Supplement of Earth Syst. Sci. Data, 18, 8311–8328, 2026
https://doi.org/10.5194/essd-18-8311-2026-supplement
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Supplement of

Mapping 20-years winter wheat dynamics in global primary planting areas using Gaussian mixture models with adaptive thresholds

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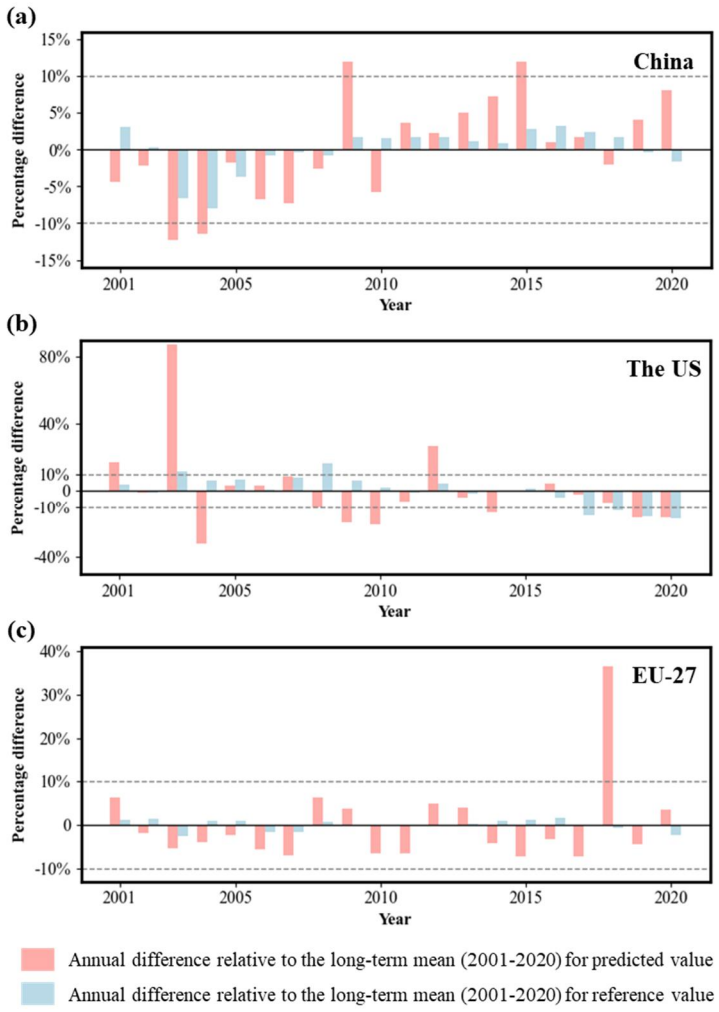


Fig S1. The annual difference relative to the long-term mean (2001-2020) for reference and predicted values in China (a), the US (b), and the EU-27 (c).

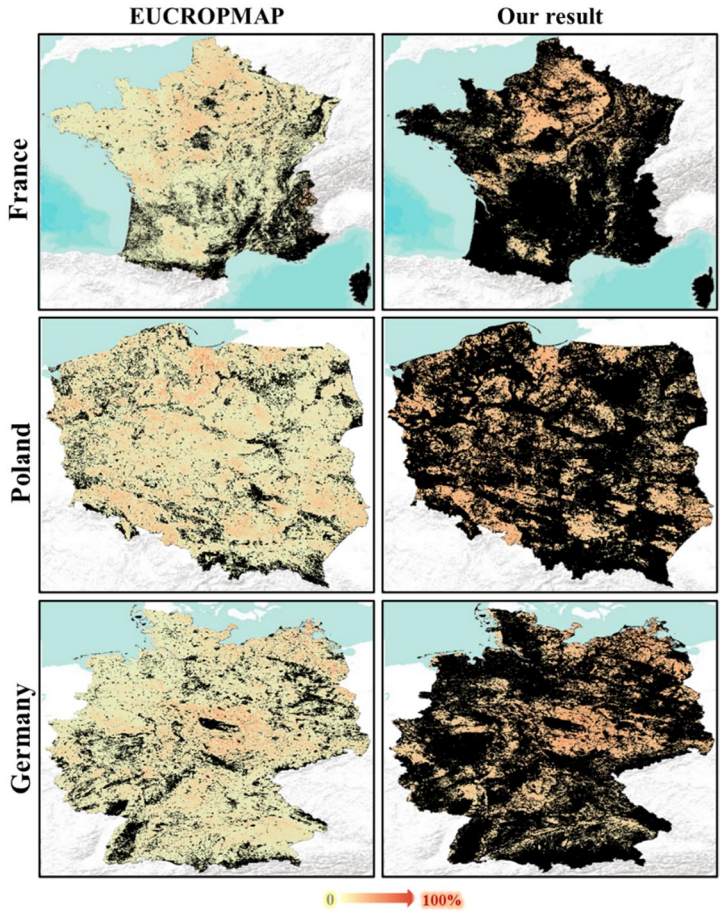


Fig S2. Mapping performance in our study area between the EUCROPMAP product (left) and our mapped results (right) in 2018.

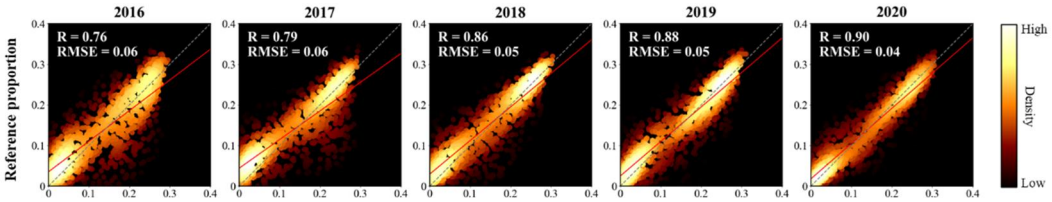


Fig S3. The Comparison of aggregated winter wheat fraction data at 5km between our results and the 30m winter wheat maps in China from 2016 to 2020.

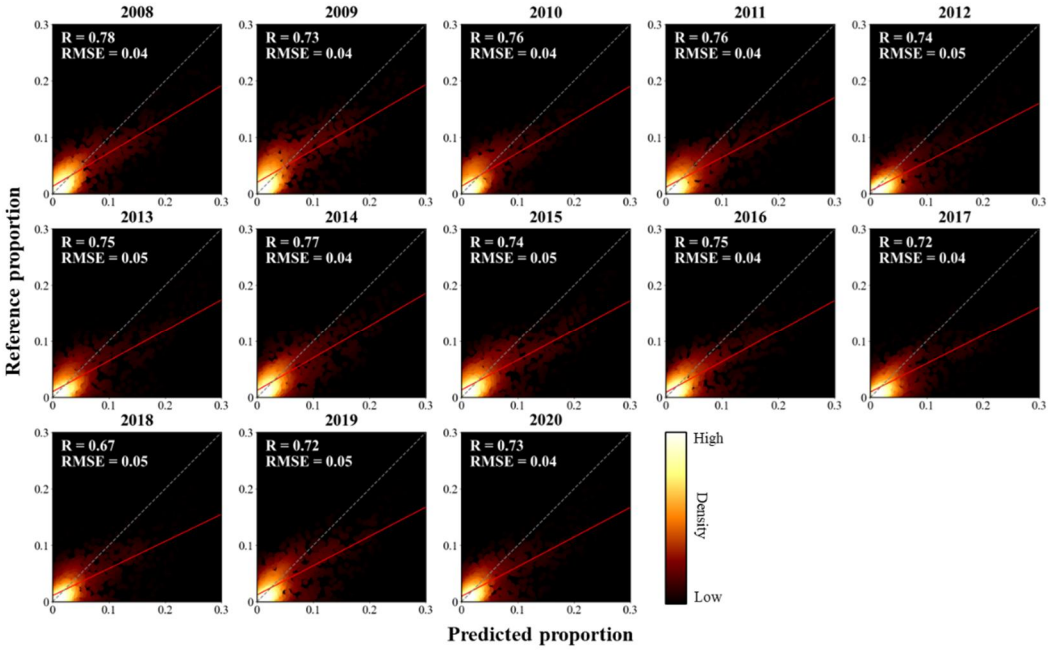


Fig S4. The Comparison of aggregated winter wheat fraction data at 5km between our results and the CDL data in the US from 2008 to 2020.

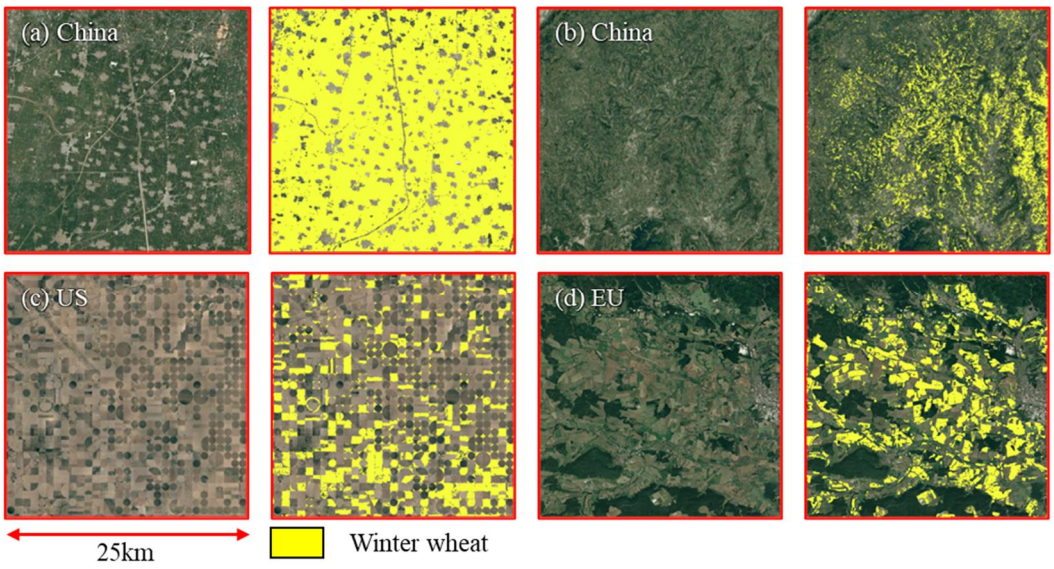


Fig. S5. Comparison of the agricultural structure of winter wheat in China (a and b), the US (c), and the EU (d).

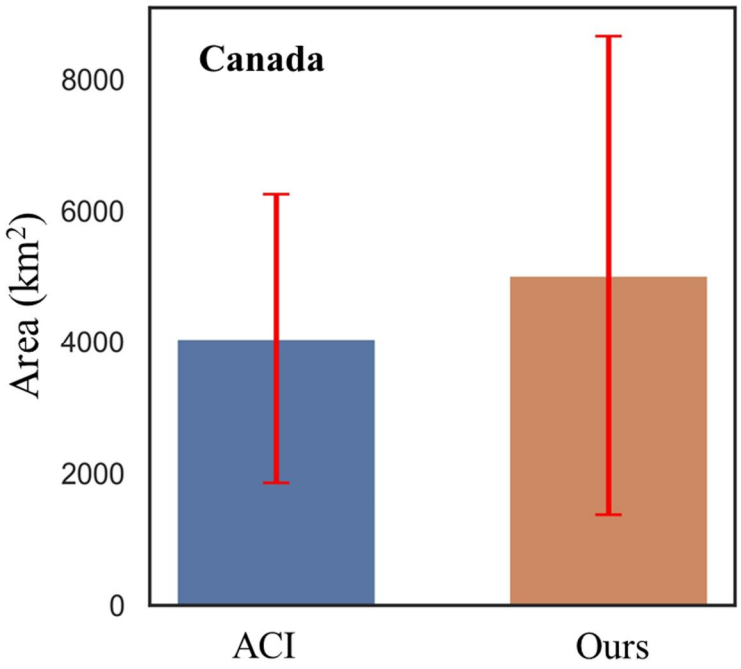


Fig S6. Comparison of region-scale winter wheat areas between our mapped results and the public crop datasets in Canada.

Table S1. The input feature for the Random Forest model.

Source Data	Spectral Bands	Monthly Quantiles	Temporal Sequence
MODIS (MOD09GA.061)	Red NIR Blue Green SWIR-1 SWIR-2 SWIR-3	5th Percentile 50th Percentile 95th Percentile	12 monthly windows (i.e., spanning the full winter wheat growing season)

Table S2. Comparison of winter wheat fractional coverage at the pixel level in China between our findings and the ChinaWheat30L dataset.

Year	R	RMSE	Year	R	RMSE
2001	0.72	13.08%	2011	0.76	12.57%
2002	0.73	11.58%	2012	0.73	11.95%
2003	0.71	12.40%	2013	0.75	13.47%
2004	0.75	12.73%	2014	0.72	10.61%
2005	0.72	10.99%	2015	0.74	15.11%
2006	0.74	11.00%	2016	0.77	10.92%
2007	0.73	11.05%	2017	0.78	12.77%
2008	0.77	10.96%	2018	0.76	11.88%
2009	0.72	11.60%	2019	0.79	10.25%
2010	0.74	12.18%	2020	0.78	16.42%