

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION



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DATASET PROPOSED

LaThuile

TITLE OF PAPER AND OUTLINE

Parametrisation and a formalised uncertainty analysis of the Managed Land module in LPJ-GUESS

Dynamic global vegetation models (DGVMs) have been used to assess the effects of changing climate and atmospheric composition on the terrestrial vegetation and ecosystems as well as the associated feedbacks to the atmosphere.

Recently we have implemented a managed land (mL) module for the DGVM LPJ-GUESS (adopted from Bondeau et al., GCB., 2007). At the present day, cultivated land covers 12% of the Earth's land surface, making it crucial to include managed ecosystems in simulations of the carbon and nitrogen cycle on a global scale. However, the inclusion of managed land in DGVMs, is not yet standard, only a handful of models and studies having taken steps in this direction (eg. Bondeau et al., GCB., 2007). This is despite the acknowledged effects of past and present-day land use/land cover change for carbon cycle and biophysical exchanges, and potentially large importance of future land use change for projections of climate, atmospheric chemistry and air pollution. Over coming years, with the mL module in LPJ-GUESS we aim to investigate how implementation of crop ecosystem management and interactions with changing climate, CO₂ concentration, N and O₃ deposition will affect the terrestrial productivity, crop yields and exchange fluxes.

A crucial first step to achieve these goals will be testing the LPJ-GUESS-mL simulation output against suitable data. In a similar fashion like previously done for forest flux data (i.e., Morales et al., GCB, 2005) we seek to utilize eddy measurements from crop and pasture sites as one potentially suitable benchmark data set. The data can be used to improve model parameterization on the one hand, and model evaluation on the other. Furthermore, we aim to utilize flux data for a standardized uncertainty analysis of the crop model within LPJ-GUESS, based on Bayesian statistics. Bayesian methods provide a formal way of accounting for uncertainty through the use of probability, and likelihood. Model output (eg. NEE,

LAI) and the likelihood of the model is compared with the likelihood of the site measurements.

Due to the global coverage of the model we seek suitable flux data from a wide range of climatic zones, and crop/pasture types..

PROPOSED SITES TO BE INVOLVED

All crop and grassland sites

PROPOSED RULES FOR CO-AUTHORSHIP

Based on the rules of the La Thuile data, data providers from crop/pasture sites selected for the above analysis will be kept fully informed of the use of their data. They will be invited to give intellectual input to the studies that use their data, and significant intellectual input should lead to co-authorship