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Turbulent CO_2 and H_2O flux measurements with an eddy-covariance-system over a wheat field in the Upper Rhine Valley (Project INTERREG IIIa 3c.10)

M. Zygmuntowski (1,2), D. Viville (3), G. Najjar (4), P. Kastendeuch (3)

(1) Meteorological Institute of the Albert-Ludwigs-University at Freiburg, Germany, (2) Geographical Faculty of the Louis-Pasteur-University at Strasbourg, France, (3) CGS, (UMR 7517 CNRS/ULP), Strasbourg, France, (4) LSiiT, (UMR 7005 CNRS/ULP), Strasbourg, France

(markus.zygmuntowski@meteo.uni-freiburg.de / Fax: +49-761-203-6922 / Phone: +49-761-203-6926)

Concerning predictions of hotter and dryer summer seasons in Central Europe by regional climate models, the Upper Rhine Valley with its hot and dry summers gets a perfect observation area for analysing which yield and carbon stock changes (in relation to the sense of the protocol of Kyoto) will result from these modifications in water plant supply in future. To assess the impacts of climate changes on the vegetation in the upper Rhine Valley, the project aims at carbon budgets establishment for different plants (wheat, pine, maize) submitted to similar meteorological conditions.

In this framework, turbulent CO_2 and H_2O fluxes have been measured over a wheat field close to Hohengoeft village (48^o 40' N, 7^o 29' E, alt.: 220 m., France) from April 2005 to December 2006. The turbulent fluxes are determined with a CSAT3 sonic anemometer and a LICOR 7500 infrared gas analyzer at a frequency of 20 Hz. Climatological variables are measured in the atmosphere (radiation, temperature, humidity, wind, precipitation) and in the soil (temperature, water content, water tension).

A database management has been developed for improving data processing. Several methods for quality assessment and quality control have been used before common flux corrections for the density (Webb, 1980), the sonic temperature (Schotanus, 1983) and the spectral loss (Moore, 1986) have been applied. The use of the eddy-covariance-method will be presented. Comparisons of non-corrected and corrected

turbulent CO_2 and H_2O fluxes based on 30-min time steps gives an evaluation of the database and of the methods. The dynamic of CO_2 and H_2O concentrations and fluxes at daily and seasonal time steps will be discussed in relation to the climatological patterns.