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Carbon budget of a sugar beet crop

C. Moureaux (1), A. Vilret (2), S. Delvoye (1), B. Bodson (2), A. Debacq (1), M. Aubinet (1)

(1) Unité de Physique des Biosystèmes, Faculté universitaire des Sciences agronomiques de Gembloux, Belgium, (2) Unité de Phytotechnie tempérée, Faculté universitaire des Sciences agronomiques de Gembloux, Belgium (moureaux.c@fsagx.ac.be / Fax: +32 81 62 24 39 / Phone: +32 81 62 24 92)

The carbon budget of a sugar beet crop was assessed from measurements performed at different temporal and spatial scales.

At the whole crop scale, CO_2 fluxes were measured continuously during 1 year by the eddy covariance technique in order to provide the NEE. Complementary meteorological measurements were performed in order to infer the response of the flux to climate. The seasonal evolution of this response has also been studied.

At the leaf scale, the leaf net assimilation response to the radiation (PAR) was measured fortnightly during two months with a portable photosynthesis system. PAR profiles were also taken in the canopy. Integration of these results provided an estimation of the crop GPP.

At soil chamber scale, soil CO_2 efflux measurements were performed fortnightly during two months with a portative chamber. The response of the soil respiration to the soil temperature and the soil water content was established. Integration of these results could give an estimate of total soil respiration. The comparison of these different terms would allow a first assessment of the crop carbon balance.

Finally, crop samplings were performed continuously in order to follow the evolution of the mass and carbon content of the sugar beets and to validate the preceding results.