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Mie Lidar for Aerosols and Clouds Monitoring at Otlica Observatory

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Aerosol and cloud densities are the most important atmospheric parameters, which significantly influence the atmospheric conditions. The study of their spatial and temporal properties can provide detailed information about the transport processes of the air masses.

In recent years, lidar techniques for remote sensing of the atmospheric parameters have been greatly improved. Like the lidar systems of the Pierre Auger Observatory in Argentina (35.2S, 69.1W, 1400 m a.s.l.), the Mie lidar built at Otlica Observatory (45.93N, 13.91E, 945 m a.s.l.) in Slovenia employs the same hardware, including the transmitter, the receiver, and the DAQ system. Due to its high-power laser, large-diameter telescope, and photon-counting data-acquisition technique, the Mie lidar has the potential ability to measure the tropospheric and stratospheric atmospheric conditions, and is suitable for monitoring the changes of the cirrus clouds and atmospheric boundary layer.

We have been performing routine atmospheric monitoring experiments with the Otlica Mie lidar since September 2008. Using the techniques of event-averaging, noise-elimination, and data-gluing, the far end of lidar probing range is extended from 30 km up to 40 km. The extinction profiles are calculated using the Klett method and the time-height-intensity plots were made. They clearly show the evolution of atmospheric conditions, especially the motion of the cirrus clouds above Otlica.