EMS Annual Meeting Abstracts
Vol. 11, EMS2014-33, 2014
14th EMS / 10th ECAC


# Nitrogen dioxide and formaldehyde observations at DOAS Network in Moscow Region

Alexander Borovski (1), Aleksander Elokhov (1), Oleg Postylyakov (1), Victor Ivanov (2), and Yugo Kanaya (3)

(1) A.M. Obukhov Institute of Atmospheric Physics, Russian Academy of Sciences, Russian Federation (alexander.n.borovski@gmail.com), (2) Belarus State University, Belarus, (3) Japan Agency for Marine-Earth Science and Technology, Japan

A.M. Obukhov Institute of Atmospheric Physics (IAP) of Russian Academy of Science developed a network of atmosphere composition measurements by DOAS method. Measurement sites of the network are located in the centre of Moscow at IAP (55.74N, 37.62E) south-east part of the city at M.V. Lomonosov Moscow State University (55.70N 37.53E), and in background region at Zvenigorod Scientific Station of IAP (ZSS, 55.70N, 36.78E). Three devices are mounted at ZSS: based on MDR-23 spectrometer (since 1990), JAMSTEC MAX-DOAS (since 2008), and based on ORIEL MS257 spectrometer (since 2008). ORIEL MS260i imaging spectrometers were mounted at city stations in 2010.

Basing on performed measurements, $NO_2$ vertical distribution at twilight and total content (mainly contributed by ABL) of $NO_2$ and HCHO in daytime are obtained. The quantities are obtained for clear sky and cloudy conditions. Besides that, the vertical distribution of aerosol and $NO_2$ using MAX-DOAS are calculated for clear sky.

The HCHO total content is retrieved with error about 20%. We analyzed the variability of the HCHO in 2010. The HCHO content is larger during east wind directions than during non-east wind directions. It can be associated with Moscow Megacity influence on air quality at Zvenigorod. The estimation of Moscow Megacity influence on HCHO abundance at Zvenigorod is around 2.5E14 mol/cm2 per 1 km length of trajectory path inside Moscow Ring Road. Our data show statistically significant positive temperature effect in HCHO for the background condition for temperatures from –5C to +33C. The temperature trend in HCHO data at ZSS is about (8.9±2.3)E14 mol/cm2/C. It can be explained by the HCHO formation from non-methane biogenic volatile organic compounds (e.g. isoprene) for which more emission is expected at higher temperatures.

The research was partially supported by RFBR grant 14-05-90012.