Geophysical Research Abstracts
Vol. 18, EGU2016-10517-1, 2016
EGU General Assembly 2016

Atmospheric aerosol optical parameters, deep convective clouds and hail occurence – a correlation study

Camelia Talianu (1), Simona Andrei (1), Florica Toanca (1), and Sabina Stefan (2)

(1) National Institute of R-D for Optoelectronics, Laser Remote Sensing, Magurele, Romania (camelia_niv@yahoo.com), (2) University of Bucharest, Faculty of Physics, Magurele, Romania

Among the severe weather phenomena, whose frequency has increased during the past two decades, hail represents a major threat not only for agriculture but also for other economical fields.
Generally, hail are produced in deep convective clouds, developed in an unstable environment. Recent studies have emphasized that besides the state of the atmosphere, the atmospheric composition is also very important. The presence of fine aerosols in atmosphere could have a high impact on nucleation processes, initiating the occurrence of cloud droplets, ice crystals and possibly the occurrence of graupel and/or hail. The presence of aerosols in the atmosphere, correlated with specific atmospheric conditions, could be predictors of the occurrence of hail events.
The atmospheric investigation using multiwavelength Lidar systems can offer relevant information regarding the presence of aerosols, identified using their optical properties, and can distinguish between spherical and non-spherical shape, and liquid and solid phase of these aerosols.
The aim of this study is to analyse the correlations between the presence and the properties of aerosols in atmosphere, and the production of hail events in a convective environment, using extensive and intensive optical parameters computed from lidar and ceilometer aerosols measurements. From these correlations, we try to evaluate if these aerosols can be taken into consideration as predictors for hail formation.
The study has been carried out in Magurele – Romania (44.35N, 26.03E, 93m ASL) using two collocated remote sensing systems: a Raman Lidar (RALI) placed at the Romanian Atmospheric 3D Observatory and a ceilometer CL31 placed at the nearby Faculty of Physics, University of Bucharest. To evaluate the atmospheric conditions, radio sounding and satellite images were used. The period analysed was May 1st – July 15th, 2015, as the May – July period is climatologically favorable for deep convection events. Two hail events have been selected (3rd of June and 12th of June, observed directly and confirmed by radio sounding and satellite imagery) and the detailed analysis has been done starting two days before the events.
The results obtained by the analysis of aerosols optical parameters and meteorological data showed the importance of atmospheric aerosol in convective events for hail production. More hail events are needed for a better understanding of the aerosol role in hail production.