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Estimating CO_2 flux of croplands for bottom-up carbon budgeting

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Agricultural crops play a significant role in the diurnal and seasonal cycle of atmospheric CO_2 over the growing season. The evolution of CO_2 flux over space and time for various crops need to be determined for establishing any (mid-)continental atmospheric CO_2 budget as it is intended to be done in the North American Carbon Program. Flux towers and the ancillary measurements are critical for regional analysis and understanding of dynamics of CO_2 and energy exchange. They provide ground-truth data for remote sensing observations, information for verifying process-based models and for interpreting aircraft and tall tower concentration measurements. Several instrumented towers are monitoring CO_2 and energy fluxes from agricultural crops such as corn, wheat, soybean, sugar beet, rape seed, and rice paddies for various locations through networks such as Ameriflux, CarboEurope, and Japanflux. Our objectives are (i) to prepare an exhaustive inventory of the eddy flux measurements carried out (past and present) reporting the crop types, agro-climatic conditions, soil type and slope, management practices and type of measurements (fluxes and the so-called ancillary ones) along with any relevant methodological problems encountered in flux measurements above short canopy crop and (ii) to compare different temporal series (30-min, daily, 10 days) of flux measurements acquired through the growing season in order to stress the commonalities and the differences in the functional response of the various

crops in relation to climate, and management practices.