Supplementary materials

Table S1. Data list of remote sensing images in 2017.

Image resource	Orbit	Product serial number (date)	Cloudiness
Landsat8	118029、118030	92 (2017/4/2)	10%
Landsat8	118029、118030	156 (2017/6/5)	10%
Landsat8	118029、118030	268 (2017/9/25)	10%
Landsat8	118029、118030	300 (2017/10/27)	10%
MOD11A1	h27v04、h26v04	145-264 (2017/5/25-2017/9/21)	-

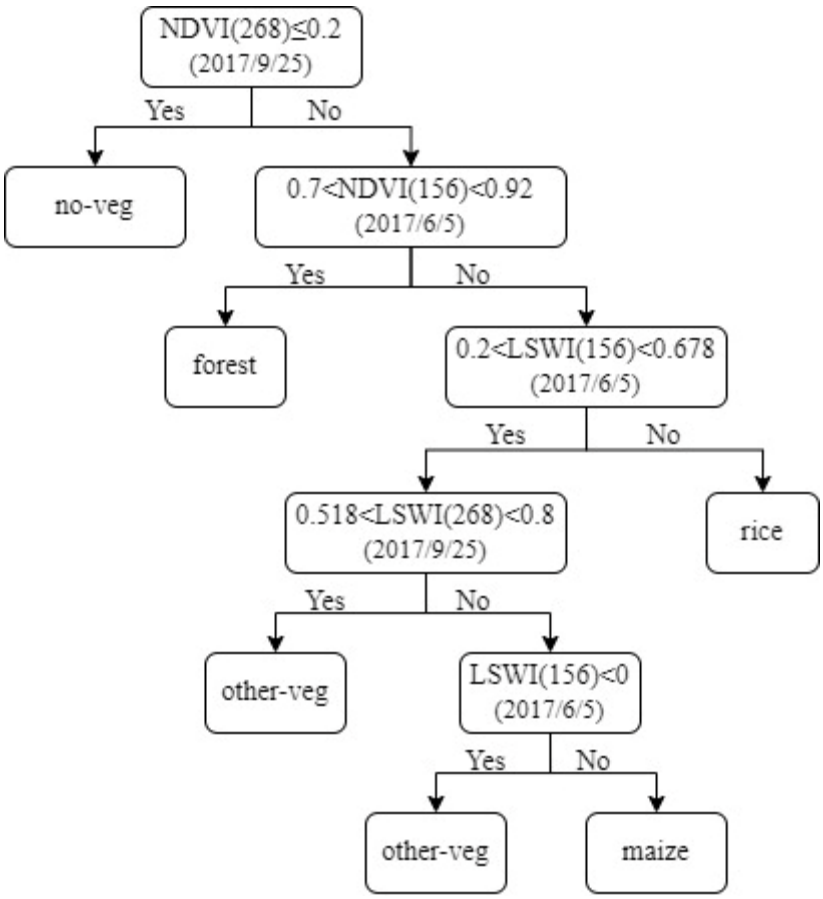

Figure S1. Rules of decision tree classification for Landsat8 images based on the values of NDVI and LSWI in ROI in 2017 (No.268 (2017/9/25) and No.156 (2017/6/5)).

Table S2. Values of harvest index (HI) of maize collected or measured in Changchun and its surrounding areas.

	Subarea	Longitude	Latitude	HI
Collected in Changchun surrounding areas	Qianguo	124.870	45.080	0.500
	Changling	123.970	44.250	0.550
	Shulan	126.930	44.380	0.490
	Yongji	126.520	43.700	0.550
Collected in Changchun area	Nongan	125.150	44.380	0.530
	Yushu	126.520	44.850	0.450
	Gongzhuling	124.800	44.520	0.520
	Shuangyang	125.630	43.550	0.460
Measured in the experimental station	H1	125.320	43.645	0.484
	H2	125.312	43.643	0.450
	H3	125.297	43.643	0.489
	H4	125.307	43.648	0.512
	H5	125.323	43.656	0.530
	S1	125.309	43.642	0.517
	S2	125.300	43.647	0.542
	S3	125.298	43.651	0.511
	S4	125.306	43.652	0.491
	S5	125.312	43.653	0.516
	S6	125.315	43.652	0.533
	S7	125.318	43.655	0.527
	S8	125.322	43.650	0.473

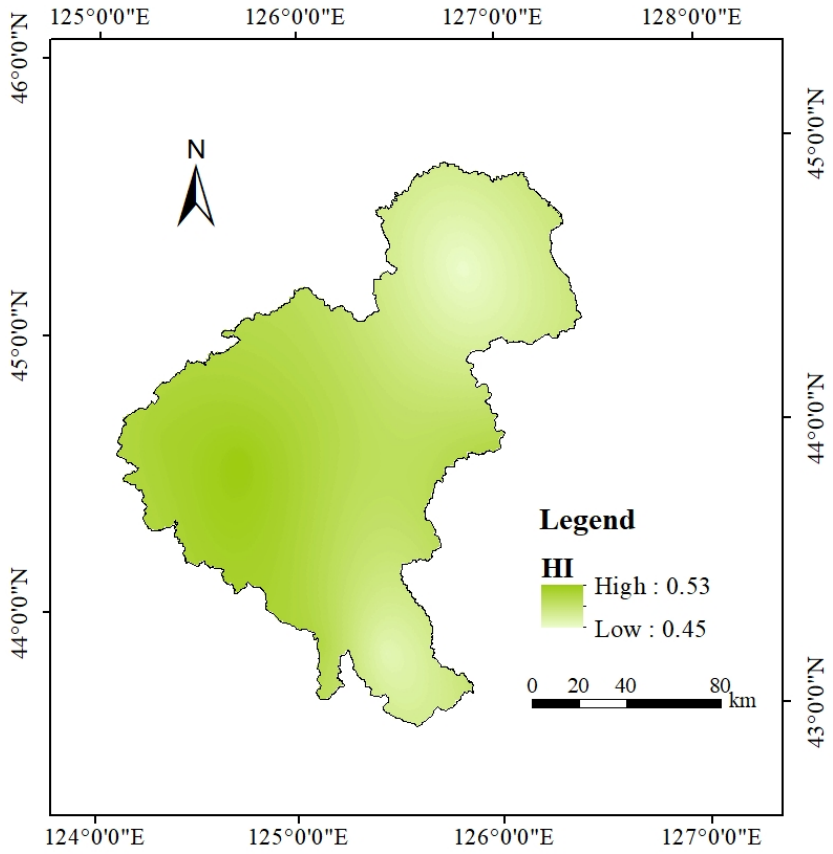

Figure S2. Map of HI obtained by the kriging interpolation method in Changchun area.

Supplementary calculation formula of Section 2.6

$$d = \frac{\sum_{i=1}^{n}(P_i - O_i)^2}{\sum_{i=1}^{n}(|P_i - \bar{O}| + |O_i - \bar{O}|)^2} \quad \text{(Equation(S1))}$$

$$RMSE = \sqrt{\frac{\sum_{i=1}^{n}(P_i - O_i)^2}{n}} \quad \text{(Equation(S2))}$$

$$R^2 = \frac{[\sum(P_i - \bar{P})(O_i - \bar{O})]^2}{\sum(P_i - \bar{P})^2 \sum(O_i - \bar{O})^2} \quad \text{(Equation(S3))}$$

$$RE = \frac{P_i - O_i}{O_i} \quad \text{(Equation(S4))}$$

$$CV = \frac{SD}{MN} \quad \text{(Equation(S5))}$$

Where P_i is the simulated value, $\bar{P}$ is the average value of P_i, O_i is the measured value, $\bar{O}$ is the average value of O_i, n is the number of samples, SD is the standard deviation, MN is the mean values.

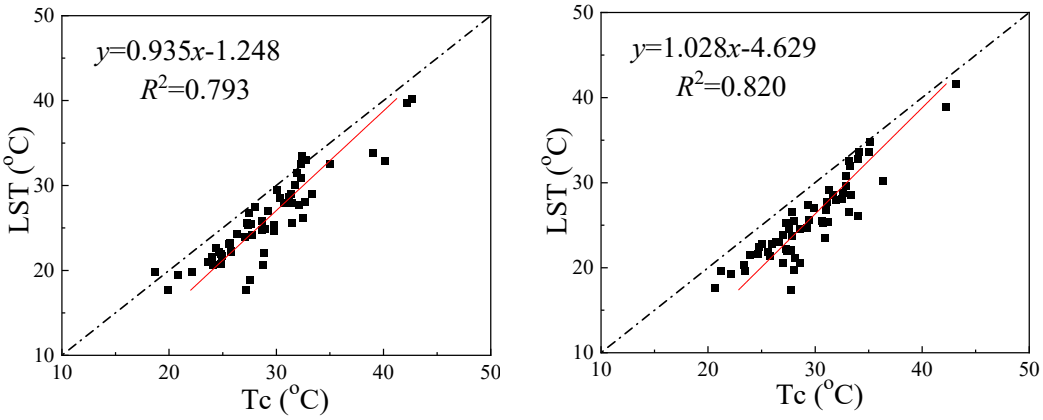

Figure S3. Regressions between the LST from MOD11A1 product and the observed Tc in field in 2017. (**a**) H4; (**b**) H5.

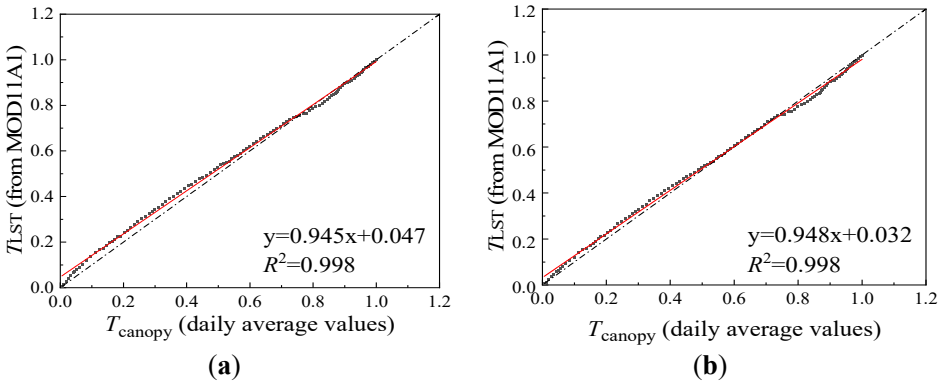

Figure S4. Regressions between the T_{LST} calculated by the remote sensing instantaneous LST values at 11:30 am (interpolation results) and daily average values observed (T_{canopy}) from the CTMS system in 2017. (**a**) H4; (**b**) H5.