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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Transport of aerosols over the French Riviera – Link between ground-based lidar and spaceborne observations" *by* Patrick Chazette et al.

Anonymous Referee #2

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This work focuses on analyzing the vertical aerosol structure in the troposphere on the westen part of the French Riviera. In particular, the authors used a backscatter N2-Raman lidar to investigate the different aerosol properties in the boundary layer and free troposphere according the different aerosol transport patterns and source origins. In addition, satellite measurements from SEVIRI, MODIS and CALIPSO are also used to study the spacial extent of these vertical structures and properties. In cases of dust transport in the free troposphere, the authors obtain marked differences in the aerosol properties between the free troposphere and boundary layer. On the contrary, these vertical diferences are notably reduced in cases of transport of pollution particles in the free troposphere. The aim of this work, the measurements and methodology used is

an interesting approach that reveals the complexity of aerosol vertical structures in the Western Mediterranean. This should be better studied and paramatrized to improve the operational weather and air quality forecasting. In addition, the paper is well written and structured. Therefore I think it is suitable for publication in ACP.

Specific comments: P5-L9: is this native vertical sampling correct? P5-L15-L22: The two layer inversion method should be explained with more detail, since is one the novelties of the paper. P13-L22: I do not understand so well the word "supply" within the sentence "...the Sahara can supply the western Mediterranean coast.". Maybe you can change it by "reach". P17-L11: When the authors assert "The endpoints of the back trajectories are defined using the lidar profiles in Figures 2 or 3", are the endpoints of the backtrajectories referred to different altitudes or different spatial locations? please, add a comment on that. P18-L9: Can the authors add a refference justifing the sentence "..excluding desert dust 10 episodes, MODIS observations often show AOT values above 0.6 in the south of Murcia during summertime". P22-L23: Have the authors inverted the CALIOP profiles from the level 1 data? If so, pleasy especify it. If not, what inversion do the authors refer to in the sentence "The CALIOP profiles are inverted with BER values..."?

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