

**Fig. S1.** Isolines of LAI in the S2REP<sub>norm</sub>/S2NDRE feature space, nearly parallel to the X-axis. The color of the dots represents the LAI value for each pixel.



**Fig. S2.** Absorption coefficients of individual leaf biochemical constituents in 680 - 800 nm interval as incorporated in the PROSPECT-D model (Féret et al., 2017).



Fig. S3. Leaf or canopy reflectance spectra in the 650 - 825 nm interval simulated by the PROSPECT-D and SAIL models (Jacquemoud et al., 2009).



**Fig. S4.** Correlation between Sentinel-2 SNAP-derived LCC and ground-measured leaf chlorophyll content of winter wheat in the Luohe experimental area.



Fig. S5. Whisker boxplots illustrating the LCC estimation bias for different soil moisture factor intervals using (a) S2REP and (b) S2LCI. The soil moisture factor is represented as the percentage of dry soil. The shaded area indicates an error margin of  $\pm 5 \ \mu g/cm^2$  in the LCC retrieval.



Fig. S6. Whisker boxplots illustrating the LCC estimation bias for different average leaf angle (ALA) intervals using (a) S2REP and (b) S2LCI. The shaded area indicates an error margin of  $\pm 5 \ \mu g/cm^2$  in the LCC retrieval.