
AMBIENT NO_x CONCENTRATION ABOVE BARE SOIL IN SOUTHERN UKRAINE**Medinets S.¹, Medinets V.¹, Butterbach-Bahl K.², Gasche R.², Pitsyk V.¹, Skiba U.³**¹*Odessa National I. I. Mechnikov University (ONU), Odessa, Ukraine*²*IMK-IFU, KIT, Garmisch-Panterkirchen, Germany*³*Centre for Ecology and Hydrology (CEH), Edinburgh, UK*E-mail: s.medinets@gmail.com

Studies of biogeochemical cycle of nitrogen (N), one of the most important biogenic element, is a timely issue for Europe and Ukraine. Moreover NO_x soil-atmosphere exchange is the most poorly investigated, compared with others N species. Surface ozone level is formed mainly due to photochemical reaction of nitrogen (N) oxides (NO_x = NO + NO₂) and volatile organic carbon (VOC) in near ground atmosphere (Hertel et al., 2006; Fowler et al., 2009). Therefore obligatory investigations of entire triad NO-O₃-NO₂ is needed, furthermore reactions between constituents are reversible and occur at high-rates (Ludwig et al., 2001; Fowler et al., 2009). Determination of NO_x level at surface atmosphere is timely and urgent task for agricultural regions worldwide and was our main target during this study.

Completely automatic realtime continuous measurements of NO_x concentration using automatic dynamic chamber system for gas analyzing (KIT, Germany; described in details by Butterbach-Bahl et al., 1997) with NO/NO_x chemoluminescence analyzer CLD 88P with photolytic converter PLC 860 (EcoPhysics Ins., Switzerland) was described and performed first time on the territory of Ukraine. First short set of nitric oxide and nitrogen dioxide concentrations data have been reported here for 19th September – 5th October 2012 period.

Preliminary results regarding NO and NO₂ concentration, which are closely related with ozone, have shown that average concentration of nitric oxide in surface ambient air was 0.31±0.67 ppb, with maximal magnitude 6.56±8.65 ppb at 12:00 - 14:00 (September, 16). The minimal concentrations (0.01±0.01 ppb) were registered from time to time in the evening and nocturnal time. At the same time the maxima of N dioxide (16.28±8.22 ppb) were observed in 2nd of October from 9:00 to 11:00 am with diurnal mean magnitude of 2.72±2.51 ppb. This slight data set of results demonstrated high variability of NO_x concentration, which corresponded well with previous studies (Ludwig et al., 2001; Wang et al., 2010), that in rural areas normally are influenced by soil community activity (in particular nitric oxide; Ludwig et al., 2001; Laville et al., 2011) and N oxide species (NO and NO₂) could convert rapidly, depending on ambient ozone concentration (Ludwig et al., 2001; Fowler et al., 2009). Long-term investigations are recommended for quality quantification of the ambient mean NO and NO₂ concentrations and description of seasonal pattern.

Authors gratefully acknowledge support from the projects “Effects of Climate Change on Air Pollution Impacts and Response Strategies for European Ecosystems” (ÉCLAIRE), funded under the EC 7th Framework Programme (Grant Agreement No. 282910), “Evaluation of Agriculture and Fires Impacts to Lower Dniester Ecosystems and Greenhouse Gases Emission into Atmosphere” (No. 505), funded by the Ministry of Education and Science of Ukraine, and EU COST Action ES0804 -

«Biodiversity. Ecology. Adaptation. Evolution.» Odessa, 2013

Advancing the integrated monitoring of trace gas exchange Between Biosphere and Atmosphere (ABBA).