Geophysical Research Abstracts
Vol. 20, EGU2018-18603, 2018
EGU General Assembly 2018


# Inhibition of leaf respiration by light: implications for eddy-covariance partitioning

Trevor Keenan (1,2), Mirco Migliavacca (3), Dario Papale (4), Dennis Baldocchi (2), Markus Reichstein (3), Margaret Torn (1), and Thomas Wutzler (3)

(1) Lawrence Berkeley National Lab., Climate and Ecosystem Science, Berkeley, United States (trevorkeenan@lbl.gov), (2) Department of Environmental Science, Policy and Management, UC Berkeley, (3) Max-Planck Institute for Biogeochemistry, Jena 07745, Germany, (4) University of Tuscia, Viberto, Italy

Despite the importance of global photosynthesis and respiration, direct ecosystem-scale observations of either are lacking. Eddy-covariance (EC) measurements are widely used as the closest 'quasi-direct' ecosystem-scale observation from which to estimate ecosystem photosynthesis and respiration. Recent research, however, suggests that current estimates may be biased by up to 25%, due to a previously unaccounted-for process: the inhibition of leaf respiration in light. Yet the extent of inhibition at the ecosystem scale remains debated, and impacts on global estimates of photosynthesis and respiration unquantified. Here, we quantify the extent of inhibition of ecosystem respiration across the global FLUXNET EC network, and identify a pervasive influence that varies by season and ecosystem type. We develop partitioning methods that account for inhibition, and find that diurnal patterns of ecosystem respiration might be markedly different than previously thought.