

Interactive comment on “Variability of aerosol optical properties in the Western Mediterranean Basin” by M. Pandolfi et al.

Anonymous Referee #1

Received and published: 3 July 2011

General comments:

The manuscript presents aerosol scattering and absorption coefficients and the derived quantities single scattering albedo and Angstrom scattering exponents. Also PM masses were measured and a mass specific absorption coefficient was derived. The variability of optical properties was related to the origin of air masses.

The manuscript is well written and structured. The reviewer recommends the manuscript for publication.

Specific comments:

The authors state to explain the variability in aerosol optical properties by the origin and ageing of air masses (Page 14902 line 21). The reviewer thinks that the effects of aging

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on aerosol properties were not discussed sufficiently. The authors should discuss the aerosol aging alongside with mass specific absorption coefficients and aerosol mixing state. In chapter 2.3 the mass specific absorption coefficient was determined to be 10.4 m²/g. Is there a dependence of the mass absorption coefficient on the origin of the air mass?

Page 14092 line 7: MAAP does not measure BC but absorption coefficient.

Page 14042 line 14: The manuscript is not accessible to the reviewer.

Page 14096 lines 20-22: It is not entirely clear how the correction was done. What is the result of the experimental comparison between Ecotech and TSI nephelometers?

Page 14096 lines 23-24: The heater prevents the presence of liquid particles in the nephelometers. Does it also prevent effects of hygroscopicity induced scattering enhancement of particles? The authors should discuss humidity effects and give ranges of humidity in the measurements systems.

Page 14097 line 1: MAAP measure primarily the absorption coefficients.

Page 14097 line 1: Reference must be Mueller et al. 2011

Page 14098 lines 9 to 23: The section might be misunderstood by the readers. MAAP measures absorption coefficient. The black carbon concentration calculated from MAAP is an equivalent BC concentration assuming a specific mass absorption coefficients. In that section the authors derive a mass specific absorption coefficient of 10.4 m²/g, which is more appropriate for the aerosols in the WMB. All following BC concentrations in the manuscript are linked to the absorption coefficient by this value. The reviewer suggests to consequently use the term equivalent black carbon throughout the manuscript if the values are derived from MAAP.

Line 14100 line 25: “These relatively high values. . . “ which high values ? It is not clear to what this is referring to.

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Page 14103 Line 14: Typo in “-3:-1 Mm-1”

Page 14103 line 22: “absorption” or “adsorption”

Page 14106 lines 9-12: What is the source of the increased atmospheric BC?

References: Mueller et al. 2010a has been published in 2011.

Table 1: Is the statistics based on the hourly mean values? Row BC: Is that the equivalent BC? If yes, it should be noted that it was calculated from σ_{abs} using the mass absorption coefficient of 10.4 m²/g. What does the wavelength of 670 nm mean for BC? Value for maximum of BC seems to be too high?

Figure 7: (i) and (f) are the same considering the mass absorption coefficient of 10.4 m²/g.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 14091, 2011.