LIDAR technique: a central puzzle piece to build an integrated observation - modeling approach for air mass aerosols concentration evaluation

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This paper presents a study of the temporal and vertical variation of mixed aerosol mass concentration near Bucharest during a dedicated observation campaign performed in summer 2012. To obtain the vertical mass concentrations profiles a combination of measured (mainly based on LIDAR technique) and modeled data was used. This method is based on the hypothesis that any mixture in the atmosphere can be described as a combination of low-depolarizing and high-depolarizing particles of a particular type. It uses the method proposed by Tesche et al. (2009), combined with forward simulations (i.e. OPAC). Based on supplementary information (e.g. preliminary assessment of aerosol source from forecast models and back trajectories) and several optical indicators (Angstrom exponent, LIDAR ratio, particle depolarization, AOD we built an approach to 2 cases of aerosol mixture, and validate the results using other information sources: sun photometry, forecasts, back trajectories. The first case was proved to be a smoke predominant layer, the second a Saharan dust predominant layer. Information from various data sources (DREAM, HYSPLIT, AERONET, MODIS) was consistent with our retrievals.