Geophysical Research Abstracts
Vol. 20, EGU2018-16735, 2018
EGU General Assembly 2018

Homogeneous data-reprocessing and full synthesis of eddy-flux measurements in French terrestrial ecosytems : 1999 - 2015

Virginie Moreaux (1), Denis Loustau (1), Eric Ceshia (2), Nicolas Delpierre (3), Eric Dufrêne (3), Richard Joffre (4), Katja Klumpp (5), Daniel Berveiller (3), Jean-Marc Limousin (4), Jean-Marc Ourcival (4), Aurore Brut (2), Olivier Darsonville (5), Sébastien Lafont (1), Karim Piquemal (4), and Bernard Longdoz (6)

(1) INRA : Centre Nouvelle-Aquitaine-Bordeaux, Villenave d'Ornon, France (virginie.moreaux@inra.fr), (2) Centre d'Etudes Spatiales de la Biosphère, Toulouse, France, (3) Laboratoire Ecologie, Systématique et Evolution, Orsay, France, (4) CEFE Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier, France, (5) INRA, Grassland Ecosystem Research, Clermont-Ferrand, France, (6) Gembloux Agro-Bio Tech, Gembloux, Belgium

The attribution of the significant inter-annual variability of long lived greenhouse gas (GHG) fluxes, between edaphic, meteorological variables and ecosystem management parameters - independently or in interaction, evolving as a long term drift or as extreme events - remains uncertain. Our research aims to quantify the potential impact of climatic drifts or anthropogenic and meteorological events on ecosystem-atmosphere exchanges of French sites by analyzing the long series (at least continuous 9 years, between 1996 and 2015) of eddy covariance (EC) fluxes. We firstly performed a homogeneously repost-processing of the raw EC data across 5 sites: three forest ecosystems (deciduous broad-leaved FR-Fon, evergreen broadleaved FR-Pue, and evergreen coniferous FR-Br), one extensive grassland (FR-Lq2) and one cropland (FR-Aur). These data, in terms of net ecosystem exchanges (NEE), gross primary production (GPP) and ecosystem respiration (Reco) were put together with the corresponding climatic and edaphic data and with the carbon stock inventory for an homogeneous statistical analysis and comparative interpretations.
The standard protocol, excluding any Nakai's corrections, helped to reduce the influence of the methodology and experimental design on the temporal and spatial variability. The methodology adopted finally used 35% on average of flux data for all sites. Based on the first analysis of reprocessed data from the forests, no significant long term evolution of NEE, Reco and GPP through the studied periods despite [CO_2] increase and long term change observed in environmental parameters. Combining all years, a respiration limitation at high air temperature was observed on the forest sites, with a LAI dependency for deciduous ecosystems, and REW dependency for evergreen southern sites. A dominant effect of air vapor stress, compared to edaphic stress was observed on GPP response to PPFD in the deciduous northern forest, significantly decreasing with VPD increase.