A ten-year record of aerosol optical properties at SMEAR II – Supplementary material

Krista Luoma[1], Aki Virkkula[1,2], Pasi Aalto[1], Tuukka Petäjä[1], Markku Kulmala[1]

[1]Institute for Atmospheric and Earth System Research, University of Helsinki, Helsinki, 00014, Finland
[2]Finnish Meteorological Institute, Helsinki, 00560, Finland

Correspondence to: Krista Luoma (krista.q.luoma@helsinki.fi), Aki Virkkula (aki.virkkula@fmi.fi)

Diurnal variation

Since the SMEAR II station is located in a rather remote area, we did not expect to see any strong diurnal variation that could be caused by anthropogenic activities. In the article we presented the diurnal variation of σ_{sca}, σ_{abs} and ω_0, since they had the most clear variation. The diurnal variation of all the PM10 AOPs are presented in Fig. S1 separated by different seasons. The diurnal variation was similar to the PM1 particles, so we do not present that separately.

The clearest diurnal variation was seen for σ_{abs}, which had an effect on ω_0 and k that can be observed in Fig. S1. For n the diurnal variation is barely visible, but it is the opposite to k. For the size depended properties b and α_{sca}, there is no daily variation whatsoever. For the α_{abs}, there is no variation during the winter, but during other seasons, the α_{abs} experiences a small decrease during the daytime. The variation of the α_{abs} is strongest during the summer and during the other seasons the variation is rather small. In the summer, there is more organic material present that can condensate on BC particles and thus cause variation in the α_{abs}.
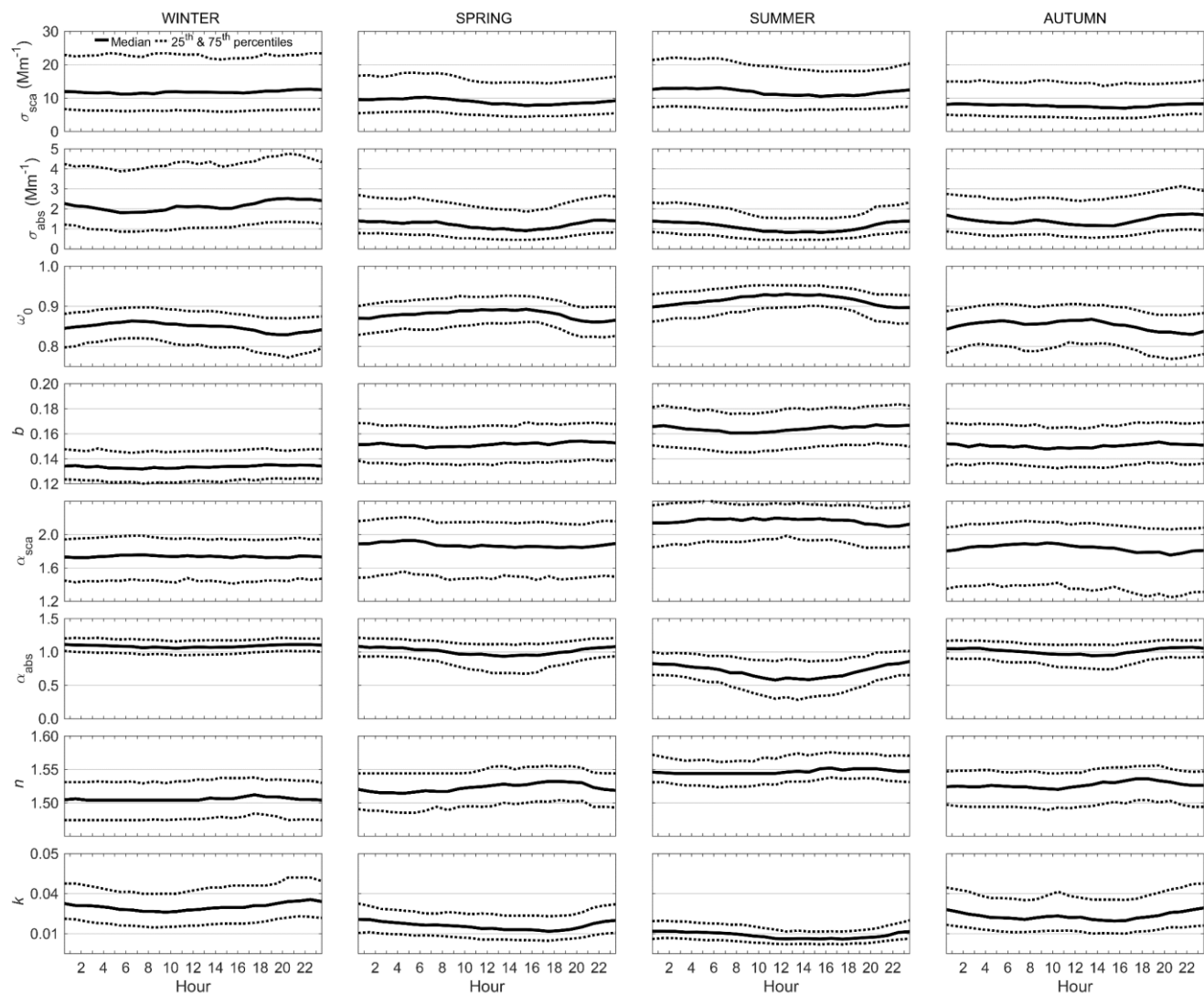
Figure S1: Diurnal variation of different optical properties for different seasons for PM10 particles. The solid black line represents the median value and the dashed lines are the 25th and 75th percentiles.