

Supplementary

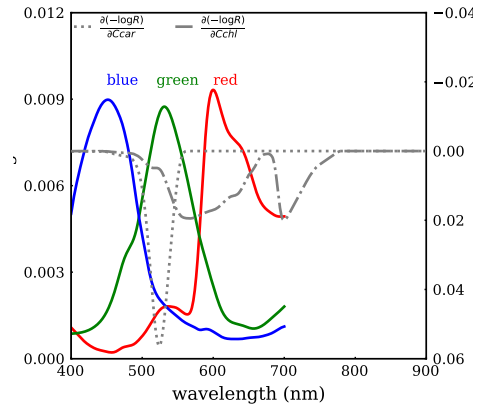


Figure S1: The convolution function of RGB channels used in GCC (Sonntag et al., 2012) is overlaid with the chlorophyll Jacobian ($\frac{\partial(-\log(R))}{\partial C_{chl}}$, dash-dotted) and the carotenoid Jacobian ($\frac{\partial(-\log(R))}{\partial C_{car}}$, dotted).

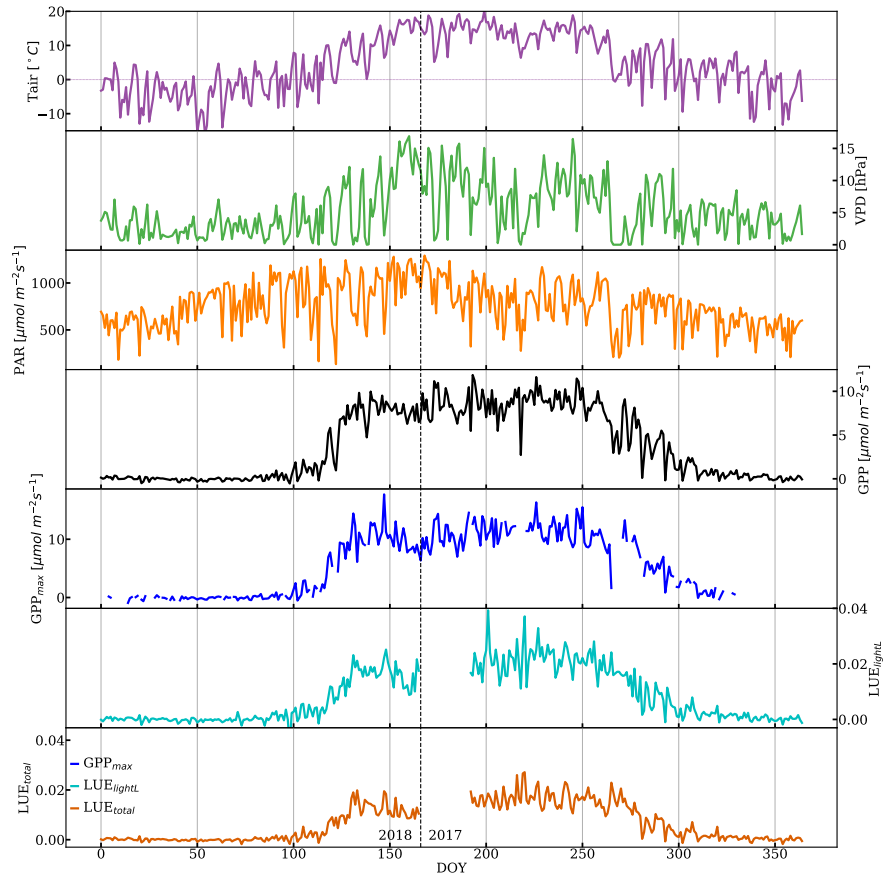


Figure S2: Time series of Air Temperature (T_{air}), Vapor Pressure Deficit (VPD), Photosynthetically Active Radiation (PAR), Gross Primary Production (GPP), Light Use Efficiencies (LUEs), and GPP_{max} . DOY 166 (2017) is the first day of observation. The vertical dashed line divides the observations from Day of Year (DOY) for year 2017 and 2018.

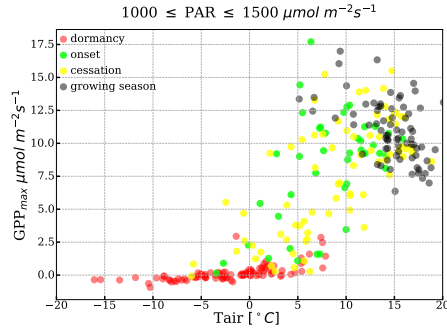


Figure S3: Scatter plot of GPP_{max} against T_{air} . The definition of seasons follows the same convention as in Fig. 1. The onset is the transitioning period from dormancy to the growing season. The cessation is the transitioning period from the growing season to the dormancy

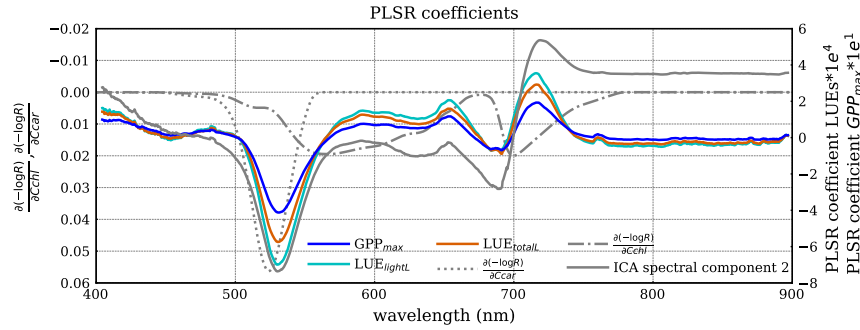


Figure S4: PLSR coefficients of reflectance with GPP_{max} , LUE_{lightL} , and LUE_{total} . The overlaid dash-dotted and dotted lines are chlorophyll and carotenoid Jacobians, respectively. The overlaid solid line is the second ICA spectral component. The vertical dashed line divides the observations from DOY for year 2017 and 2018.

References

Sonntag, O., Hufkens, K., Teshera-Sterne, C., Young, A. M., Friedl, M., Braswell, B. H., Milliman, T., O'Keefe, J., and Richardson, A. D.: Digital repeat photography for phenological research in forest ecosystems, *Agricultural and Forest Meteorology*, 152, 159–177, <https://doi.org/10.1016/J.AGRFORMET.2011.09.009>, URL <https://www.sciencedirect.com/science/article/pii/S0168192311002851>, 2012.