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# Optimization of the lidar optical design for measurement of the aerosol extinction vertical profile.

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A lidar for aerosol monitoring with conventional optical design can provide good quality signals from several hundred meters up to tens of kilometres above the ground, but the aerosol load is mainly contained (up to 80%) in the planetary boundary layer that can have a height of the order of hundreds of meters. Therefore, the measurement of the complete aerosol extinction profile is generally a very difficult challenge.

In this paper, we studied different optical designs of Lidar systems by using ray tracing tools. Different vertical profiles of the overlap function have been obtained for different telescopes and optical schemes, showing that a lidar with an optimized optical design is able of producing signals starting from a few tens of meters above the ground. The overlap profiles obtained by ray tracing simulation and the one from an optimized lidar were also compared and verified.

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