A49-A50

INVESTIGATION OF AEROSOL OPTICAL PROPERTIES AT THE GROUND-BASED STATION IN KISHINEV DURING THE FIRE EVENTS IN THE WEST REGIONS OF RUSSIA ON SEPTEMBER 2002

Alexandr Aculinin (Institute of Applied Physics, Academy of Sciences of Moldova, Moldova, Republic of, akulinin@phys.asm.md)

It is investigated variation of atmospheric aerosol optical properties derived from the direct Sun and sky radiance measurements within the spectral range from 340 nm to 1020 nm made with the automatic Sun/sky scanning radiometer CIMEL CE-318. These properties are analyzed in connection with the influence of the smoke particles long-distance transported from the Russia, Belarus and Ukraine, where numerous of forest and peat fires were observed from the 5 to 7 September, 2002. Column-integrated aerosol optical and microphysical parameters, such as aerosol optical thickness (AOT), single scattering albedo (SSA) and volume size distributions, have been derived from the Sun/sky radiance measurements. These measurements have been carried out at the Kishinev site, Moldova (47.00oN, 28.82oE; 205 m a.s.l.). The site is in operation within the framework of the Aerosol Robotic Network (AERONET) program, managed by the NASA/GSFC. Columnar optical and microphysical properties of aerosol particles are routinely computed with the AERONET's smart inversion algorithms. The history of air masses was retrieved from 5-days back trajectories analysis by using HYSPLIT 4 model. Three days of observation, from 9 to 11 September 2002, were chosen when the air masses with smoke reached the region of Moldova from Russia. Day of 11 September was characterized with maximum variability of aerosol optical and microphysical properties due to intrusion of air masses with smoke particles. It was observed distinct spectral variation of daily average values of AOT at seven wavelengths from 340 nm to 1020 nm. Retrieved AOTs were defined as very high and showed spectral variation owing to the presence of small particles. In particular, on 11 September, AOT was the highest one ever measured at Kishinev site and reached the value of ~2.16 (at wavelength 500 nm). Daily average values of SSA for the Kishinev case varied from 0.97 (on 09 September) to 0.99 (on 11 September). Little spectral variability of SSA was due to presence in air masses particles with large size of fine mode ~0.26 μm and with low values of imaginary part of retrieved refractive index k~ 0.0012. It was shown that discrepancy between values retrieved at the Kishinev site and parameters measured at the Moscow site in the vicinity of peat fires occurred from 5 to 7 September was due to the presence of fresh smoke particles with smaller particle size of fine mode and high content of black carbon in composition of particulate matter at Moscow site. For Kishinev case low value of k and fine mode radius enlarging from 0.16 μm to 0.26 μm was due to condensation growth of smoke particles because of particulate matter may contain hygroscopic sulfur from smoldering combustion of peats in Moscow region. Retrieved volume size distribution revealed two modal shape, but with increasing contribution of fine mode into the size distribution observed on September 11. This was due to combination of factors such as hygroscopic growth, smoke aging, and mixing with the urban/industrial pollutions during the long-path transport from the west regions of the Russia and other countries along this path.