

## **PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION**

### **Title**

**Evaluation of cropland potential light utilization efficiency over eddy flux sites in Europe and North America**

### **Initial Coordinators and Proposing Group**

Tiexi Chen, Guido van der Werf, A.J. (Han) Dolman, Margriet Groenendijk  
Faculty of Earth and Life Sciences, Vrije Universiteit Amsterdam, De Boelelaan 1085, 1081 HV  
Amsterdam, The Netherlands

### **Short Outline**

Models based on Light use efficiency (LUE) are widely used to diagnose terrestrial ecosystem productivity of gross primary productivity (GPP) or net primary productivity (NPP), such as CASA and MODIS-MOD17 algorithm which all related on this approach. However, the key parameter, maximum possible light use efficiency  $\epsilon^*$ , may change with vegetation type and introduces large uncertainties during modeling. Recently, Zhang et al. (2008) found that  $\epsilon^*$  in the MODIS algorithm was underestimated after calibration of a site of double-cropped winter wheat and summer maize in China.

Croplands cover a very large area around 15.0 million km<sup>2</sup> all over the world and have special characteristics compared with natural ecosystems. Models based on remote sensing could offer large scale and near real-time estimation of GPP/NPP or ecosystem net exchange (NEE). It is worth and practicable to detect  $\epsilon^*$  world wide through comparing model results and FLUXNET measurements.

The Carnegie-Ames-Stanford-Approach (CASA) biogeochemical model is used here together with flux data from the La Thuile data set. First, we will compare NPP in CASA and GPP measurements from fluxes, as the ratio NPP/GPP in the LUE approach use essentially the same equation. Therefore, we suggest that NPP should catch the GPP temporal pattern first. Second as CASA is a biogeochemical model, NEE, which is directly measured by eddy flux towers, is also modeled by CASA. Optimized  $\epsilon^*$  parameters thus can be obtained by fitting CASA modeled NEE to the NEE observed values.

### **Proposed Sites to Be Involved**

Croplands sites in Europe and American of grain crops and soybean with good carbon flux and meteorological measurement will be considered for this paper.

### **Rules Applied For Use of Site Data and Co-authorship Strategy**

La Thuile FLUXNET data policy will be applied.

### **Reference**

Zhang, Y. Q., Q. Yu, et al. (2008). "Calibration of Terra/MODIS gross primary production over an irrigated cropland on the North China Plain and an alpine meadow on the Tibetan Plateau." Global

