Geophysical Research Abstracts,
Vol. 11, EGU2009-12095, 2009
EGU General Assembly 2009

Does inter-annual variability of Net Ecosystem Exchange exceed uncertainty?

C.M.J. Jacobs, E.J. Moors, J.A. Elbers, W.W.P. Jans, and B. Kruijt
Alterra-WUR, Wageningen, Netherlands (cor.jacobs@wur.nl, +31 317 419000)

The inter-annual variability of Net Ecosystem Exchange of CO_2 (NEE) was studied using a 13-year record of eddy-covariance data from the Loobos forest flux site (*Pinus Sylvestris*) in The Netherlands. The data were processed and quality-controlled following well-established protocols. In addition, an angle-of-attack correction was performed to account for contributions from wind directions outside the calibration range of the sonic anemometer as well as a correction of the effect of surface heat exchange of the open-path gas analyzer on the CO_2 flux. Annual NEE varied by more than a factor of two between individual years. Attempts were made to relate the observed NEE to several meteorological conditions, hydrological conditions, ecosystem response characteristics, and nitrogen and ozone deposition, with and without consideration of time lags. Overall, none of these factors or factor combinations consistently explained the year-to-year variations. In some cases differences between individual years could be explained by considering sub-seasonal variations, such as differences in ecosystem respiration caused by excessive drought followed by excessive precipitation in one year but not in the other or temporary reduction of carbon uptake due to storm damage. The question arises whether or not the inter-annual variability exceeds uncertainty because of uncertainty in the eddy covariance measurements and its corrections and uncertainty in ecosystem characteristics. For the Loobos site some major uncertainties will also be highlighted and compared with the inter-annual variability. Implications for modeling approaches will be discussed.