Identification of a general light use efficiency model for gross primary production

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Non-stationary and non-linear dynamic time series analysis tools are applied to multiannual eddy-covariance and micrometeorological data from 44 FLUXNET sites to derive a light use efficiency model on a daily basis. The extracted typical behaviour of the canopies in response to meteorological forcings leads to a model formulation allowing a variable influence of the model parameters modulating the light use efficiency. Thereby, the model is applicable to a broad range of vegetation types and climatic conditions. The proposed model explains large proportions of the variation of the gross carbon uptake at the study sites while the optimized set of six parameters is well defined. With the parameters showing explainable and meaningful relations to site-specific environmental conditions, the model has the potential to serve as basis for general regionalization strategies for large scale carbon flux predictions.