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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol sources and their contribution to the chemical composition of aerosols in the Eastern Mediterranean Sea during summertime" *by* J. Sciare et al.

Anonymous Referee #1

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Overall the paper presents a concise analysis of aerosol chemical composition measurements during a month long field campaign on the island of Crete. The measurements are placed in the context of a trajectory analysis to identify major aerosol sources to the region. A source-receptor model using the air mass trajectories was used to determine the contribution of different regions to the measured concentrations of sulfate and BC. The source regions were found to be in qualitative agreement with EMEP emission inventories. In addition, the paper includes many references to previous results such that the conclusions from this analysis are strengthened. My only issue with the paper is a lack of detail on methodology. Specific issues are outlined below.

1) p. 1292: For a short time during the campaign SO2 concentrations measured with

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filter packs and with the mist chamber were compared. It is stated that the comparison resulted in a slope of 1.13. Which technique gave the higher values?

2) p.1292: What particle size range was sampled with the low volume impactor?

3) p. 1293: A PSAP was used to approximate BC concentrations. Were values of the absorption coefficient determined with the PSAP corrected for a scattering artifact and the size of the deposit spot as per Bond et al. 1999? Given the amount of sea salt and dust present, the scattering artifact could have been significant.

4) p. 1293: As the authors state, use of the absorption coefficient to derive BC concentrations can result in a high level of uncertainty. Recent field campaigns focused on measuring aerosol optical properties and chemical composition (e.g., INDOEX and ACE Asia) have reported mass absorption efficiencies (MAE) ranging from 8 to 20 m2/g. The uncertainty of the BC concentrations presented here should be presented. This could be done by assuming a range of MAE and propagating that through the calculation of BC. This should then be applied to the reported BC/nss SO4 ratios.

5) p. 1294: At the first mention of the measured BC/nss SO4 ratios, the ratios should be reported - both the stable value and the high values during the dusty periods.

6) p. 1296: It is stated that the "great proximity of Turkey compared to Algeria, as well as the difference in altitude in the transport of the dust...." What was this altitude? Based on what? The trajectories appear to only have been calculated for the 500 m height.

7) p. 1298: The MSA/nss SO4 ratio - temperature relationship (Bates et al., 1992) is also a function of particle size. Again - what was the size range of the particles sampled in this study?

8) p. 1298: The BC/nss SO4 ratio averages around 10% in many regions (as measured during ACE 2, INDOEX, and ACE Asia). Perhaps the more appropriate question is why are the models using such a high ratio?

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Interactive comment on Atmos. Chem. Phys. Discuss., 2, 1287, 2002.