

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION



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TITLE OF PAPER AND OUTLINE

Towards a better understanding of temporal variability of inverse model parameter estimates in process-based models

In this global scale synthesis paper on parameter estimation we want to use carbon and water eddy flux and remote sensing data with a process based ecophysiological model to explore temporal variability (or stability) of physiological and phenological parameters (e.g. V_{cmax} , J_{max} , α). In this study we want to focus on the following points:

- Statistical characterization of the temporal variability of the parameters
 - which is the dominant temporal scale of variability
 - autocorrelation and cross-correlation of the parameters
- Drivers for parameter variability
 - Can parameter variation be related external (meteorological) or internal (vegetation structure, soil...) factors
 - Does parameter variation reflect missing processes?
 - Can parameter variation be related to remote sensing indices?

A simplified variant of the PROXEL model will be used for this purpose and model parameters will be estimated for moving time windows similar to (Owen et al. 2007) and (Reichstein et al. 2003) using inverse parameter estimation methods. Time-series analysis will be performed to analyse the temporal modes of parameter (co-) variation.

PROPOSED SITES TO BE INVOLVED

All sites containing at least 2 full years of flux and meteorological data maybe considered for this analysis.

PROPOSED RULES FOR CO-AUTHORSHIP

The rules as proposed in the disclaimer for the FLUXNET2007 synthesis will be applied.

References:

Owen, K. E., J. Tenhunen, M. Reichstein, Q. Wang, E. Falge, R. Geyer, X. Xiao, P.

Stoy, C. Ammann, A. Arain, M. Aubinet, M. Aurela, C. Bernhofer, B. Chojnicki, A. Granier, T. Gruenwald, J. Hadley, B. Heinesch, D. Hollinger, A. Knohl, W. Kutsch, A. Lohila, T. Meyers, E. Moors, C. Moureaux, K. Pilegaard, N. Saigusa, S. Verma, T. Vesala, and C. Vogel. 2007. Linking flux network measurements to continental scale simulations: ecosystem CO₂ exchange capacity under non-water-stressed conditions. *Global Change Biology* **13**:734-760.

Reichstein, M., J. Tenhunen, J.-M. Ourcival, S. Rambal, O. Roupsard, F. Miglietta, M. Pecchiari, A. Peressotti, G. Tirone, and R. Valentini. 2003. Inverse modelling of seasonal drought effects on canopy CO₂/H₂O exchange in three Mediterranean Ecosystems. *Journal of Geophysical Research* **108**, **D23**:4726, 4716/4721-4716/4716, doi:4710.1029/2003JD003430,.