POPFULL

Water table change differently affects CO_2, CH_4, and N_2O fluxes in a bio-energy poplar plantation

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POPFULL

➢The POPFULL research project started in Flanders (Belgium) is testing the potential of SRC plantations to sequester CO_2 from the atmosphere and investigate the emission/uptake of the most important GHG (H_2O, CH_4, N_2O, O_3) and their environmental controls.

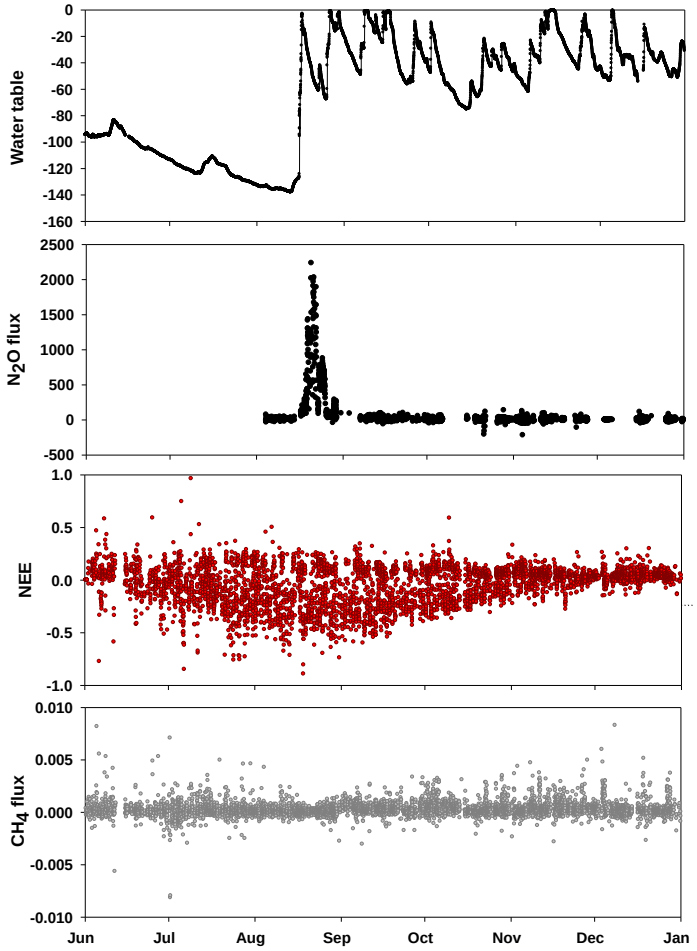
Fig. 1 Eddy covariance tower (left) in the experimental plantation in September 2010.

We installed a meteorological and eddy flux tower in March-April 2010 and are currently measuring:

➢ Environmental variables (water table, soil moisture, soil and air temperature, solar and thermal radiation, diffuse radiation, soil heat flux, etc.)

➢CO_2 ,H_2O, CH_4, N_2O, and O_3 fluxes from the plantation with eddy covariance

Within the framework of the POPFULL project we are also quantifying the complete energy balance and the full economic accounting in line with a full life cycle assessment.



In Fig. 2 are shown data from the first field season (2010) when an intense precipitation event (~80 mm rainfall in 48 hours) occurred after a prolonged fairly dry summer period.

This first extreme precipitation caused:

➢peak N_2O emissions (up to 2.200 µg N_2O-N m^{-2} h^{-1})

➢CO_2 (NEE) and CH_4 fluxes did not respond to any of these rain events

This was probably caused by the N availability to microorganisms that exceeded C availability at our site.

Fig. 2 Water table, N_2O fluxes (µg N_2O-N m^{-2} h^{-1}), CO_2 fluxes(NEE, mg CO_2 m^{-2} s^{-1}), and CH_4 fluxes (mg CH_4 m^{-2} s^{-1}) in the plantation during part of the month of Jun-December 2010. Notice the increase in N_2O emission after water table drop on the 19 to the 26 of August.

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