Geophysical Research Abstracts
Vol. 12, EGU2010-11044, 2010
EGU General Assembly 2010

Correlation of the PM10 surface concentrations and aerosol optical thickness from AERONET observations over Bucharest

Anca Nemuc (1), Luminita Filip (2), and Sabina Stefan (2)

(1) National Institute of Research and Development INOE, Bucharest-Magurele, Romania, anca@inoe.inoe.ro, (2) Faculty of Physics, University of Bucharest, Romania,sabina_stefan@yahoo.com

SSpatial and temporal variation of aerosol particles is very important for human health and also for air quality and climate change studies. The columnar AOT (Aerosol Optical Thickness) is an aerosol optical property that is commonly used as aerosol load indicator. Worldwide the AOT is routinely monitored by sun-photometers and also accessible from satellite measurements.

This work aims to find a relationship between in situ measurements of PM 10(Particulate Matter) mass concentrations and daily mean AOT values of atmospheric columns in different spectral regions at two sites in Bucharest area (Magurele and Baneasa) located far from local pollution sources. Measurements were performed with sun-photometers part of the Aerosol Robotic Network (AERONET) for AOT, and low-volume samplers near-ground for in situ PM mass concentrations.

The analysis was applied for July and August of 2007, June and August 2008 and August 2009. Although, several factors like aerosol vertical distribution or hygroscopic growth factor could affect the linkage between PM10 ground concentrations and aerosol optical thickness, our linear regression analysis results have shown significant correlation coefficients, ranging from 0.60 to 0.80. Therefore the columnar observation can be transferred to near surface conditions, for the meteorological situations observed during our analysis. Consequently, due to this correlation PM10 mass concentration can be computed at ground level by using AERONET AOT for the specified location.

The uncertainties of this approach have been investigated including influence of relative humidity and dust intrusions in the free troposphere from long range transport.

This study showed that it is possible to use Sun photometric measurements in order to improve existent air quality surveillance or to extend their spatial coverage.