PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION

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TITLE OF PAPER AND OUTLINE

Influence of the driving temperature for eddy covariance carbon flux partitioning

Eddy covariance measurements have contributed strongly to our understanding of the ecosystems responses to climate with respect to the water, carbon and energy fluxes (Mahecha et al. 2010, Law et al. 2002, Falge et al. 2002,Teuling et al. 2010).

To attribute the ecosystem's reponse to processes the observed net ecosystem exchange (NEE) is often split up into gross primary production (GPP) and ecosystem respiration (Reco). This procedure is usually based on semi-empirical models of respiration, that use temperature as a driver.

The collection and harmonization of the observations from many stations all over the world (www.fluxdata.org) and recent methodological developments now also allow to derive global estimates of these fluxes from the local eddy covariance flux measurements (Beer et al. 2010). In addition to the value of having a global estimate based on observations, the data streams are highly promising for model validation and improvement. The uncertainty of the GPP estimate has been partly considered by including estimates based on daytime and nighttime data, but both algorithms rely on air temperature as driver for respiration. As respiration takes place in many compartments of the ecosystem it remains unclear which temperature (air or soil in a specific depth) is the most appropriate.

In this study we investigate the potential of air and soil temperature as a driver for the Lloyd and Taylor respiration model across FLUXNET sites. We quantify the uncertainty and potential biases arising from the choice of the driving temperature for respiration and try to attribute the differences between the annual flux components derived with the two temperatures to statistical measures of the relation between air and soil temperature and to vegetation structure. Moreover we quantify the effect on ecosystem parameters derived from the flux components.

PROPOSED SITES TO BE INVOLVED

The sites will cover a broad variety of climates and vegetation types. Sites will be selected according to the successful parameter estimation. Availability of NEE and meteorological data is required.

PROPOSED RULES FOR CO-AUTHORSHIP

The main focus of the paper is on rather technical aspects of the flux partitioning. The possibility of intellectual input is possibly limited but co-authorship will be offered to PIs for contributions that significantly change the paper. Acknowledgment and citation of the PI's work is implied automatically.

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