



Analysis of air-mass modification over Poland and Romania by means of multiwavelength lidars – a case study 19-21/07/2014

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A case study of air-mass modification over Poland and Romania, assessing the role of the Carpathian Mountains, during 19-21/07/2014 is analyzed. The study is based mainly on measurements taken by two multiwavelength Raman lidars at two different sites: the Radiative Transfer Laboratory (RT-Lab) at the Faculty of Physics of the University of Warsaw in Warsaw (Poland) and at the RADO site of the National Institute of R&D in Optoelectronics in Magurele (Romania). These data were complemented with meteorological data collected at two other sites: SolarAOT in Strzyżów (Poland) - equipped also with AERONET photometer and CHM15k ceilometer, and in Cluj (Romania). The RADO site, with its 7-wavelength aerosol-Raman-depolarization lidar (RALi) is integrated into EARLINET network. The RT-Lab site, with its 8-wavelength aerosol-Raman-depolarization (PollyXT-type) lidar, started the procedure to join in EARLINET last year. Moreover, RT-Lab and SolarAOT sites are part of the Poland AOD network.

The analysis is focused on evaluating both multi-wavelength lidar data sets in order to search for similarities and differences in the vertical profiles describing the atmospheric layers above the two stations. Accordingly to GDAS Hysplit 4-days backward trajectory ending up in Magurele at 0.5, 1.5 and 3 km an air-mass from western Europe entered Poland from the north-west on 19/07/2014, descended on the following day over the Poland AOD station in Strzyżów, followed by Cluj and end up at Magurele on 21/07/2014. As the four stations are located along a north-west to south-east line the objective was to evaluate the aerosol properties of the air flow transported over Poland and further to Romania. At both sites, backscatter profiles at 355, 532 and 1064nm, extinction profiles at 355 and 532nm, and depolarization profiles at 532nm and 355nm, show distinctly layered structure in the atmosphere. Along with these we used data from stations in Strzyżów and Cluj as well as information obtained from satellite imagery to describe the local and regional meteorological situation development and further characterized the aerosols properties.