Mechanistic evidence for tracking the precise seasonality of photosynthesis with solar-induced fluorescence*

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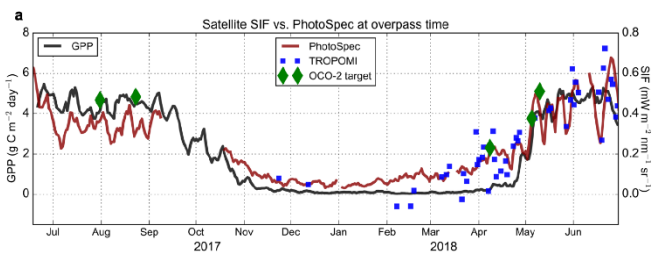
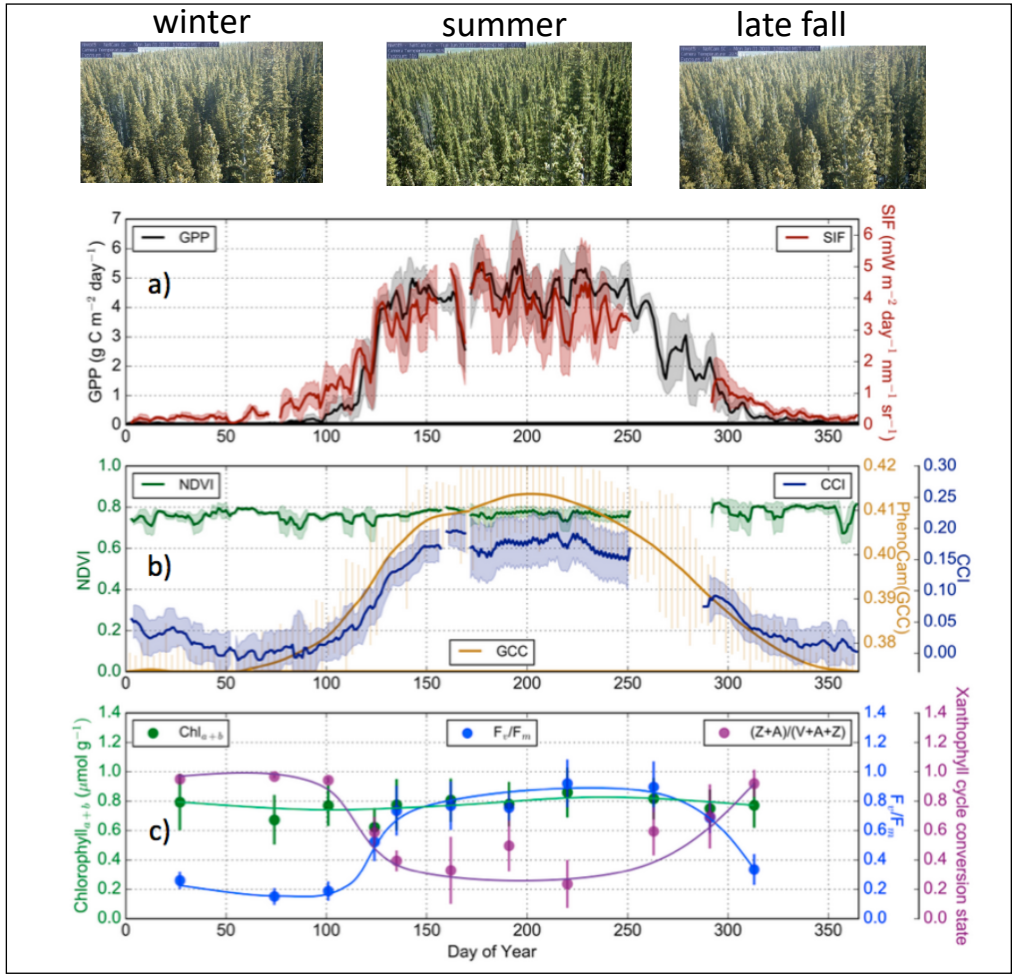
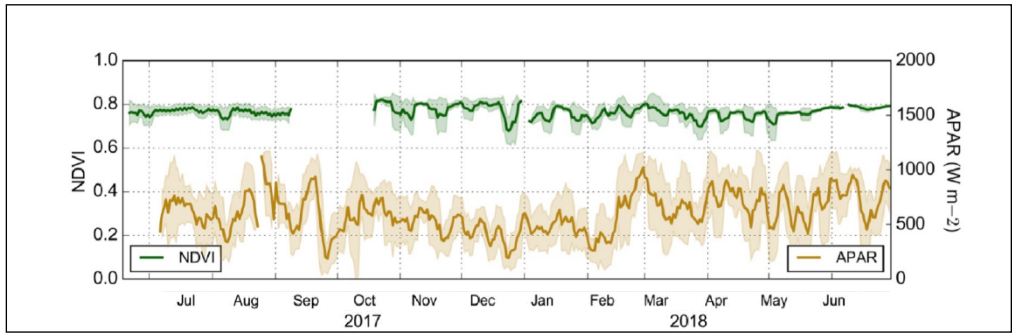
- Measurements of SIF (PhotoSpec–spectrometer system) and leaf pigments were used to understand the seasonality of photosynthesis at a sub-alpine conifer forest (Niwot Ridge, CO)
- The relation between SIF and GPP was highly linear year-round at the daily, weekly, and monthly time scales, and the seasonal patterns of both were very similar -- indicating SIF is a powerful proxy for GPP and provides information on LUE
- GPP shutdown in winter was coincident with sustained leaf-scale non-photochemical quenching, caused by increased xanthophyll cycle pool size and conversion to facilitate thermal energy dissipation, leading to changes in LUE.
- Satellite SIF retrievals (OCO-2, TROPOMI) seem consistent with PhotoSpec – this could lead to diagnosis of within and across season phenology at unprecedented spatial scales







Additional Press: NPR (Utah): https://www.kpcw.org/post/green-earth-may-28-2019-troy-magney#stream/0
University of Utah: https://unews.utah.edu/forest-glow/
Phys.org: https://phys.org/news/2019-05-forest-reveals-awakening-hibernation.html