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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol optical properties at Lampedusa (Central Mediterranean) – 1.Influence of transport and identification of different aerosol types" *by* G. Pace et al.

G. Pace et al.

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COMMENT: Page 4933, lines 22-23. What is the influence of the changed averaging interval in the data analysis? I suppose that cloud contamination is more problematic for a long averaging time, therefore those data should have larger uncertainties.

ANSWER: As reported in the text (Page 4935 line 3-7), cloudy periods were removed before calculating the mean value over the solar zenith angle interval of ś2.5°. However, as pointed out by the referee, residual cloud contaminations can still occur, especially when longer averaging time is used. The further screening based on the empirical threshold on the aerosol optical depth per cent error (Dt%M) results to be particularly

efficient in these cases (see page 4935 line 27-28 and page 4936 line 1-10). We feel that this two-step cloud screening is robust, and cloud-contaminated data are efficiently removed also from averages over long intervals. As discussed on page 4935 lines 21-24, larger uncertainties are assumed when a single value is available the solar zenith angle interval.

COMMENT: Page 4939, lines 25 onwards. "For this reason, we developed a different method to identify the aerosol source sector. We assume that the aerosol is confined to the boundary layer at the source location, and we look for regions along the trajectory where the airmass interacts with the boundary layer. We assume that aerosol is loaded when the airmass altitude, zair, is lower or close to the altitude of the mixed layer, zmxl (entrainment condition); we apply the condition (zair-zmxl)$<$500 m. The geographical sector where this condition is met along the trajectory is identified as the source of the observed aerosol. The region around Lampedusa (latitude and longitude around the island) is excluded from the search. If the entrainment condition is met at more than one point, we choose the geographical position where the difference (zair-zmxl) is lower (sign included). Both the airmass and mixed layer altitudes are supplied by the Hysplit dispersion model" It could happen that the (zair-zmxl) is lower at sector A than at sector B, but for a shorter lapse of time. In this case, at which sector would the airmass be assigned?

ANSWER: We choose the minimum value of zair-zmxl, independently of the lapse of time. In the suggested case the air mass would be assigned to sector A.

COMMENT: Other comments: 1) If possible, I would suggest expanding the comparison to aerosol optical depth data collected in the western Mediterranean.

ANSWER: To our knowledge, there are few studies on multi-year measurements of columnar aerosol optical properties in the Western Mediterranean. Reference to measurements in Spain by Cachorro et al. (2000) was added.

COMMENT: 2) Finally, I would suggest that section 4 is renamed into "Column load

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and aerosol types" instead that "Optical properties and aerosol types"

ANSWER: The text was changed as suggested.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4929, 2005.