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Continuous and automatic measurement of atmospheric structures and aerosols optical properties with R-Man510 nitrogen Raman lidar

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A new compact and light nitrogen Raman lidar (R-Man510) has recently been developed by Leosphere company. This UV-lidar system is based on a low energy diode pumped Nd:YAG laser at 355 nm and has been developed to be operated unmanly for the meteorological and airport needs. Measurements are typically performed with a vertical resolution between 15 and 60 m and a temporal resolution between 30 seconds (for elastic channel) and 10 minutes (for Raman channel). The elastic channel of the lidar is used to automatically detect up to 9 atmospheric structures (Plantery Boundary Layer height, aerosol and cloud layers) in quasi real-time. Aerosols are classified in 6 types (pollution aerosols, desert dusts, volcanic ashes, marine aerosols, biomass burning and no aerosols) considering informations on depolarization ratio determined with the two cross-polarized elastic channels and on aerosols optical properties (extinction-to-backscatter ratio, aerosol backscatter and extinction coefficients) determined thanks to the nitrogen Raman channel at 387 nm. Aerosols optical properties can then been used for the assessment of mass concentrations which is crucial in case of hypothetical volcanic eruption.
We will present the first results obtained with this new commercial lidar system. Daytime and nighttime performances of the system will be analyzed and compared with simulations from an instrumental model.