

## Analysis of 8-year of multi-wavelength Raman-polarization lidar observations at ATOLL observatory, Hauts-de-France

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Lidar observations provide valuable results for the study of aerosols and clouds in the atmosphere. A multi-wavelength Mie-Raman-polarization lidar—LILAS, at ATOLL station (Lille, France) has been operated since 2014, in the frame of EARLINET. With years of development, LILAS system [1] now provides, in the frame of ACTRIS, with minor human interventions (or with a high level of automation), the profiles of 3 backscatter coefficients, 2 extinction coefficients, 3 depolarization ratios, water vapor mixing ratio and aerosol fluorescence. In this study, we analyze the observations and the statistics of LILAS accumulated records from 2014 to 2022. The number of observations increased from about 200 hours per year in 2014 to 2600 hours per year in 2022. Lidar measurements are hourly averaged and screened out of clouds. The aerosol optical properties are computed with the AUSTRAL server [2], developed at LOA, University of Lille. The results consist of hourly planetary boundary height, profiles of extinction and backscatter coefficients, lidar ratios and particle depolarization ratios in the height range of 0-10 km. This dataset, along with the collocated AERONET observations, reveals the multiannual trend of aerosol, especially the vertical distributions, in the north of France and contribute to the validation of model simulations, as well as satellite observation retrievals.

**Keywords:** aerosol, trends, lidar, vertical profiles

### References

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[https://www.researchgate.net/publication/362155848\\_AUSTRAL\\_User's\\_Guide\\_AUtomated\\_Server\\_for\\_the\\_Treatment\\_of\\_Atmospheric\\_Lidars](https://www.researchgate.net/publication/362155848_AUSTRAL_User's_Guide_AUtomated_Server_for_the_Treatment_of_Atmospheric_Lidars)