

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION (LA-THUILE POLICY)



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TITLE OF PAPER AND OUTLINE

Synthesis of global upscaling of land surface – atmosphere fluxes

In this study we aim at estimating global fields of carbon and energy fluxes (GPP, TER, NEE, H, LE) from FLUXNET observations using the methodology of Jung et al. (2009) with a monthly time step. We want to characterize the biosphere-atmosphere exchange of global biomes based on the above five key fluxes from seasonal to multi-annual time scales. This study will provide a synthesis of land – surface atmosphere fluxes of global biomes derived from in-situ measurements and will illustrate regions of coherent multivariate oscillations or trends of biosphere-atmosphere exchange. Based on the up-scaled flux patterns, we want to further explore whether functional classes of biomes are identifiable and if they are spatially coherent. Regarding the latter, we will employ time series decomposition in conjunction with dimensionality reduction and clustering methods (Mahecha et al. 2007ab). The paper will be part of a JGR-Biogeosciences special issue on upscaling of eddy-covariance data, initiated by Jingfeng Xiao et al.

References:

- Jung, M., Reichstein, M. & Bondeau, A. Towards global empirical upscaling of FLUXNET eddy covariance observations: validation of a model tree ensemble approach using a biosphere model. *Biogeosciences* 6, 2001-2013 (2009).
- Mahecha, M.D., M. Reichstein, H. Lange, N. Carvalhais, C. Bernhofer, T. Grünwald, D. Papale, and G. Seufert. 2007a. Characterizing ecosystem-atmosphere interactions from short to interannual time scales. *Biogeosciences* 4:743-758.
- Mahecha, M.D., A. Martinez, G. Lischeid, and E. Beck. 2007b. Nonlinear dimensionality reduction: Alternative ordination approaches for extracting and visualizing biodiversity patterns in tropical montane forest vegetation data. *Ecological Informatics* 2:138-149.

PROPOSED SITES TO BE INVOLVED

The sites will cover a broad variety of climates and vegetation types. Sites will be selected according to minimum requirements regarding data quality. Availability of NEE, GPP, TER, LE, H, Rn, G and meteorological data is required.

PROPOSED RULES FOR CO-AUTHORSHIP

The rules of the FLUXNET LaThuile synthesis terms of reference apply, i.e. additional significant intellectual input leads to co-authorship in this paper.