

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION



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Collaborators needing access to data:

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TITLE OF PAPER AND OUTLINE

Calibration of a light use efficiency model using FLUXNET data.

Background: estimating the present global gross primary production (GPP) and giving reliable future predictions is one of the major challenges of carbon cycle research.

Gap: at the present a number of global GPP estimates are available but none can claim to have a solid and wide, geographically and temporally extended experimental base.

Model: among all the prognostic models, the ones based on light use efficiency (LUE) are considered to be the most potential to investigate spatial-temporal dynamics of GPP. Their advantage is that all the drivers can be derived from remote sensed data or from existing climate observation networks. The only model operational at global scale is MOD17.

Aims: with the present proposal we want to

- i) estimate LUE for different biomes, highlighting its spatial variability;
- ii) use optimal estimate of LUE and its uncertainties to provide typical gross primary productivity for a given biome;
- iii) by mean of land cover classification, to provide an estimate of global GPP and its associated uncertainties;
- iv) to describe statistically the global GPP inter annual variability.

Methods: to answer to our research questions, we'll optimize the MOD17 model against eddy covariance data in a Bayesian framework adopting the Metropolis-Hastings algorithm. FAPAR values will be obtained from MOD15. A multivariate analysis will be performed to find possible other relevant drivers of GPP (e.g., water and nitrogen limitation). The biome specific results will be weighted with a land cover classification (MOD12) to upscale the site level findings.

DATA REQUIREMENTS

The analysis will be performed using daily sums of carbon exchange. All the IGBP Classes will be included. We may take in consideration all sites where at least a full growing season of flux measurements and meteorological data (including radiation and VPD) are available. The opportunity to use other ancillary data will be explored.

For linking to remote sensed data the minimum footprint area should be at least extended as the MODIS pixel size

PROPOSED RULES FOR CO-AUTHORSHIP

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