The research project we just started in Flanders (Belgium; POPFULL) will provide a full accounting of the greenhouse gas balance and energy production of a 18.4 ha short rotation coppice (SRC) plantation of fast-growing poplar and willow.

The goal of this project is to test the potential of SRC plantations to sequester CO₂ from the atmosphere and also investigate the emission/uptake of the other most important greenhouse gases (H₂O, CH₄, N₂O, O₃) from the plantation and their environmental controls.

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

- A complete suite of environmental variables (water table, soil moisture, soil and air temperature, solar and thermal radiation, diffuse radiation, soil heat flux, etc.)
- CO₂, H₂O, CH₄, N₂O, and O₃ 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 balance in line with a full life cycle assessment.

Below are shown some of the preliminary results from the first season. The fluxes are dominated by CO₂ and N₂O (CO₂ sink and a N₂O source). The CH₄ fluxes show very low values (data not shown), probably for the sandy soil usually dry on the surface. The emission of N₂O follows the drop in water table (Fig. 2). When the soil dries out further the plantation presents a N₂O sink. The plantation is also a sink for O₃ (Fig. 3).

Acknowledgements
The research leading to these results has received funding from the European Research Council under the European Community’s Seventh Framework Programme (FP7/2007-2013), ERC grant agreement nr. 233366 (POPFULL) and the Marie Curie Reintegration grants (PIRG07-GA-2010-266257). We thank Kristof Mouton for logistic support at and management of the field site. (PIRG07-GA-2010-266257). We thank all the Ph.D and post-doctoral students and that helped in the project, especially Laura, Melanie, Sylvestre, and Ouafik.