



Assessment of the impact of forest fires on aerosols distribution in the atmosphere over Kyiv based on AERONET and satellites measurement techniques

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The study of the dynamics of aerosol particles, revealing their sources in the atmosphere is one of the urgent problems of modern meteorology, climatology, atmospheric physics, and ecology. Monitoring of the air pollution caused by aerosols contributes to the determination of its effects on the climate and to the reduction of its negative impacts on the health of the population. The research work comprises latest technologies and approaches: remote ground-based together with satellite measurements of the optical properties of aerosol particles, atmospheric dynamics research and modeling of transport of particles.

The dynamics of aerosol layer properties over Ukrainian cities as Kyiv, Sevastopol, and over the rural site Martova is the subject of the remote sensing investigation made by the sun photometers network AERONET/PHOTONS, dealing with the columnar aerosol optical properties particularly aerosol optical depth (AOD). As well the CALIOP lidar data on board of CALIPSO satellite were used for AOD analysis for appropriate territory and further comparison with AERONET measurements.

It was stated that during warm periods a large concentration of impurities was observed due to natural sources, such as forest fires in Ukraine and the European Russia. Especially in summer 2010 the high-altitude anticyclone and a ridge above the European Russia and Ural caused the hottest weather in the East Europe region for the period that promoted origin of vast and intensive forest fires in Central and Western Russia that caused reach pollution of the atmosphere over Ukraine by aerosols. Thus, in August 15, 2010 an aerosol optical depth over Kyiv at a wavelength of 440 nm reached a value of 1.5, which was associated with the aerosols arrival from these fires. Thus, the values of aerosol optical depth that date was triple more in comparison to usual distribution.

The ways of aerosols arrival to the atmosphere over Kyiv from the fires centers during some days of August 2010 and effect on the aerosol optical properties were studied using synoptic analysis and back-trajectories techniques. The fires localization and intensity were detected from MODIS measurements on board of Terra and Aqua satellites.