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- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

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Submission

Review

Production

Subscription

Comment on a Paper

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[Volumes and Issues](#) [Contents of Issue 2](#)

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The vertical distribution of aerosols, Saharan dust and cirrus clouds in Rome (Italy) in the year 2001

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Abstract. A set of 813 lidar profiles of tropospheric aerosol and cirrus clouds extinction and depolarization observed in Rome, Italy, between February 2001 and February 2002 is analyzed and discussed. The yearly record reveals a meaningful contribution of both cirrus clouds (38%) and Saharan dust (12%) to the total optical thickness (OT) of 0.26, at 532nm. Seasonal analysis shows the planetary boundary layer (PBL) aerosols to be confined below 2km in winter and 3.8km in summer, with relevant OT shifting from 0.08 to 0.16, respectively. Cirrus clouds maximise in spring and autumn, in both cases with average OT similar to the PBL aerosols one. With the exception of winter months, Saharan dust is found to represent an important third layer mostly residing between PBL aerosols and cirrus clouds, with yearly average OT \approx 0.03. Saharan dust and cirrus clouds were detected in 20% and in 45% of the observational days, respectively. Validation of the lidar OT retrievals against collocated sunphotometer observations show very good agreement. These results represent one of the few yearly records of tropospheric aerosol vertical profiles available in the literature.

[Final Revised Paper](#) (PDF, 737 KB) [Discussion Paper](#) (ACPD)

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