

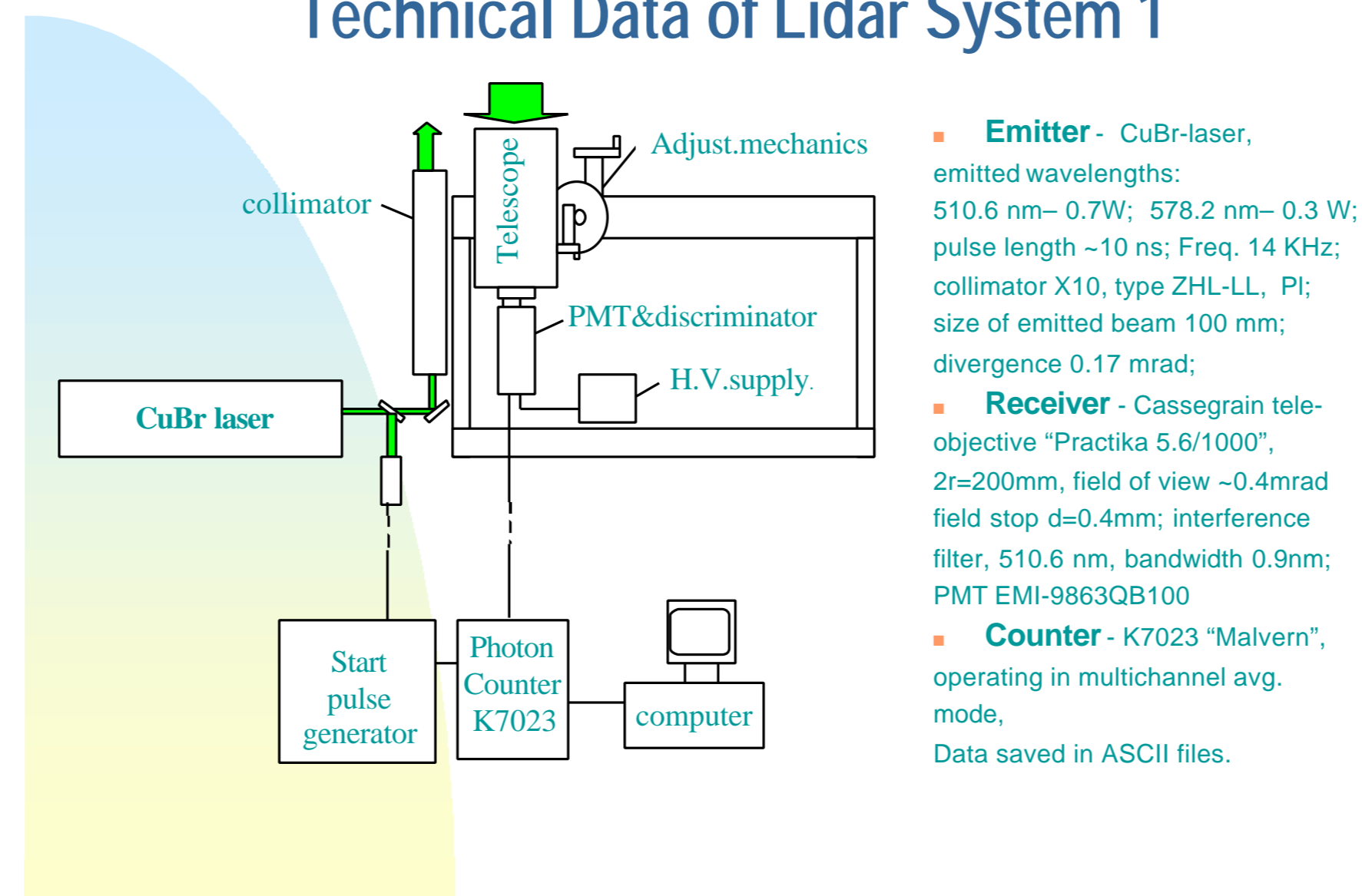
Lidar profiling of the atmospheric extinction (WP2, WP7) above the city of Sofia, Bulgaria, measured at $\lambda = 510.6$ nm by CuBr laser

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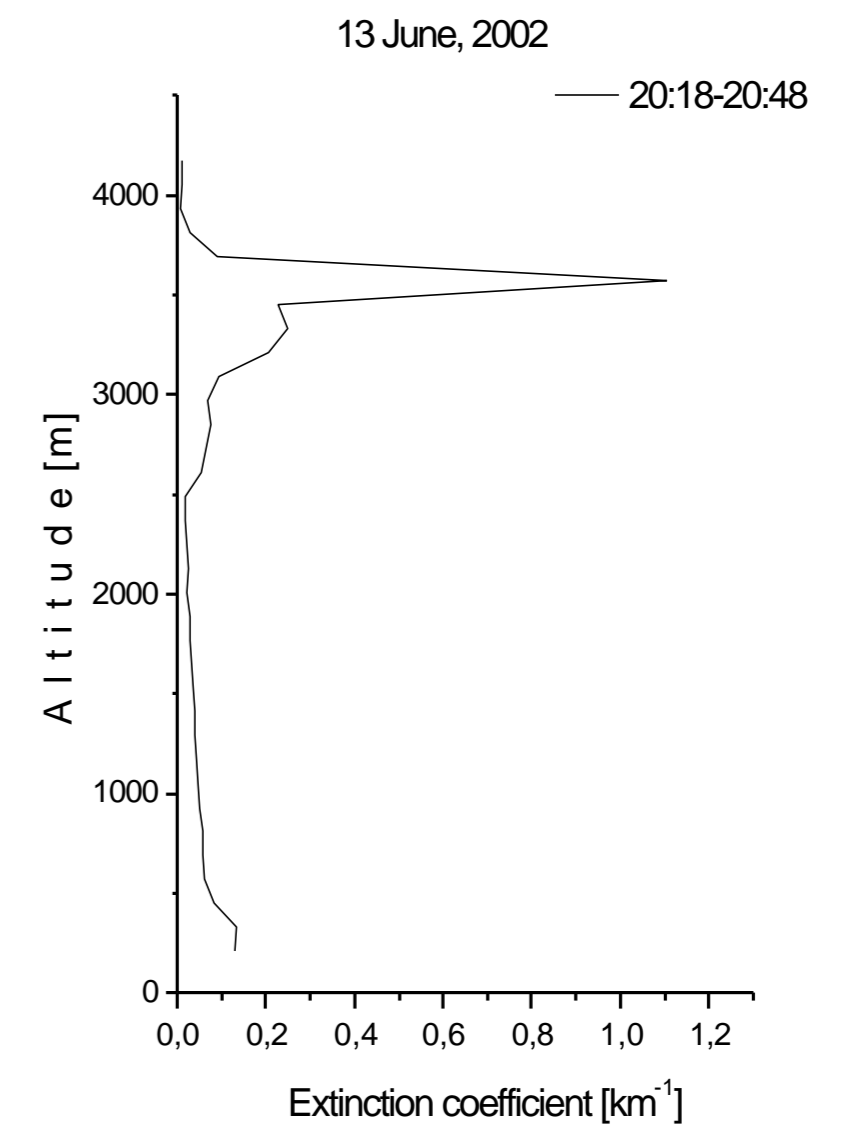
Aerosole lidar system with high repetition rate of sounding was created in 1984 in our laboratory at the Institute of Electronics BAS, Sofia. The system is working night- and daytime. One of its main advantages is the simultaneous sounding of the troposphere and stratosphere. This is realized by applying a high repetition, high mean power laser (CuBr vapor) with low pulse power combined with high sensitivity photon counting detector. The system operates without any protection of the photon detector for closer distances. The registration of one profile takes about 1 min.

The profiles of the extinction coefficient, which we calculated using the lidar signals obtained during our work on the EARLINET project, have spatial resolution of 150 m and time of averaging 30 min. The total number of profiles in the EARLINET data base is WP2 63; WP7 68. The poster shows extinction profiles typical for this type of lidars.

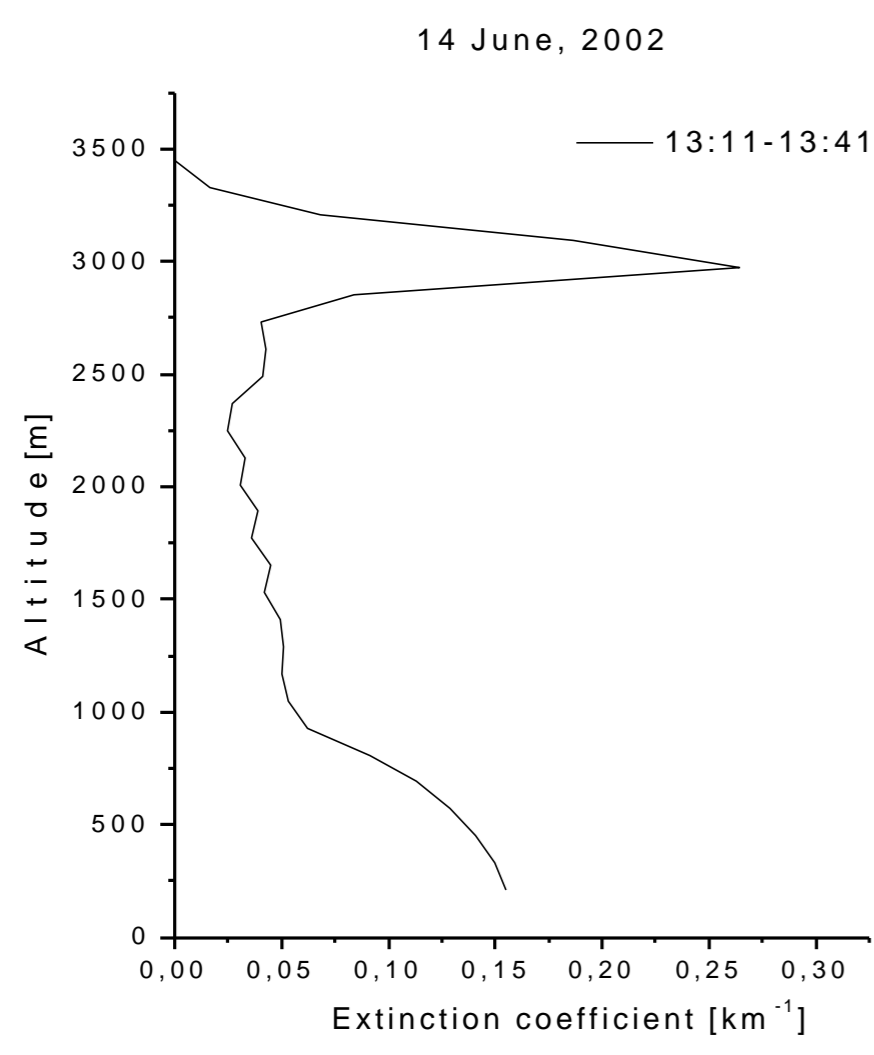
Technical Data of Lidar System 1



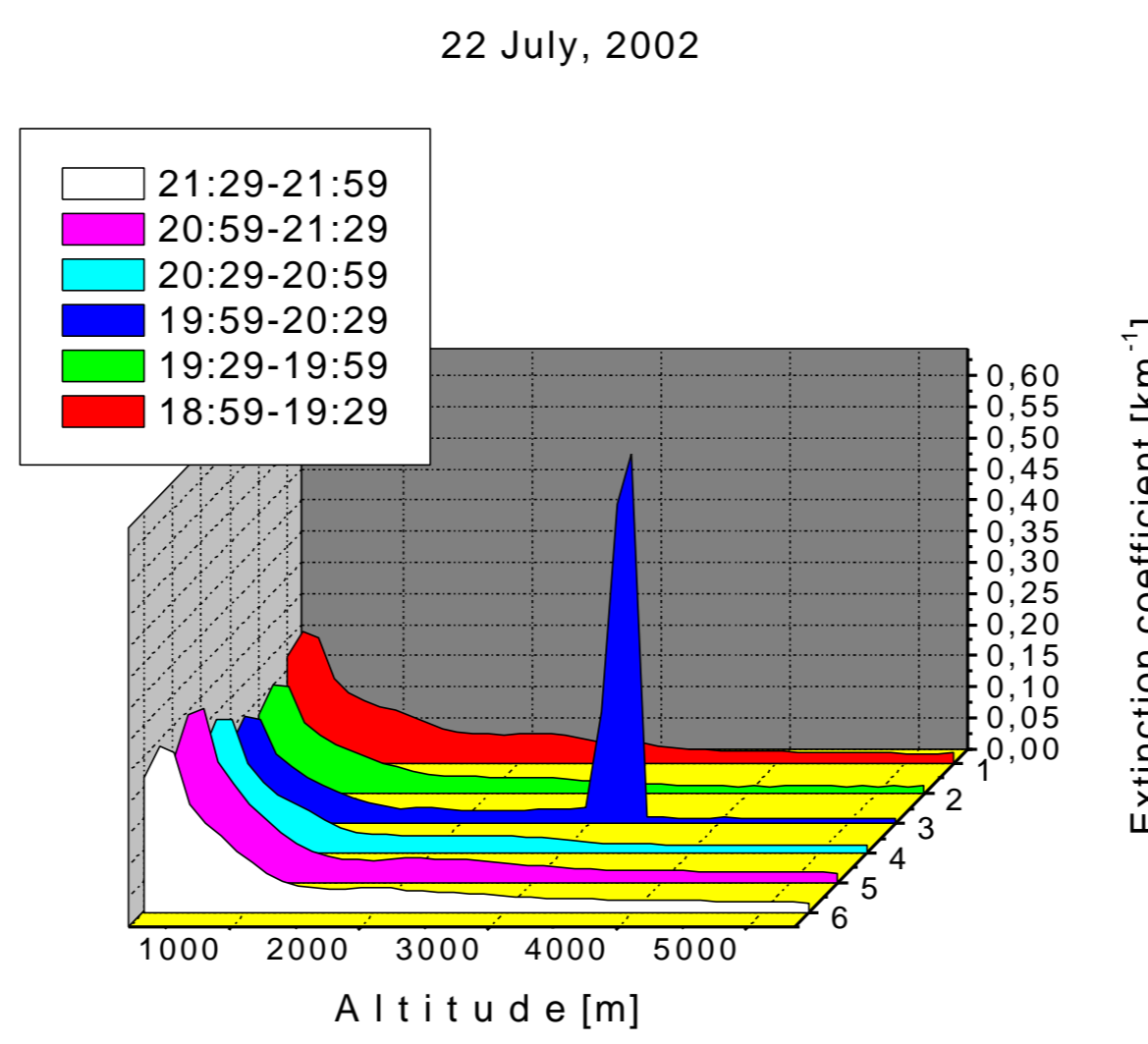
- Emitter** - CuBr-laser, emitted wavelengths: 510.6 nm- 0.7W; 578.2 nm- 0.3 W; pulse length ~10 ns; Freq. 14 KHz; collimator X10, type ZHL-LL, PI; size of emitted beam 100 mm; divergence 0.17 mrad;
- Receiver** - Cassegrain tele-objective "Practika 5.6/1000", 2r=200mm, field of view ~0.4mrad field stop d=0.4mm; interference filter, 510.6 nm, bandwidth 0.9nm; PMT EMI-9863QB100
- Counter** - K7023 "Malvern", operating in multichannel avg. mode, Data saved in ASCII files.



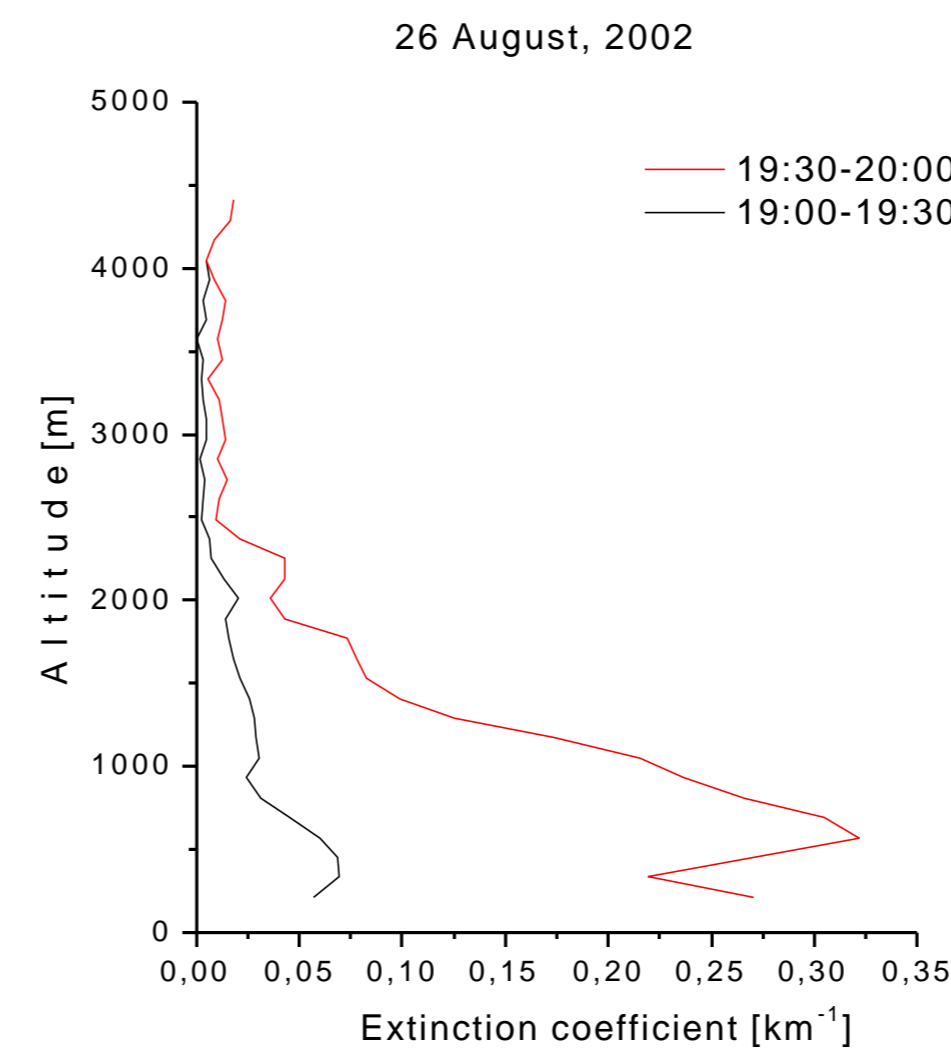
WP2: A considerable increase of the aerosol concentration inside a cloud (h = 2500 m -3500 m) is shown. Correspondingly, the signals originating from above the cloud are sharply attenuated.



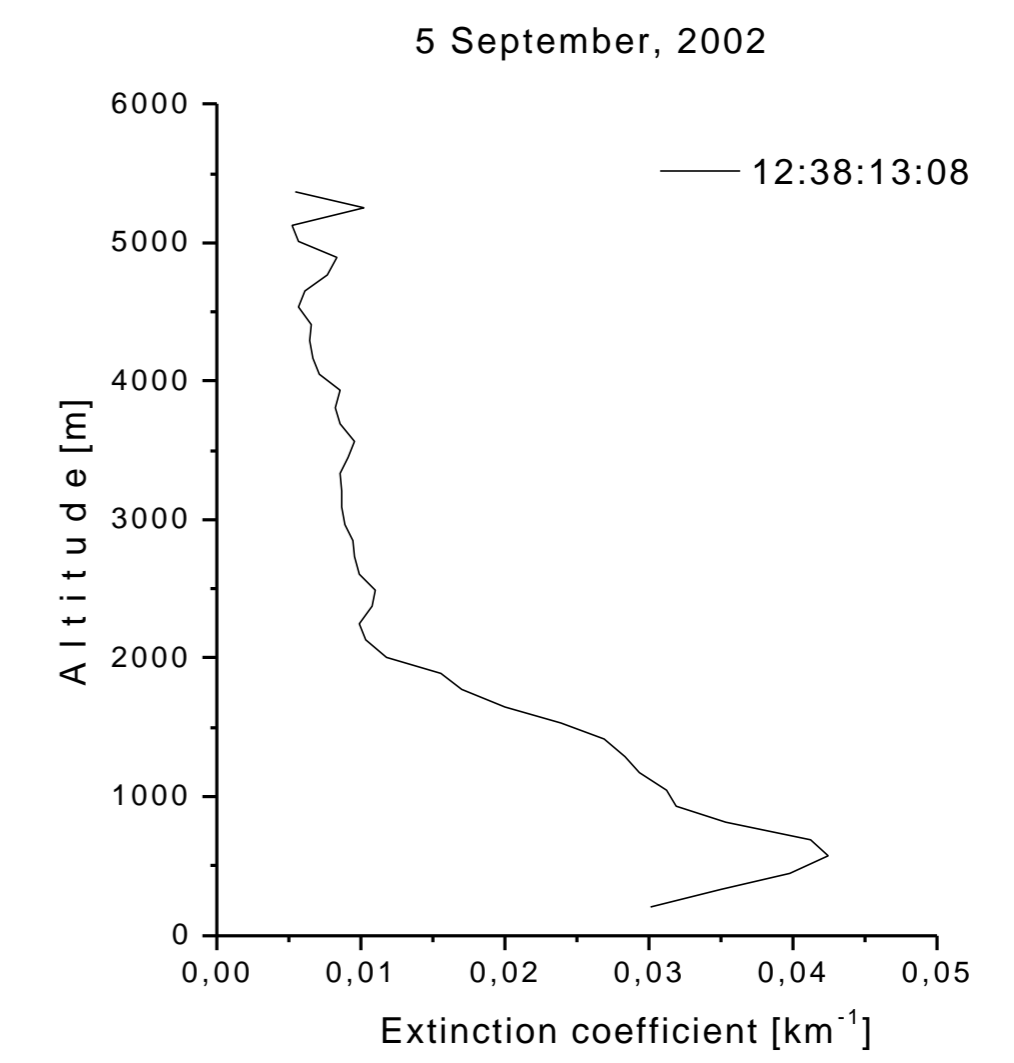
WP2: Daytime profile exhibiting steep signal attenuation caused by the cloud, similar to the one shown in the previous graph (13 June night).



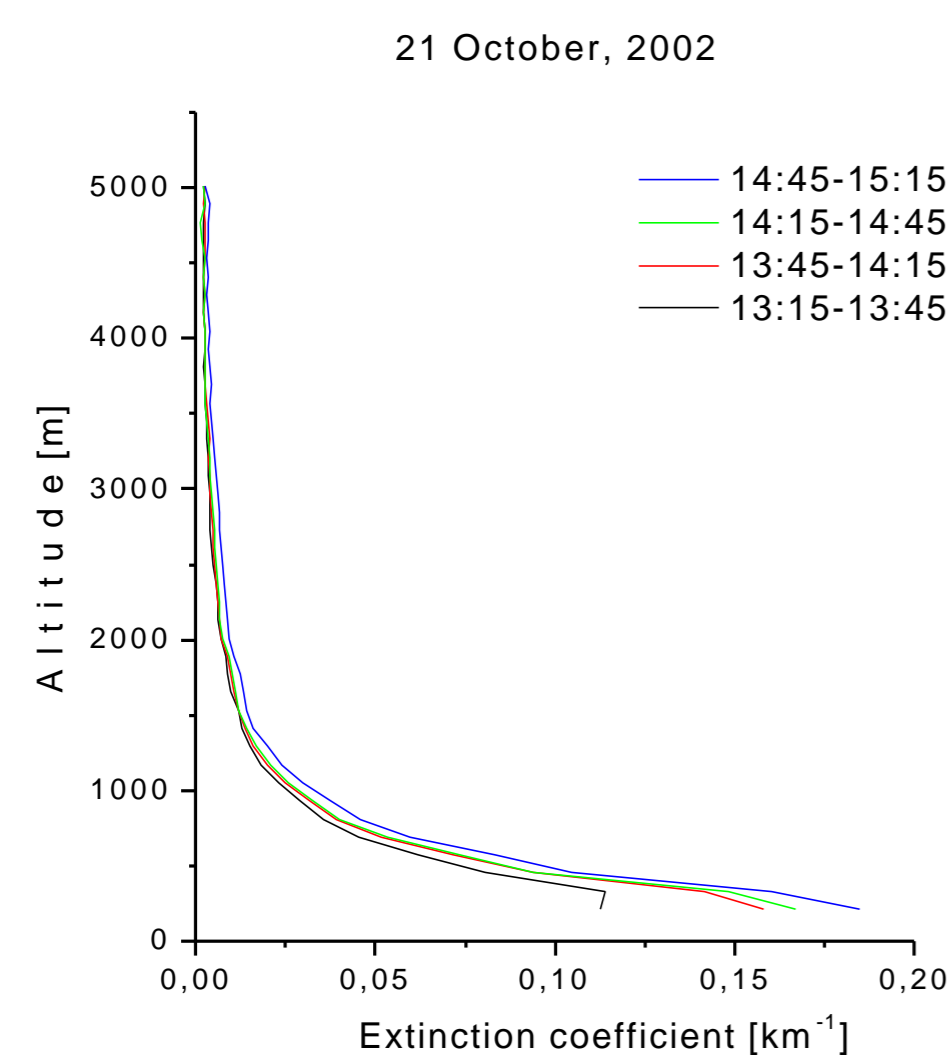
WP2: 3D-graph showing a sequence of profiles registered with an average time of 30 minutes. A cloud can be seen, appearing during one of the sessions.



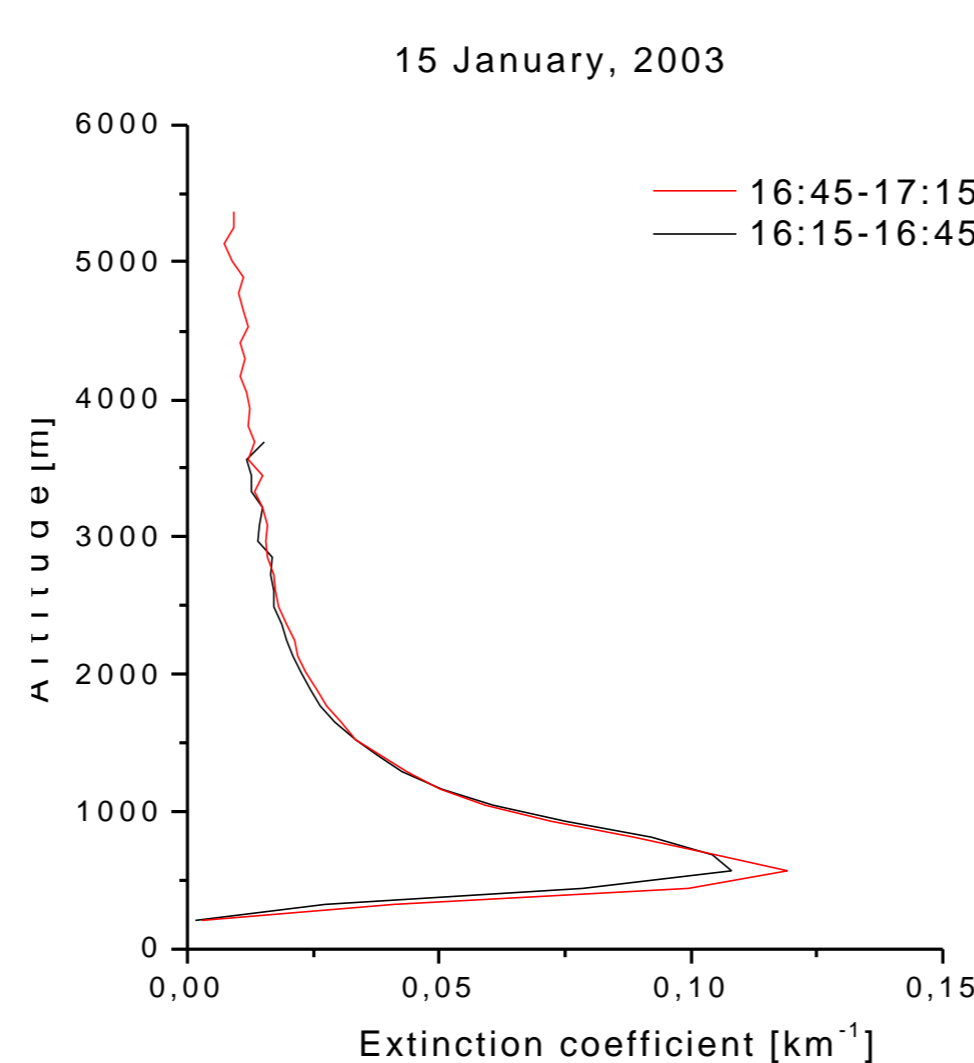
WP2: Two successively registered profiles are juxtaposed, revealing a fast 1-hour evolution of the aerosol concentration in the Planetary Boundary Layer (PBL).



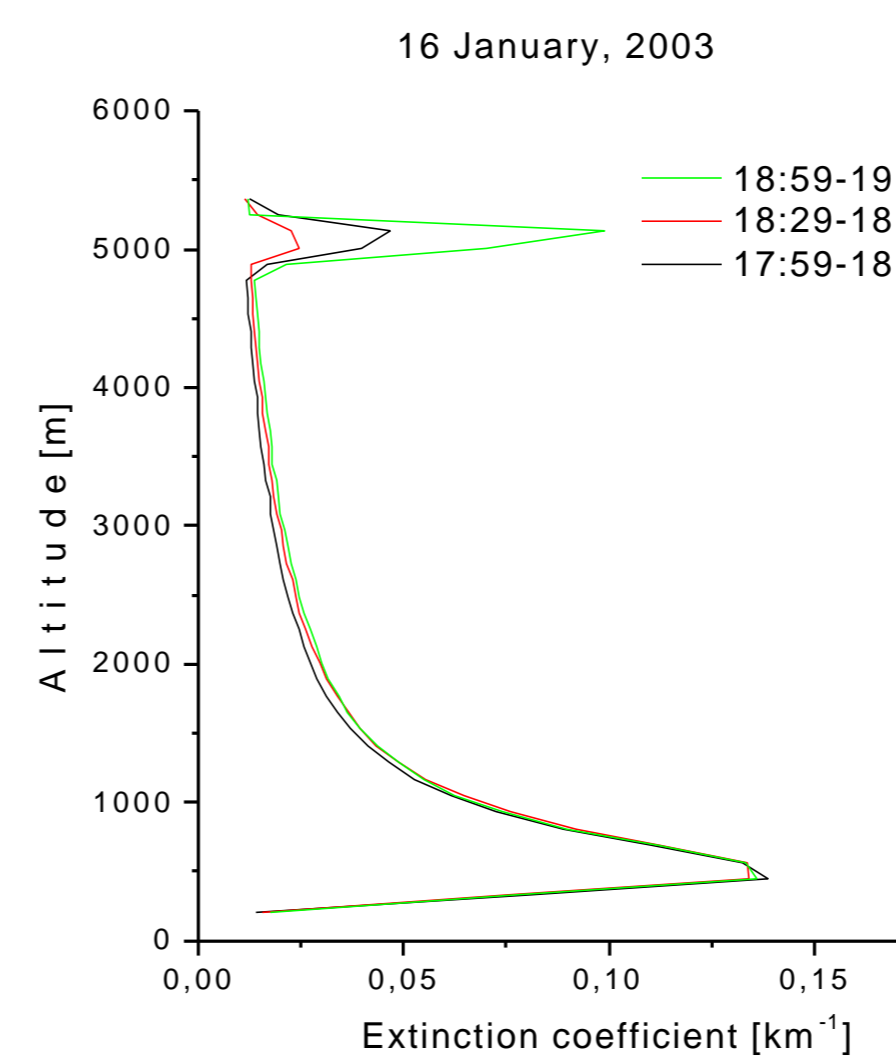
WP2: Profiles obtained by daytime sounding in clear atmosphere. Informative signals are received from altitudes of up to 5500 m.



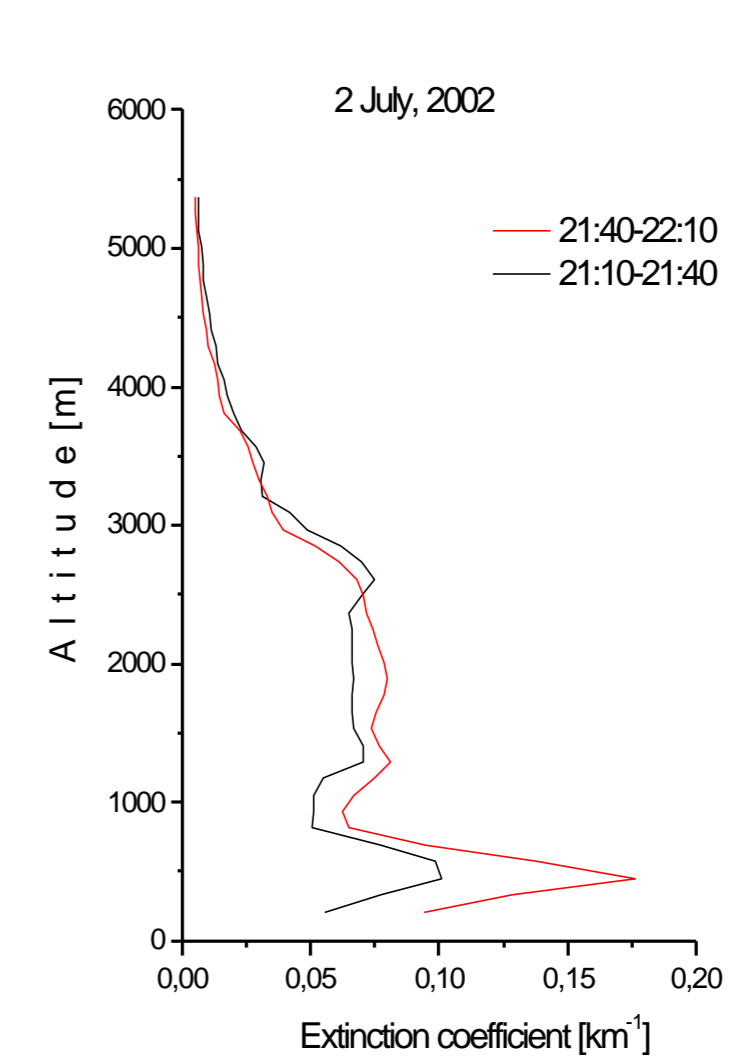
WP2: Typical daytime profiles obtained in clear atmosphere.



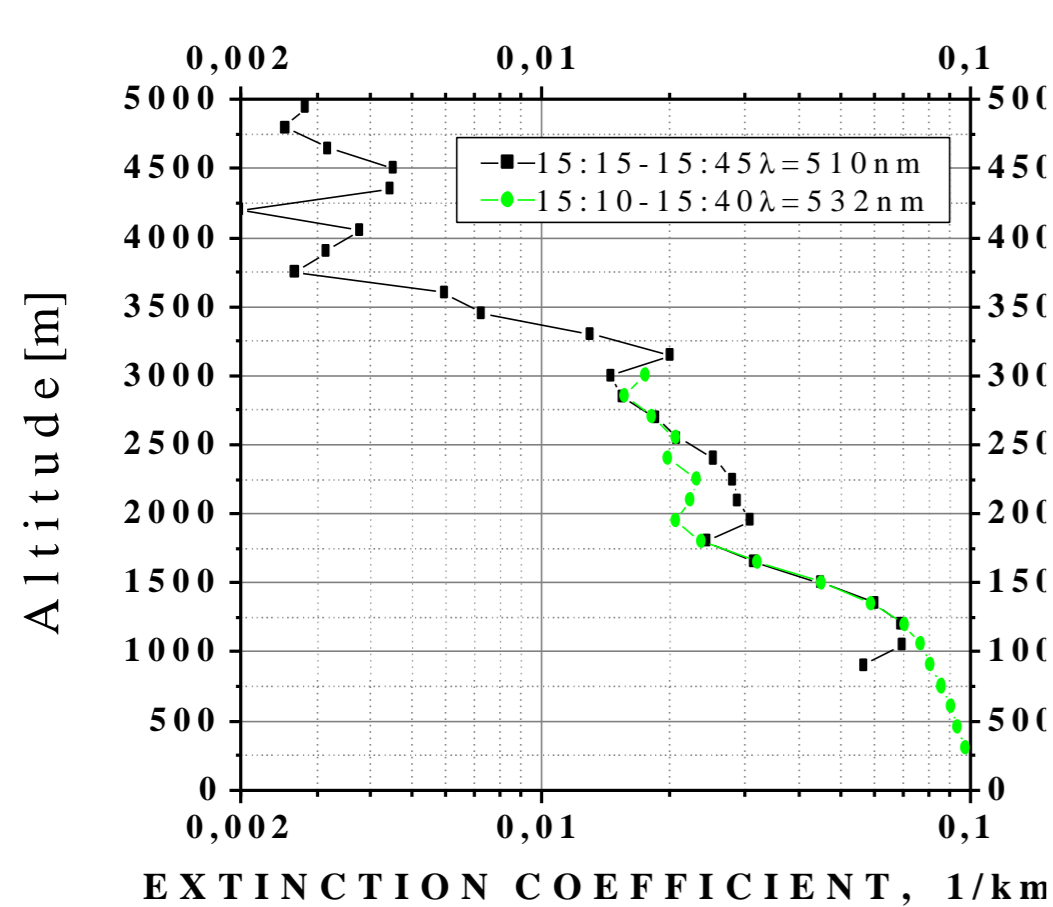
WP2: The graph shows daytime profiles with the lidar overlap function taken into account.



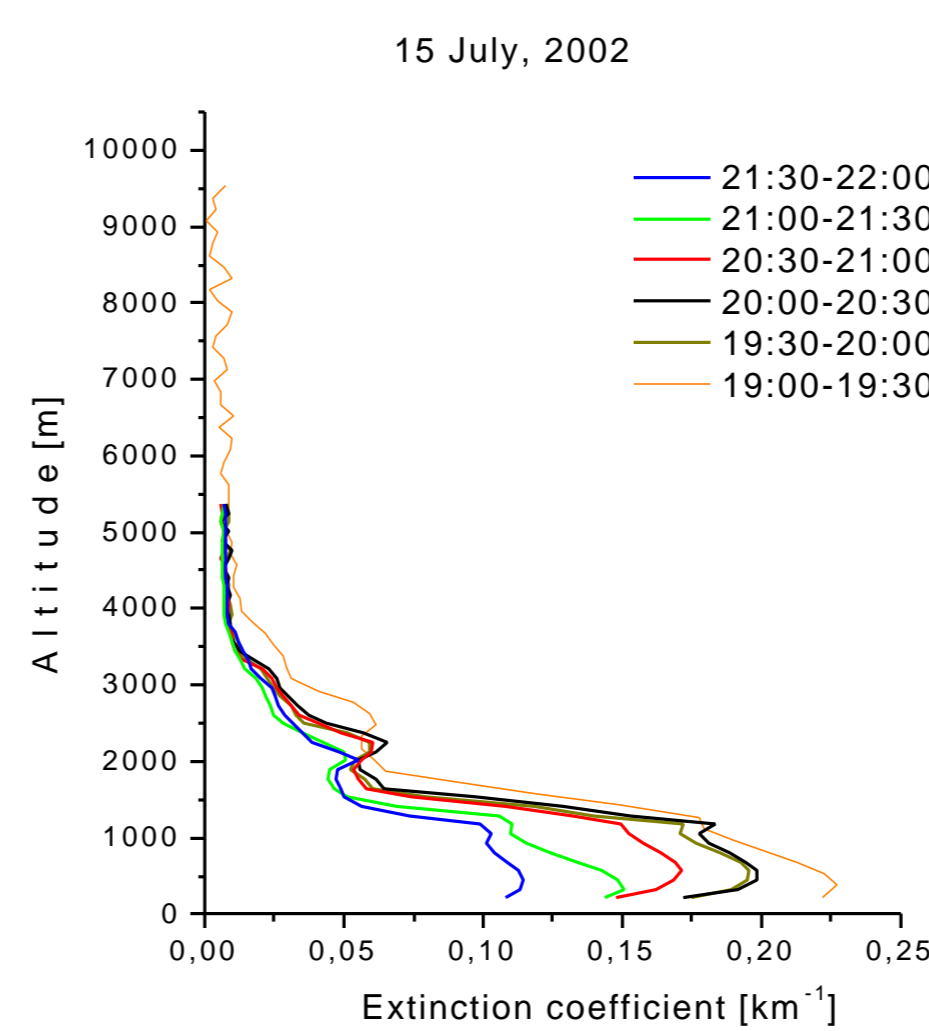
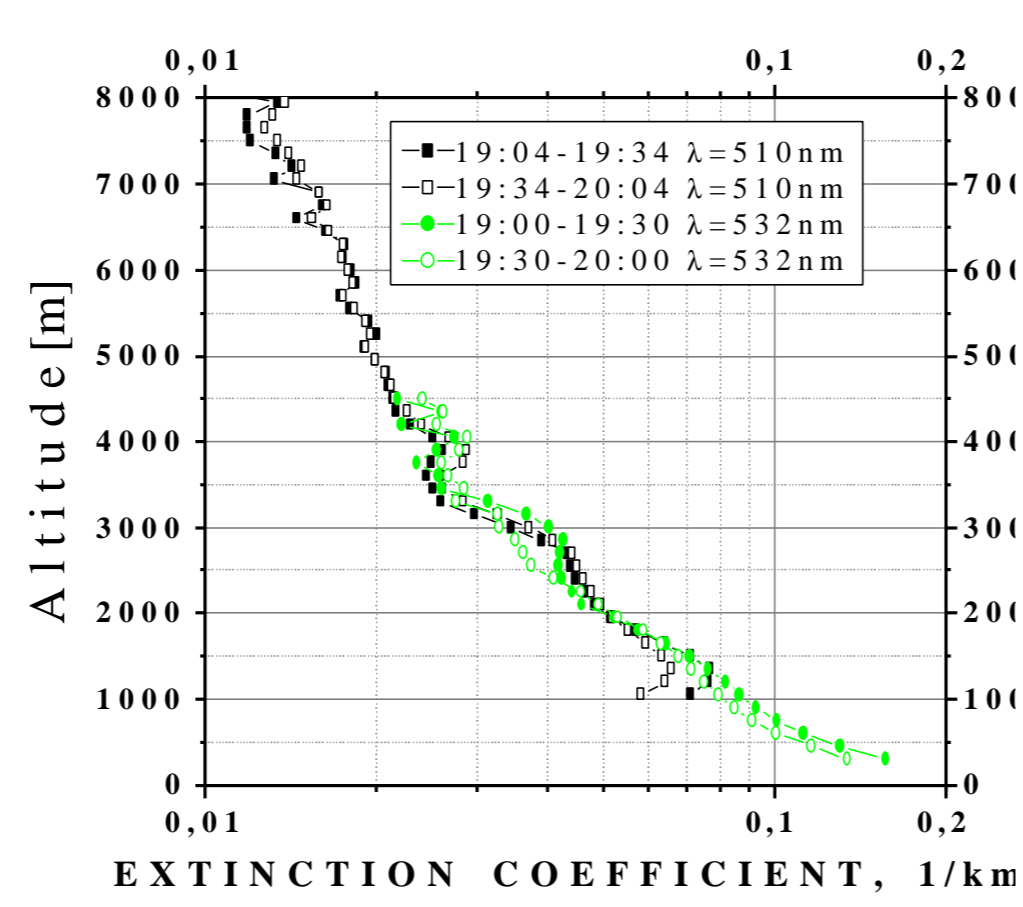
WP2: Registered cirrus clouds at an altitude of about 5000 m are shown.



WP7: These profiles are obtained at the time of a Saharan dust event.



Comparison between extinction coefficient profiles obtained by both lidar systems at wavelengths of 532 nm (Nd-YAG) and 510.6 nm (CuBr).



WP7: An aerosol layer located between 1800 m and 4000 m is detected during a Saharan dust event.

