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.

University of Utah: https://unews.utah.edu/forest-glow/