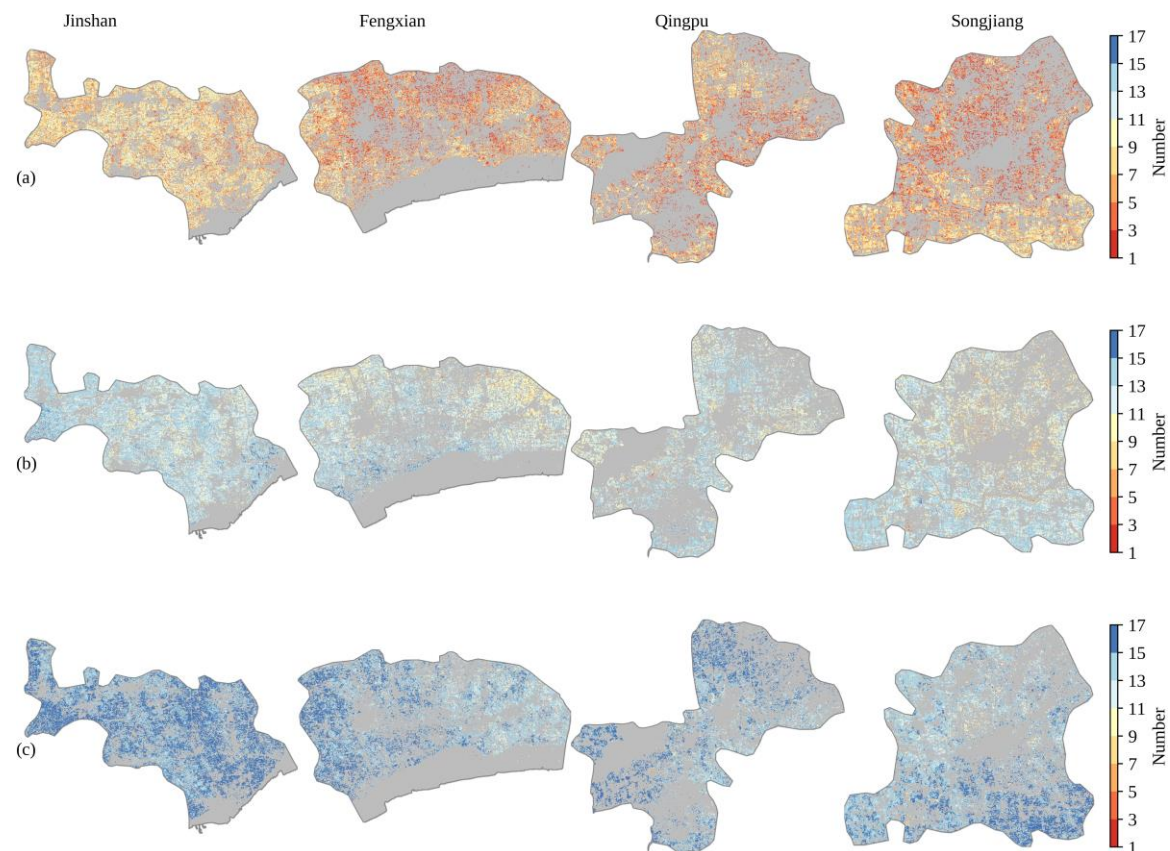
Fig. S5. Maps of number of years we successfully derived annual metrics in the four counties of Shanghai. Each column in the figure indicates one of the four counties. (a) No. years that were able to derive POS1. (b) No. years that were able to derive SOS2. (c) No. years that were able to derive POS2. Gray regions represent missing data and non-crop areas.