**Measuring Terrestrial Biosphere Metabolism with a Global Flux Network**

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## Abstract

FLUXNET has expanded to include broader representation of vegetation types and climates. The current version of the network includes numerous tower sites over tropical and alpine forests, savanna, chaparral, grasslands, wetlands and an assortment of crops. Many sites have been operating over ten years and there are several groups of sites working across chronosequences to evaluate disturbance effects on net carbon fluxes. We recently developed an integrated and gap-filled database that contains over 600 site years from over 180 field sites. The original dataset contains direct eddy covariance measurements of $CO_2$, water vapor, heat and an array of ancillary meteorological, soil and plant information. Value-add products of gross primary productivity and ecosystem respiration have been produced at daily and annual time scales. In this paper we perform a global-scale analysis of ecosystem metabolism. Among the products discussed in this paper, we produce a statistical sampling of net and gross (assimilation and respiration) annual ecosystem fluxes, on an annual basis and we explain the behavior of the probability distributions (range, interannual and spatial variability) fluxes based on information relating to climate, functional type and disturbance. We aim to address whether or not we can produce new information on global metabolism using statistical sampling of an extensive network of direct flux measurements to constrain information produced by a Cartesian and gridded approach that has been derived indirectly by models and remote sensing.