Geophysical Research Abstracts
Vol. 17, EGU2015-15084-1, 2015
EGU General Assembly 2015

Agricultural crops and soil treatment impacts on the daily and seasonal dynamics of CO_2 fluxes in the field agroecosystems at the Central region of Russia

Ilya Mazirov (1), Ivan Vasenev (1), Joulia Meshalkina (1,2), Alexis Yaroslavtsev (1), Egor Berezovskiy (1), and Turmusbek Djancharov (1)

(1) Laboratory of Agroecological Monitoring, Ecosystem Modelling and Prediction, Russian Timiryazev State Agrarian University, Moscow, Russia, (2) Soil Science Faculty, Moscow Lomonosov State University, Moscow, Russia

The problem of greenhouse gases' concentrations increasing becomes more and more important due to global changes issues. The main component of greenhouse gases is carbon dioxide. The researches focused on its fluxes in natural and anthropogenic modified landscapes can help in this problem solution. Our research has been done with support of the RF Government grants # 11.G34.31.0079 and # 14.120.14.4266 and of FP7 Grant # 603542 LUC4C in the representative for Central Region of Russia field agroecosystems at the Precision Farming Experimental Field of Russian Timiryazev State Agrarian University with cultivated sod podzoluvisols, barley and oats - vetch grass mix (Moscow station of the RusFluxNet). The daily and seasonal dynamics of the carbon dioxide have been studied at the ecosystem level by the Eddy covariance method (2 stations) and at the soil level by the exposition chamber method (40 chambers) with mobile infra red gas analyzer (Li-Cor 820). The primary Eddy covariance monitoring data on CO_2 fluxes and water vapor have been processed by EddyPro software developed by LI-COR Biosciences.

According to the two-year monitoring data the daily CO_2 sink during the vegetation season is usually approximately two times higher than its emission at night. Seasonal CO_2 fluxes comparative stabilization has been fixed in case the plants height around 10-12 cm and it usually persist until the wax ripeness phase. There is strong dependence between the soil CO_2 emission and the air temperature with the correlation coefficient 0.86 in average (due to strong input of the soil thin top functional subhorizon), but it drops essentially at the end of the season – till 0.38. The soil moisture impact on CO_2 fluxes dynamics was less, with negative correlation at the end of the season. High daily dynamics of CO_2 fluxes determines the protocol requirements for seasonal soil monitoring investigation with less limitation at the end of the season.

The accumulated monitoring data will be very useful for verification the current regional assessments of the organic C balances, investigated crops' C-footprint calculations and better understanding the soil organic matter dynamics in these soils with different crops and farming practices.