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Wavelength dependent near-range lidar profiling of smog aerosol over Athens

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Recently, the ACTRIS2 JRA1 field campaign focusing on joint remote and in-situ sensing of absorbing aerosols has been conducted in Athens (http://actris-athens.eu). In the frame of the ACTRIS2 BL-Smog TNA, co-located measurements of the near-range lidar receiver (NARLa) of the University of Warsaw with the multi-wavelength PollyXT lidar of the National Observatory of Athens were performed.
The excellent capacities of the PollyXT-NOA lidar, equipped with eight far-range channels (355, 355s, 387, 407, 532, 532s, 607, and 1064nm) and two near-range channels (532 and 607 nm), were enhanced by integrating the NARLa for simultaneous observations. By using the NARLa, equipped with the elastic channels (355 and 532nm) and Raman channels (387 and 607nm), the wavelength dependence of the aerosol particles properties within boundary layer was captured. The dominant conditions observed during the JRA1 period were the fresh winter smog layers occurring in lowermost boundary layer over Athens.
NARLa provided profiles as close to surface as 50m, thus the data obtained in the near-range were used for the incomplete overlap region of the far-field channels. With NARLa we assessed the overlap at 355 and 532nm wavelengths and concluded on the possibility of using the single near-range 532 nm channel for the overlap correction in both VIS and UV channels of the PollyXT-NOA.
As a result, the obtained lidar profiles are expected to be more consistent with the sunphotometer measurements. In the future, the GARRLiC code can be applied on the synergy of combined near and far range lidar profiles with AERONET data sets in order to study improvement on the inversion results.