

PROPOSAL FOR FLUXNET synthesis publication



**Initial
coordinator
s::**

Willem Verstraeten (1), Frank
Veroustraete (2), Roel Van Hoolst
(1)

(1) Katholieke Universiteit
Leuven, Belgium

**Affiliation
s:**

(2) Flemish Institute for
Technological Research - VITO

DATASET PROPOSED

LaThuile

TITLE OF PAPER and OUTLINE

Estimation of carbon mass fluxes over Europe using the C-Fix model and Euroflux data.

Background:

Ecosystems can be a carbon sink (positive flux) or source (negative flux). The magnitude of a positive flux determines the capacity of an ecosystem to sequester atmospheric carbon dioxide which might originate from anthropogenic induced emissions. The magnitude of a negative flux determines the longevity of the carbon stock (Keith et al., 2010). This flux can be enhanced or reduced due to environmental conditions. In Europe, an increasing growth rate and beneficial age structure in forests is noticed the last decades. Suggested factors for this productivity enhancement are increasing atmospheric carbon dioxide concentration, an improved temperature and precipitation climate, increasing nitrogen deposition and better management. The result from the increasing growth and beneficial age structure is that European forests can act as a carbon sink to reduce atmospheric CO₂ content by offsetting fossil fuel emissions (Nabuurs et al. 2003; Tupek, et al., 2010).

To make predictions of carbon exchange on a regional or global scale it is necessary to take into account spatial variation in vegetation, soil and climatic conditions. Remote sensing has played an important role in providing information on the current climatic conditions and changing state of vegetation (Coops et al., 2009).

Outline:

Within the context of the monitoring of regional carbon fluxes, we plan to estimate carbon mass fluxes of terrestrial ecosystems (Net Ecosystem Productivity, NEP) over Europe using

the remotely sensed product efficiency model C-Fix. NEP will be estimated using MODIS imagery from 2001 until 2010. EUROFLUX datasets will be used as an independent dataset for evaluating the C-Fix model.

The C-Fix model, presented in its original form by (Veroustraete, 1994), simulates ecosystem carbon mass fluxes. It is a Monteith type parametric model driven by temperature, radiation and fraction of Absorbed Photosynthetically Active Radiation (fAPAR). C-Fix, in its original form, has been applied over Europe using NOAA/AVHRR imagery of 1997 (Veroustraete et al. 2002) and for the period of 1998-1999 using SPOT4-VGT imagery (Veroustraete et al. 2004). Verstraeten (2006) improved the algorithm by the integration of water and temperature limitation. The new algorithm can be applied to estimate net ecosystem productivity in a fully water limited mode. C-Fix, with the fully water limitation algorithm, has been successfully applied over Europe using NOAA/AVHRR imagery of 1997 (Verstraeten et al., 2010).

Proposed SITES to be INVOLVED

The proposal focuses on the Euroflux sites. All sites in this region with more than 1 year of observations of Net Ecosystem Productivity, latent heat, humidity, soil moisture content and global radiation will be considered.

Proposed Rules for Co-Authorship

Members of the FLUXNET community are welcome as coauthors given that they provide academic input for the analysis. Sites of which PI does not want that their data is used, will be excluded from the analysis.