

## ***Interactive comment on “Aerosol classification from airborne HSRL and comparisons with the CALIPSO vertical feature mask” by S. P. Burton et al.***

**Anonymous Referee #1**

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### GENERAL

The authors compare aerosol classification products derived from airborne HSRL measurements with those of the CALIPSO Level 1 Vertical Feature Mask. Whereas the HSRL classification is derived solely from direct measurements of intensive aerosol parameters, the CALIPSO scheme is based on a relatively simple decision tree using Level 1 lidar data and location information, since the classification is needed early in the evaluation procedure in order to select appropriate lidar ratios needed as input for the Level 2 data retrievals. Therefore, the validation of the CALIPSO aerosol classification scheme is of high importance. The authors discuss in detail for which cases

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the CALIPSO typing works well and under which conditions it may fail. Case studies as well as statistical findings from more than 100 underflights of the satellite are provided. Furthermore, suggestions for improvements of the CALIPSO typing scheme are discussed.

The work is carefully performed and gives a very good insight into the complex problems of aerosol typing from limited information content. I have only a few minor comments which should be considered in a revised version of the manuscript.

### MINOR COMMENTS

Page 1818, lines 16-19: “fine aerosol types” – actually the CALIPSO clean continental type does not represent a “fine aerosol”, but is rather dominated by coarse particles; it has the largest effective radius of all CALIPSO aerosol types; this is also reflected in the relatively small lidar ratios (see e.g. size distributions given by Omar et al., 2009).

Page 1819, lines 8-9: “. . .comparison with. . .with”; please check formulation!

Page 1825, discussion related to smoke: This discussion is not fully convincing, since optical properties of smoke do not only depend on age, but also on type of fire (smoldering vs. flaming); please add some discussion here!

I have the impression that there are several abbreviations in the paper which are not explained. Please check!

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 1815, 2013.

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